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ARMY AL&T

Joint Programs and Interoperability

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FEATURES

DEPARTMENTS

COVER

Interoperability requirements are now considered in virtually every systems development program, and each Service acquisition executive coordinates efforts to ensure these requirements are met.

ACHIEVING INTEROPERABILITY THROUGH INTERNATIONAL COOPERATIVE PROGRAMS

BG John W. Holly

Sri Lanka, 2017

In the wake of flaring hostilities in the decades-old conflict between Sri Lankan forces and Tamil Tigers, U.N. observers found themselves swept unexpectedly into the fray. The multinational force is composed of observers from the United Kingdom (U.K.) and several African countries. Their only offensive weapon capable of halting the belligerents' armor formations was the U.K.'s limited number of WAH-64D Apache Longbow helicopters. The U.K. version of this nearly 20-year-old attack helicopter was limited in employment because of the island country's monsoon season. Fortunately, they did have a large stock of U.S.- and U.K.-developed Common Missiles.

In less than 72 hours, a brigade of U.S. forces equipped with Future Combat Systems (FCS) and RAH-66 Comanche helicopters was deployed by C-130s to the small airstrip still controlled by the U.N. forces. Employing the U.K.'s stock of Common Missiles on the FCS and Comanche, the U.S. brigade was able to separate the warring factions and re-establish peace. The U.S. brigade will remain in Sri Lanka for another 30 days to assist in reparations of the damage caused by the monsoons and warring factions. The U.N. forces will have their Common Missiles and other supplies replenished by the Carrier Group's Marine Expeditionary Force, which will be leaving the Indian Ocean within a week.

Introduction

While the above is a fictional account of a futuristic event, it highlights the great potential gained by a fully interoperable weapon system—the Common Missile—developed in an international cooperative program. Interoperability such as that described previously, decreased national armament budgets, access to offshore technological expertise, and a shrinking Defense industrial base all contribute to creating an environment that requires international cooperative programs. However, regardless of how well cooperative programs appear at a philosophical level, the real challenge is whether they can be successful.

Structure For Success

Within the United States, interoperability is a key performance parameter. The best way to ensure interoperability is through a joint or an international program with a key ally. However, the single most critical aspect of a joint or an international program is a common need. Partners must possess an operational requirement that is sufficiently similar to allow for a common solution. While the overarching requirement is essential, the "devil lies in the details." The ability to clearly harmonize the operational requirements is paramount to a successful and affordable program. This is accomplished by a set of clearly delineated processes for development with other Services (e.g., Joint Requirements Oversight Council or Joint Operational Requirements Documents). However, with an international cooperative program, the processes are tailored to suit the partner nations, their industries, and the system being developed.

An international cooperative program must first support the national policy of the partners. Without a

Common Missile Factoids: The Real Program

- Cooperative Program: United States-United Kingdom
- Joint Program: Army, Navy, Marines
- Replaces Aging Hellfire and Tube-launched, Optically-tracked, Wire-guided Fleet
- Objective Missile for Comanche—Candidate for FCS
- Time-Phased Operational Requirements Document and Evolutionary Acquisition Strategy
- PDRR FY01-03, Development FY04-07, Production FY08-20
- Competition Throughout Life Cycle
- Concurrent Production and Planned Technology Insertion
- Army Requirement: ~73,000 Missiles

Lessons Learned From Other Programs

• There must be strong and dedicated support both financially and politically throughout the lifetime of the program by all parties' governments.

• Common and agreed-to program goals must be present from initiation to completion.

• Senior-empowered managers from all partners must be involved and committed to success.

• Limiting the number of partners diminishes decisionmaking and coordination difficulties.

• Work share and cost share cannot always be met—flexibility within acceptable standards must be understood—industry is best suited to realistically address work share.

• Technology transfer and export licensing, as well as language and cultural differences, are issues that must be anticipated and addressed. They can be overcome and should not be considered impediments to program success.

• Trust, honesty, and speaking with "one voice" results in no surprises and often leads to achieving milestones.

clear-cut, national strategic interest in a teaming relationship and a long-term commitment, any initiative is doomed to failure. Given this prerequisite, successful programs result from establishing the partnership from the beginning. This allows for a truly collaborative program rather than just a cooperative program. Collaboration implies that the partners jointly contribute to the solution of a common requirement, rather than merely provide financial resources. Consequently, wisely selecting a partner(s) becomes an overriding concern. But a more practical consideration also comes into play by limiting the number of partners in the program. As a senior U.K. Defence official stated recently during a conference, "International programs are like car pools … two can generally agree on arrival and departure times. Introduction of additional partners significantly complicates the entire decisionmaking apparatus."

Economic Considerations

Declining budgets, increasing costs attributable to system sophistication and complexity, and less than economic production rates underwrite international cooperation as a means for providing affordable systems to our soldiers. This affordability dynamic includes not only the associated economies of scale derived from pooling production requirements, but the synergy of leveraged technology as well.

In 1970, 20 percent of research and development (R&D) dollars invested within the United States came from DOD. In 1998, DOD's share of investment dollars had dropped to only 5 percent. The dominant position has been assumed by the commercial sector investing in R&D activities focused on profitability, not national security. While there are many benefits derived from commercial R&D activities, Defense-unique requirements remain. Sharing the financial bill and the technology benefits allows the partners to leverage technical expertise and funding availability.

Recognizing that partners will each have different approval, political, and fiscal processes is an important facet. The approval process becomes vital to program initiation. Extended negotiations can actually impact in-service dates as well as contract costs and schedules. Memorandum of Understanding agreements must be timed to ensure support by the respective financial programming, budgeting, and operational requirement processes. A simple consideration such as synchronizing funding commitments to coincide with different fiscal years is a small detail with tremendous implications. Fundamentally, the partners must understand each other's bureaucracy and adjust. Further, clear understanding of each other's national expectations must be openly established. Expectations concerning duration, commitments, schedule, financial contributions, and industrial benefits must be understood and agreed to by all parties. Essentially, the partners must listen to each other on all aspects of the program—not just listen to program supporters who tell you what you want to hear.

Successful Relationships

Many advocate that the most successful cooperative programs are conceived through industrial teaming, not by government-to-government cooperation. **I disagree**. The best cooperative programs are grounded in agreements between governments. Export controls, long-term political and fiscal commitment, and common-user requirements are best accommodated through intergovernment agreements. However, execution of a multinational action can only be accomplished by expanding the government team to include industry partners and providing industry with the freedom, flexibility, and authority to make appropriate key decisions.

Entering into a cooperative program, by default, brings an expectation of mutual benefits both on the battlefield and in the factory. While many would advocate strict work-share

"To mitigate potential protectionism and negative effects on U.S.-European defense trade, both U.S. defense industry and government have taken steps to improve transatlantic cooperation."

—GAO Report 98-6, Defense Trade

ratios, I support the approach that allows industry to negotiate the best work-share relationship. The overriding factor must be to provide the best system to our soldiers. Strict work-share ratios can create disincentives to accomplishing this most important mission.

Realistically, the prime contractor understands that a successful international program will result only through the involvement of the partner nations' industries. Production sales will certainly be influenced by the domestic content. Consequently, the contractor is in the best position to identify where the best-value approach to work allocation between countries lies, with a clear recognition that content from the partner's domestic suppliers will influence the production orders.

Security And Proprietary Considerations

One of the most difficult aspects of a cooperative program is addressing export controls. Though the United States has made significant strides in streamlining and modernizing export control procedures, the desire and **need** to protect sensitive national information remains. Ensuring that critical technologies are not compromised is essential to each partner's security and national competitiveness. Within the United States, we have streamlined government-to-government procedures, resulting in improved efficiency and reduced processing times. Additionally, we have placed the disclosure and release authority at the appropriate level to assess both technological risk and competitive sensitivity. This ensures that knowledgeable individuals make informed decisions concerning the release of both classified and unclassified technical information.

Another new initiative is the use of Global Program Licenses to provide an umbrella authorization for the exchange of technical and production information throughout the life of a cooperative program.

Structure For Success

- Common national goals
- Limit number of partners
- Wisely select partners
- Industry is responsible for work share and work-share allocation
- Interoperability and requirements harmonization
- Understand one another's systems

Trust

The bedrock concept for ensuring success revolves around trust. Experience shows that if the fiscal and political considerations can be accommodated, trust between partners determines the success of the program. Developing a common understanding to ensure problems and issues are identified and resolved early allows the partners to focus on solutions rather than the problems. This trust is essentially built over time and in many respects is more personal than programmatic. Continuity of key personnel and a commitment to cooperation and collaboration by those key individuals produces long-term success.

Conclusion

International cooperative programs are both difficult and rewarding. Critics of international cooperative programs argue that these types of projects are more expensive and are influenced by political concerns. Critics also argue that these programs result in duplication of production activities and the associated loss of economies of scale. This can be true, but **only** if we allow these detractors to become the primary focus and fail to profit from past experience. However, the incontrovertible fact remains that the best way to ensure interoperability with our coalition partners is through an international cooperative program.

Currently, the United States and the United Kingdom have begun to establish a cooperative program on our next-generation tactical missile. The Common Missile Program has been structured using the lessons learned from past cooperative endeavors. We are committed to the success of that program and, through that commitment, expect to provide U.S. soldiers and Marines and U.K. soldiers with a superb system that exploits the lessons learned from previous cooperative programs.

In spite of the complexity and challenges, the Army will continue to pursue opportunities for international cooperative development and production. There are significant benefits to the United States and our allies in continuing these efforts, and we must ensure that our soldiers are the recipients of the very best interoperable systems.

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Flexible Communications For Future Warfighters . . .

THE JOINT TACTICAL RADIO SYSTEM (JTRS)

COL Michael C. Cox

Author's Note: The JTRS will be a family of advanced, reliable, and dynamic communication platforms that will be software reprogrammable, multimode capable, and network-able, while simultaneously providing voice, data, and video communications. Its open-system architecture will enable portability of waveforms across JTR systems and technology insertion through evolutionary acquisition or preplanned product improvement.

Introduction

Military engagements present one of the most dynamic and hostile environments for systems deployment and usage. System elements are continually moving, reorganizing, appearing, and disappearing, and the enemy is waging a physical and electronic information battle to destroy these systems. In this type of environment, availability, interoperability, and security are essential.

Legacy System Interoperability

The increase in DOD's communications requirements has led to a large number of various types of radios, each capable of a particular mission and each having unique characteristics for transmission. DOD legacy systems are typically single-band, single-mode radios that have limited expansion capabilities. As a result, legacy systems require complex solutions to be interoperable with other systems and networks. Use of proprietary standards further complicates interoperability, resulting in problems with noninteroperable systems that require manual intervention to interchange information. Additionally, warfighters must deploy with a different radio and support equipment for every system needed to interoperate, thus increasing their burden and logistics support. Because of this, requirements for a single radio that could be reconfigured to interoperate with the legacy radio were generated, and private industry responded with unique software-controlled reprogrammable radios. However, the proprietary designs of these radios and legacy radio waveforms perpetuated maintenance and logistical problems without truly providing interoperability.

A Coordinated Effort

Each Service within DOD began separate programs to develop a common radio system that would gain the benefits of software-defined radios (SDRs). The JTRS was initiated to coordinate the efforts of all the Services in development of a single family of interoperable radios. The JTRS Program facilitates development of a single architecture for industry and DOD to build SDRs and waveform applications to interoperate with legacy radios, as well as state-of-the-art waveforms to meet increasing demands for information on a dynamic battlefield. This approach allows the Services to gracefully migrate from existing systems to new capabilities while achieving true interoperability.

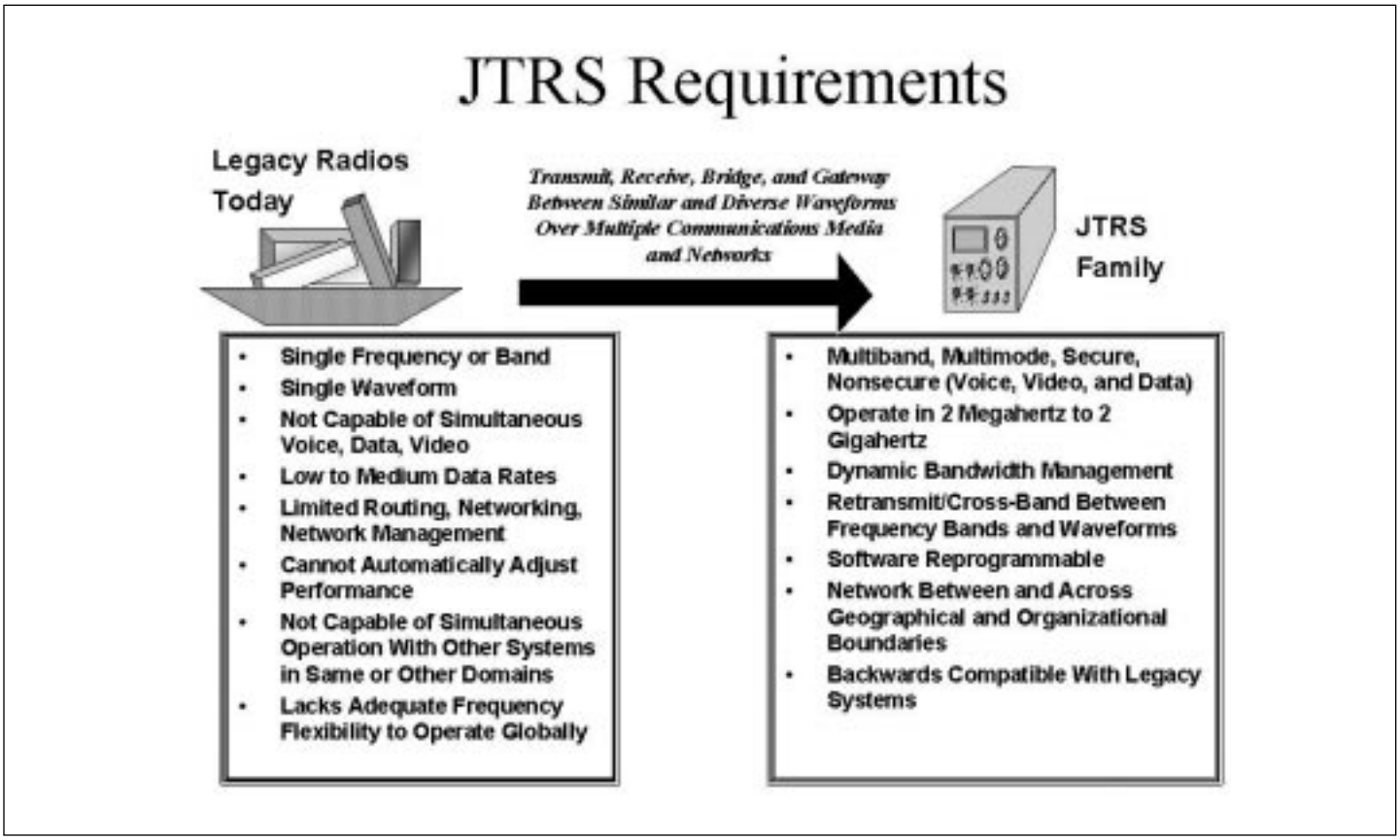
Technological Obsolescence

The dramatic pace of advances in communications technology, coupled with the military's traditionally long system-acquisition cycles, has resulted in the technological obsolescence of new systems before they are fielded. Costs have prohibited retrofitting old systems with improved capabilities, resulting in reduced military readiness. Current radio systems cannot be technologically updated cost effectively. SDRs provide the opportunity for "future-proofing" via preplanned product improvements.

The JTRS is being developed as a network-centric family of communication devices for DOD in support of Joint Vision 2020 missions. Network-centric devices focus on networked information rather than on individual radios. The JTRS is expected to provide interoperability across all geographical and organizational boundaries (horizontal, vertical, Service, and national). The JTRS will be capable of transmitting in voice, data, and video formats while operating in frequency bands ranging from 2 megahertz to 2 gigahertz. To facilitate migration into the Services, the JTRS will maintain backwards compatibility with selected legacy waveforms and provide cross-banding between disparate systems.

Centralized Management

The JTRS Program is a series of related but independent joint acquisitions involving program managers from different Services for



decentralized execution and a centralized management process for oversight. The Army is the lead Service for the joint activities. The program acquisition strategy for the JTRS is divided between the Joint Program Office (JPO) and the Services' acquisition centers. The JPO is responsible for defining, developing, validating, and maintaining the software communications architecture (SCA) (or standard) that establishes the interface between the hardware and software, and for acquiring software waveform applications.

The Services are responsible for developing JTRS radio sets—to include porting independently developed waveforms, integrating the waveforms, and fielding the JTRS radio set as a final product for the user. Each of the procurements will be a joint effort, with the acquiring Service acting as the lead Service for each procurement. The lead Service for individual procurements is selected through a management process. The JTRS Program will be developed via a phased implementation effort that balances operational requirements, weapon system integration issues, and funding constraints.

SDRs are becoming more common. However, they are each built to a different proprietary architecture, have different capabilities, are not adaptable, and are not interoperable. The strength of the JTRS is that it introduces standardized architecture and software waveforms that can be cross-banded to achieve interoperability objectives.

Overall Goal

An overall goal of the JTRS Program is to evolve to where waveform applications are developed once, are "portable" (i.e., can be rehosted to other JTRS sets with minimum effort) to existing and future JTRS radio sets, are easily upgraded, and can address joint requirements across the Services. Underlying drivers for this include joint interoperability, reduction of total ownership costs, and avoidance of technical and operational obsolescence. The JTRS acquisition approach addresses these goals by focusing on separate acquisition of waveform applications and JTRS sets.

Traditionally, hardware and software have been acquired from the same vendor. This approach does not guarantee any independence of the waveform application and the particular JTRS set. Without this independence, waveform applications will be hardware-specific and will not meet the above goals.

Hardware Versus Software

The proposed acquisition strategy for JTRS is based on the concept of independent hardware and software procurement. In this context (i.e., the JTRS), hardware includes all components and the necessary software infrastructure of an operating system, the core framework (which is the implementation of the standard architecture), and certain functional services required by the software waveform applications. Software includes waveform applications implemented as reuseable—portable software applications that are independent of the

hardware host. Each total waveform includes all functionality from the antenna to the end-user equipment.

Modular software radio technology allows for the insertion of new algorithms and technologies, the quantitative characterization of waveform performance, and separation of the waveform definition from implementation details to enhance portability. This can be achieved through development of an open, industry-accepted architecture that provides the framework for developing and evolving a family of software-programmable radios.

The JTRS SCA provides a set of application programming interfaces to standardize system control and interprocessor communications. The SCA is defined around the Portable Operating System Interface Standard applications program to provide for the portability of source-code applications across different operating systems. Common Object Request Broker Architecture (CORBA) middleware standards provide interoperability among applications on different processing machines in heterogeneous-distributed environments and provide for seamlessly interconnecting multiple-object systems.

The JTRS provides a platform for multiple, simultaneous waveform standards and services, where functionality can be changed via software downloads. The benefits include increased flexibility, smaller size, and potentially lower cost. As requirements evolve and services are improved or added, the JTRS can adapt rapidly to new technologies and capabilities without the need for major equipment changes or replacements, thus providing investment protection and quick response to a dynamic tactical environment.

Commercial Investments

The SDR concept has significant application in the commercial marketplace. Therefore, it is desirable that the Services benefit from any advancements made in the private sector in this technology. In addition, technical obsolescence can be managed by leveraging commercial technologies and their market-driven evolution. Again, this can also be addressed through the development of an open, industry-accepted architecture.

Government and industry have formed a Software Defined Radio Forum (SDRF), which acts as a radio standards development body. The SDRF has accepted the JTRS SCA as the basis for further development and standardization. Other standards organizations, such as the Object Management Group and the Institute of Electrical and Electronic Engineers Inc., are being considered for formal standardization of software-radio architectures. Once the SCA has matured, one of these organizations will maintain the JTRS software architecture as a commercial standard. This process avoids the high costs associated with military-unique standards, costs that acquisition reform mandates seek to eliminate.

The acceptance of an industry standard is usually a very lengthy process. Therefore, in practice, a *de facto* standard is accepted rather than first defining and accepting a standard. While there is much interest in the JTRS architecture within the international, commercial industry, there is no guarantee that SCA will be accepted as a standard. The likelihood of SCA being accepted increases as the SDRF continues the formalization of software radio architecture and as the Services proceed with hardware procurements and produce the first few JTRS products.

Conclusion

From the onset of the JTRS Program, the government has encouraged the use of commercial and nondevelopmental items to satisfy the JTRS requirement. Market research and strong interest and involvement by industry in the program have shown that this is a viable concept. The establishment of SCA as the standard by which all DOD-procured radios will be built not only ensures interoperability but also promotes competition. This ensures that government radios will embody leading-edge technologies that are commercially available.

The JTRS concept (i.e., software radio and SDR) has the potential of bringing new capabilities to the battlefield. These new capabilities include:

- Advanced programmable information security capabilities;
- Adaptable frequency reuse and management capabilities;
- Mobile, ad hoc networking capabilities (e.g., the new wideband network waveform); and
- New interoperability solutions (e.g., new cross-banding capabilities for different systems and over-the-air downloadable waveform applications for near real-time upgrades and mission upgrades).

SDRs offer a wide range of capabilities defined in software running on "common" hardware. SDRs allow for improvements or enhancements without altering system design. SDR capabilities also enable users to acquire common hardware and to satisfy individual requirements with software that fits each specific application (as in the personal computer marketplace).

The major advantage of an SDR (i.e., the JTRS) is its ability to be reprogrammed when the situation changes or improved software becomes available. The technological advances taking place in the world today require development of systems that are as flexible and upgradeable as possible. The JTRS encompasses these concepts and provides warfighters a flexible, adaptable communications capability that keeps pace with evolving technology and the changing battlefield environment.

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THE SINGLE INTEGRATED AIR PICTURE

LTC Michael Callahan and
CW4 Stan Darbro (USA, Ret.)

Introduction

Interoperability requirements are here to stay. As most acquisition professionals know, the August 1999 revision to the Chairman of the Joint Chiefs of Staff Instruction 3170.01A requires that system development programs address interoperability factors. Additionally, weapon systems operational requirements documents now have an interoperability key-performance parameter. Within each Service, a Program Executive Officer or the Acquisition Executive coordinates programs to meet interoperability requirements. Joint interoperability is a difficult problem because the lack of a central acquisition organization to deal with synchronization and management of joint weapon system interfaces.

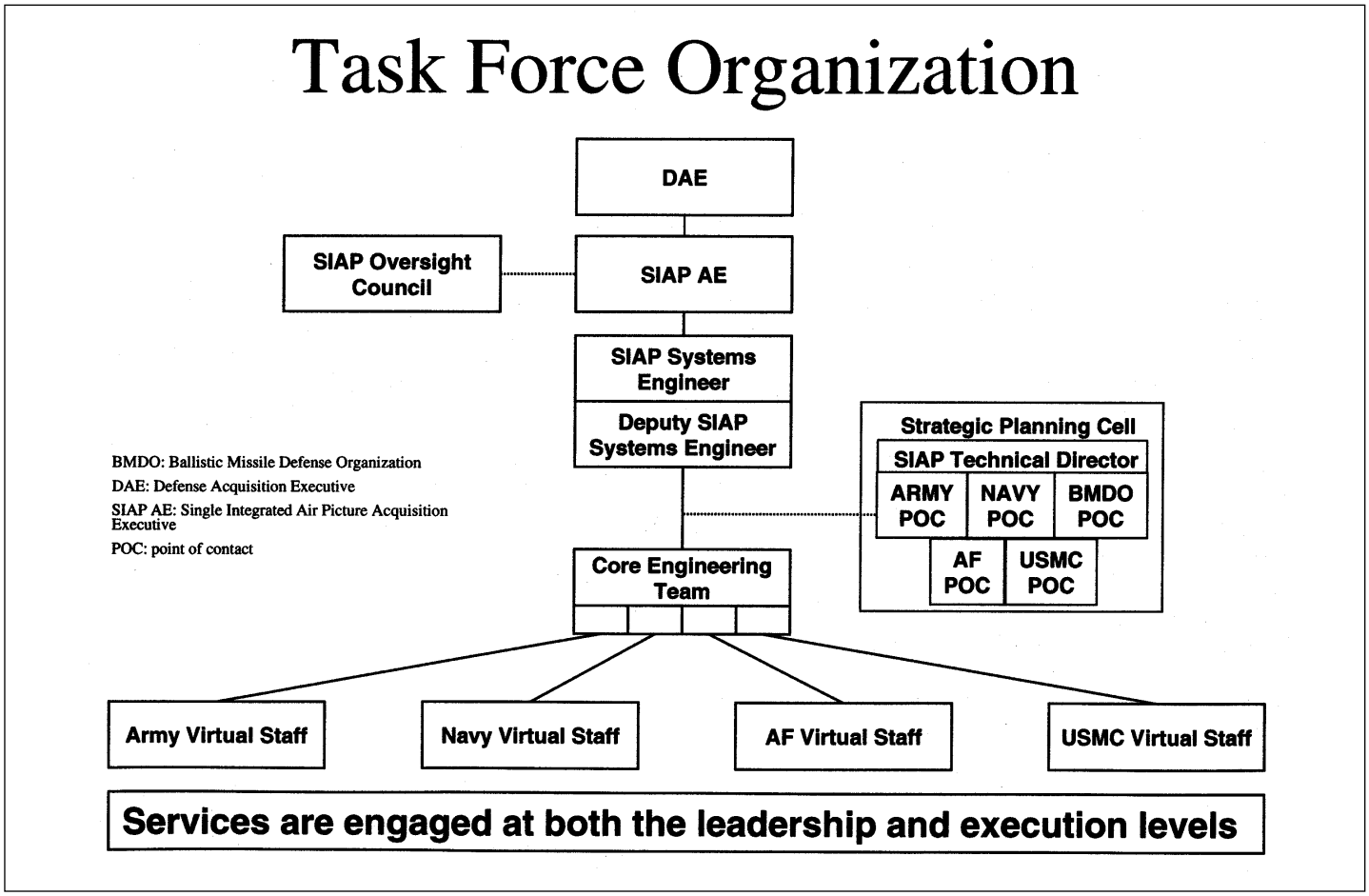
Background

In the Joint Theater Air and Missile Defense (JTAMD) mission area, interoperability has been a high priority because of the mix of forces that defend the battlespace and the potential for civilian casualties and fratricide. Since the late 1980s, air picture interoperability issues have been identified through various real-world and exercise scenarios. In 1988, the Navy AEGIS cruiser *Vincennes* incorrectly identified an Iranian airliner and shot it down over the Persian Gulf, killing all 290 passengers.

In April 1994, the tragic shooting down of two Army BLACK HAWK helicopters over Northern Iraq resulted in the deaths of 26 people and further illustrated the need for a clear and accurate air picture. Additionally, All-Service Combat Identification Exercise Tests have continually revealed shortcomings in the joint air picture, but little progress has been made to address the joint capability problem. As such, in March 2000, the Joint Requirements Oversight Council (JROC) directed the Services to "stand up" the Single Integrated Air Picture Systems Engineering (SIAP SE) Task Force to begin working on part of the JTAMD interoperability problem.

This article examines the SIAP SE Task Force approach and structure, as well as its impact on future interoperability efforts. SIAP is a warfighting concept that will allow all elements in the JTAMD architecture to have an accurate, common view of objects in the air space. Together with combat identification capabilities, the SIAP is one of the building blocks for the overall JTAMD 2010 operational concept. It allows air defense shooters to confidently engage with their weapon systems at the maximum range with low risk of fratricide. Currently, Army air defense weapons employment is restricted to areas where friendly aircraft operate. However, with the emerging cruise missile and unmanned aerial vehicle threat, all weapons must be able to engage at their maximum range. In addition, SIAP is envisioned to support advanced engagement concepts that allow shooters to use nonorganic sensors.

Joint interoperability is a difficult problem because of the lack of a central acquisition organization to deal with synchronization and management of joint weapon system interfaces.



Implementation Standards

The development of a SIAP has been hampered by differing approaches to implementing the Joint Data Network (JDN, aka Link 16) standards (MILSTD 6016A), including position location and timing differences, as well as varying rule interpretations. Some of the systems impacted by this dilemma include the Army's PATRIOT, Forward Area Air Defense Command and Control, Air and Missile Defense Workstation, the Air Force's Airborne Warning and Control System, and the Navy's AEGIS Weapons System. Each Service may believe it has complied with MILSTD 6016A; however, when systems are linked in a joint environment, the air picture can differ significantly from one system to another.

Getting all systems to comply with a common standard would appear to be a relatively simple task, but in practice it has been difficult. Each Service has made a significant investment in its systems, and the potential cost for changes could be high. Because the Services believe they met their requirements by implementing the MILSTD, they have no incentive to fund changes for fielded systems to address interoperability solutions. The JROC-directed SIAP SE Task Force coordinates the Services' efforts to solve long-standing JDN implementation and interpretation problems while preparing an architecture and road map that supports the Theater Air and Missile Defense Capstone Requirements Document.

As with most joint efforts, the real difficulty lies in the details of cross-Services implementation. In its concept for the task force, the JROC sought to make the Services full participants in the effort. The joint staff had previously worked through the Ballistic Missile Defense Organization (BMDO) to achieve joint SIAP objectives, with the Services involved through their respective BMDO or Link 16 user programs.

The original Army position on SIAP work was that the BMDO should serve as the lead agent for SIAP. However, the BMDO was not anxious to accept the lead and the Navy had expressed a desire to lead the effort. The JROC stated that joint interoperability is a four-Service problem and should be resolved by the Services. Thus, the JROC construct addressed the various concerns, including the Army position, and assigned the Navy as the "Lead Engineer" for executing the effort and the Army Acquisition Executive for overseeing the effort. The JROC further directed that the task force be composed of no more than

30 core task-force members working with the virtual staffs from each Service and agency (Figure on Page 9). BMDO and the Services were to provide funding with a JROC review of the task force's progress planned for 2 years after standup.

The Services and BMDO initiated a working group to draft a charter and prepare to stand up the organization. Charter preparation took about 60 days and involved difficult negotiations to resolve all Service concerns. The issue of a "sunset" clause for the task force was highly debated with the solution ultimately left to JROC to review after 2 years. The Services were clearly concerned about the prospect of having to fund the organization for an indeterminate period.

The task-force charter addressed the tough issues of Service equities and issue adjudication via the complex relationship between the SE and the JTAMD requirements process. The task force also established an oversight council consisting of the Service and BMDO Acquisition Executives and their designated three-star-level representatives. Funding issues were deferred to a follow-on detailed implementation plan.

Costs

In May 2000, the JROC reviewed the progress toward standing up the task force and approved a preliminary funding breakout that included funding from all Services and BMDO. The effort was estimated to cost $60-80 million over 2 years (split into 3 budget years).

Settling on a financial management construct was no small task. Each Service has its own method for working on joint programs, and the short duration of the effort was new to everyone involved. The financial management construct ended up with the Services and BMDO reprogramming to a Navy program element for simplicity of execution. This was a positive step in standing up the task force because the Services had to show trust by committing funds to the program.

At the May review, the JROC also called for the task force to provide a detailed implementation plan describing proposed work and the associated costs. This detailed implementation plan was to be the basis for approval of funding levels beyond an initial $4 million. The plan addressed many issues such as Service work share and systems engineering team focus that had previously been pushed to follow-on documents. As of December 2000, the plan is still in staffing with the difficult issue of work share among the Services remaining as an outstanding Army issue. Regarding this issue and others in the formation of the task force, the Army can address issues through its oversight role as provided by the JROC.

The Single Integrated Air Picture Systems Engineering Task Force concept forces the Services to collaborate as stakeholders to address specific interoperability issues.

The organizational construct will require active oversight by the SIAP Acquisition Executive to protect Army (and other Service) interests and balance them with progress on joint solutions to the air picture deficiencies. The end result will raise the visibility of SIAP interoperability issues to the level of Service assistant secretaries, which may provide the emphasis needed to achieve joint interoperability.

Conclusion

So what does all this mean for Army acquisition and future interoperability efforts? Through the SIAP Task Force, the JROC is pressing hard on joint interoperability issues. It has tended to place responsibility with the Services where the vice chiefs have directive authority, rather than in Defense agencies. This gives more control to the Services, but it comes with associated funding requirements and issues of Service equity.

The SIAP SE Task Force concept forces the Services to collaborate as stakeholders to address specific interoperability issues. The Army must actively participate in the SIAP SE Task Force to protect its substantial investment in its weapon systems, and to manage required changes within software and system upgrade cycles. The challenge is to orient the task force on specific improvements with a finite timeline and evolve successful efforts or rapidly end efforts that fail to meet objectives. The Army Acquisition Executive has set specific objectives that the SIAP SE must meet by July 2001. These objectives will provide an opportunity to judge the success of this new method of addressing interoperability.

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CW4 STAN DARBRO (USA, Ret.) is the Chief of Systems Engineering for the Washington, DC, office of ELMCO Inc., and is the Department of the Army Systems Coordinator for SIAP and other developmental air defense programs.

Contributing To Interoperability . . .

THE SINGLE MANAGER FOR CONVENTIONAL AMMUNITION

COL Jim Naughton

Introduction

One of the Army's major contributions to interoperability of the Services is its role as Single Manager for Conventional Ammunition (SMCA). The Army maintains an industrial base that provides most of the explosives used in Defense weapon systems and loads bomb and missile warheads for the other Services. The Army also provides ammunition used in weapons such as M16 rifles, 20mm cannon (fired from a variety of fixed- and rotary-wing aircraft), Army and Marine Corps artillery (e.g., howitzers), Air Force Spectre gunships, and Navy guns. During Operation Allied Force, the Army made a major contribution to the Nation's success without firing a shot—virtually every munition used by the Air Force and the Navy was either made in an SMCA facility or included major components and subassemblies manufactured in SMCA facilities.

Background

In 1975, the Office of the Secretary of Defense (OSD) directed the establishment of SMCA. The Secretary of the Army (SA) was designated the new single manager because the Army controlled the majority of the industrial base. This made the Army proponent for the manufacture and distribution of 13 classes of ammunition and the operator for the CONUS wholesale ammunition storage system. Navy and Air Force resources and several installations transferred to the Army. However, the Services retained control of developing new munitions and producing Service-unique munitions.

DOD Instruction 5160.65 delineates SMCA responsibilities and structure. It also divides conventional munitions into two categories—"SMCA-managed" and "Service-managed." The Army's SMCA facilities procure all mature SMCA-managed munitions and provide an industrial capability to support the Services' program, project, and product managers (PMs) in development and production of Service-managed munitions.

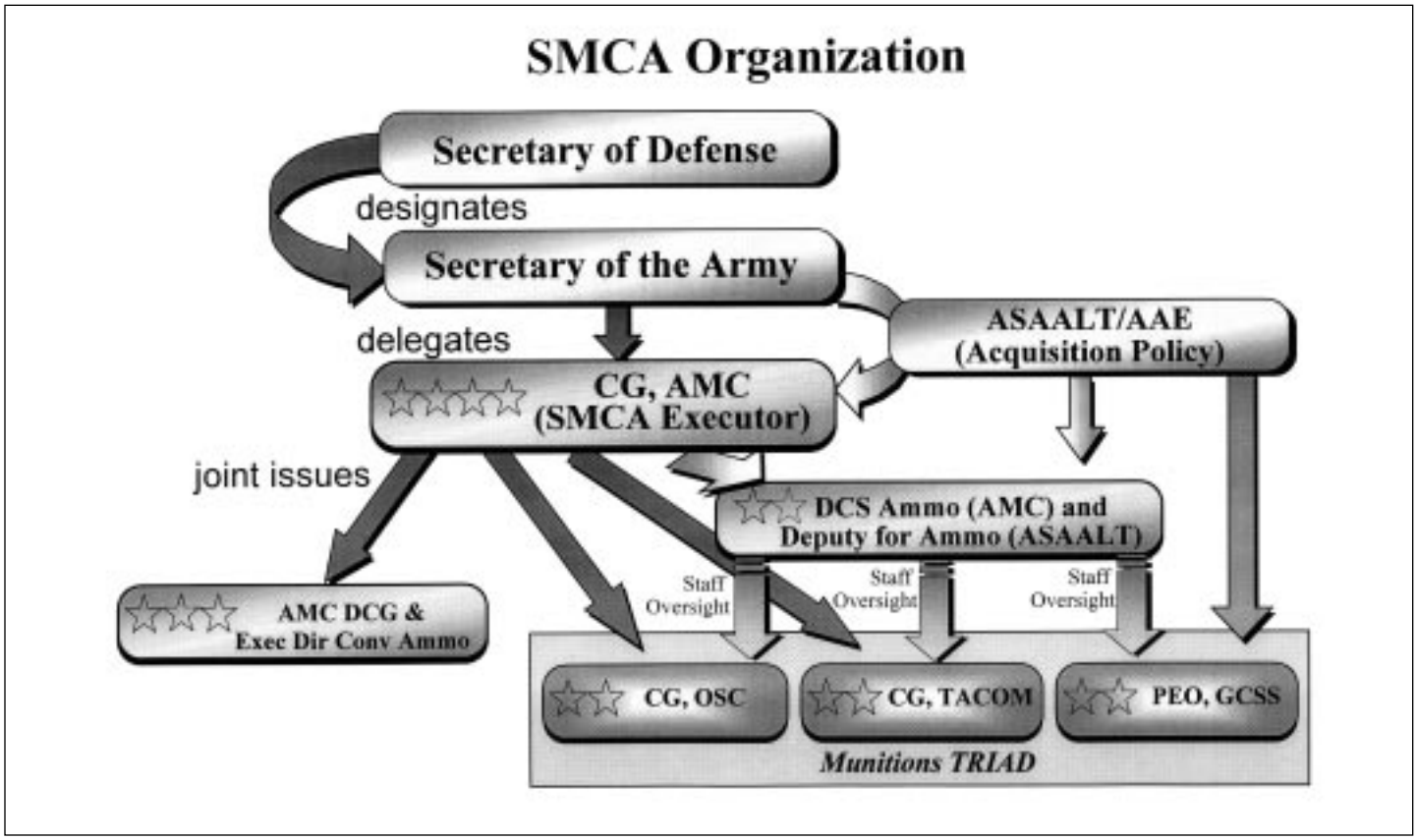
Structure

Essentially, the SA delegates mission execution authority to the Commanding General, Army Materiel Command (CG, AMC). The SMCA Center at the Munitions and Armaments Command, Operations Support Command (OSC), Rock Island Arsenal, IL, implements the SMCA mission.

The SA separately delegates acquisition authority to the Army Acquisition Executive (AAE). The AAE further delegates milestone decision authority and contracting authority to program executive officers (PEOs) and heads of contracting activities. For most SMCA procurements, these authorities flow back together in the OSC Headquarters (OSC HQ). However, many ammunition programs managed by PEO, Ground Combat and Support Systems (GCSS); PEO, Tactical Missiles; and Deputies for Systems Acquisition at various AMC major subordinate commands are not under direct control of the OSC.

To coordinate procurements from these different activities, the Army recently established the TRIAD Ammunition Management Committee. The TRIAD provides a family and command-level forum for integrating the day-to-day operations of the conventional ammunition business. The TRIAD leadership includes the CGs of the OSC and the Tank-automotive and Armaments Command (TACOM) and the PEO, GCSS. A board of directors that includes the AAE and the CG, AMC supervises the TRIAD.

Another individual responsible for the integration of the conventional ammunition program is the Army's Deputy for Ammunition/AMC Deputy Chief of Staff (DCS) for Ammunition. This flag officer serves as a member of both the Secretariat and the AMC staff. In 1988, this organization was charged with the responsibility to function as the Army's executive agency in all ammunition matters. On behalf of the Secretariat, the agency participates in Department of the Army-level councils and decisions similar to those of the directorates of the Deputy for Systems



Management, and is the AMC staff lead for ammunition matters.

The Deputy for Ammunition formulates the Army's ammunition program and budget and represents the Army to Congress and the OSD staff. He or she is the Army Executive Agent for Insensitive Munitions, and the focal point for the recent law requiring SMCA review of procurement actions for impact on the National Industrial and Technology Base. The Deputy for Ammunition is also the Executive Secretariat for the TRIAD.

The last piece of the SMCA management function is the Executive Director for Conventional Ammunition (EDCA). DOD requires the EDCA to be an Army flag officer residing in the National Capital Region and to oversee the SMCA's major activities as designated by the SMCA Executor (CG, AMC). The EDCA functions as ombudsman for the other Services when dealing with the SMCA. The current EDCA is the Deputy Commanding General (DCG) for AMC. He is supported in this function by a small personal staff headed by a Navy captain and an Air Force colonel. The SMCA structure is shown in the accompanying figure. In the following discussion, the term "SMCA" refers globally to any of these agencies acting on behalf of the SA in his capacity as SMCA.

Responsibilities

The single manager has three major responsibilities: wholesale logistics, acquisition of conventional ammunition, and management of the Defense ammunition industrial base. In its first function, the SMCA stores more than 2 million tons of Service munitions at eight CONUS storage activities. The Services are responsible for maintaining their ammunition and for manning a small liaison element at Rock Island, but the remaining costs are provided through Army resources. In addition, the Army provides demilitarization support—1 million tons in the last 8 years. The effectiveness of SMCA logistics is seen in the low cost for this function—storage of ammunition costs less than $100 a ton per year. No Defense operation of any consequence can take place without calling on the SMCA for logistics support.

The second function is the acquisition of conventional ammunition. Each Service funds the procurement of ammunition through its own appropriation. The OSC, on behalf of the SMCA, then accepts these funds and procures the ammunition. This represents the procurement of nearly $1 billion of ammunition annually—the equivalent of an Acquisition Category 1 program. The SMCA also provides the infrastructure for Service PMs to acquire munitions that have not transitioned to SMCA management. This network includes 9 active and 5 reserve ammunition plants, more than 100 contractors, and the OSC SMCA center. The SMCA is very successful in arranging production at low costs for common items, as demonstrated in its recent award for small-arms ammunition,

which saved the Services more than $200 million.

The most difficult mission of the single manager is the maintenance of the Defense ammunition industrial base. The Service's active inventory has more than 600 individual munitions, but less than 200 are procured in a given Program Objective Memorandum window. Of the remainder, nearly 100 are considered critical and require planning for replenishment within 3 years. Industrial planning requires the SMCA to remain informed on the Services' inventory of munitions, wartime requirements, and future plans.

Let's examine nitramine explosives as an example. These explosives are used in nearly all munitions, from C4 blocks to Trident missile motors. The peacetime requirement is small and can readily be provided overseas at reasonable prices. However, the replenishment requirement is approximately 100 times greater than peacetime demand and can only be met by SMCA's Holston Army Ammunition Plant. Consequently, SMCA must struggle to maintain viability at the Holston plant.

In 1998, Congress passed an additional law to assist SMCA in industrial base management. Section 806 of the Defense Authorization Act of 1999 requires SMCA to examine the industrial base and make decisions on restricting procurement depending on risks to the base. While it does not supercede the Competition in Contracting Act, the law provides an interesting twist because SMCA must evaluate procurements to determine the risk of full competition. The Army has delegated Section 806 authority through the AAE to the Deputy for Ammunition. All procurements for conventional ammunition, including Service-managed munitions, must have a certificate approved by SMCA. The new policy requires review of acquisition strategies and plans. If the Deputy for Ammunition finds a significant risk in an acquisition strategy, the AAE must render the final decision.

Recent Accomplishments

The ammunition industrial base has been through tough times as the Services reduced ammunition procurements by using excess Cold War ammunition to support training needs. Procurements in FYs 93-97 were the lowest in real-dollar value since the end of the Vietnam War. The SMCA guided the industrial base through a major restructuring that saw the elimination of nearly 70 percent of the Nation's ammunition production capacity. During this period, nine government-owned ammunition plants were transitioned to excess and one was sold.

SMCA also restructured its approach to acquisition and now uses multiyear procurements or long-term requirement contracts. This has reduced the cost of 1 ton of ammunition by 30 percent since 1997. SMCA also aggressively sought to reduce the cost of ammunition stockpile management. Stockpile management and demilitarization of conventional ammunition remain two of the best bargains in DOD. Because procurement costs are the predominant component of conventional ammunition life-cycle costs, the sum of these efforts has significantly decreased the life-cycle cost of the "typical" ton of ammunition.

Additionally, SMCA support was a combat multiplier in combat operations in the Balkans and Persian Gulf, rapidly responding to the demands of other Services for production and movement of bombs and other munitions during these hostilities.

By maintaining the industrial base, the Single Manager for Conventional Ammunition will allow the Services to minimize the cost of their munitions procurements.

The Way Ahead

SMCA will most likely evolve into a support structure that provides the Services the ability to leverage off the large volume of training ammunition and periodic replenishment of munitions used in lesser regional contingencies. By maintaining the industrial base, SMCA will allow the Services to minimize the cost of their munitions procurements. Individual procurements will not always be through the SMCA center, instead being managed as joint efforts through the ammunition TRIAD, or independently managed through the Services dealing directly with SMCA's family of proven suppliers.

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JOINT UNMANNED GROUND VEHICLES

LtCol Richard LeVan, USMC

Introduction

Both the Army, in its vision of transformation, and the Marine Corps, to some extent through the Navy's Future Naval Capability (FNC), are undergoing revolutionary changes in how their forces will be equipped to fight in the future. Both Services envision future forces to be heavily dependent on robotic technologies. Congress has also expressed its belief that unmanned systems will be an important element of our future force. The FY01 Appropriations Bill acknowledges this role by stating that "a goal of the Armed Forces is to achieve the fielding of unmanned, remotely controlled technology such that by 2015, one-third of the operational ground combat vehicles will be unmanned." Today, these systems are being developed and fielded by the Unmanned Ground Vehicles/Systems Joint Project Office (UGV/S JPO), Redstone Arsenal, AL.

Background

During the late 1980s, the Services began showing interest in outfitting their forces with a variety of robotic applications to assist in missions that included reconnaissance, surveillance, and target acquisition (RSTA); logistics; minefield detection and neutralization; obstacle breaching; explosive ordinance disposal; physical security; and operations in contaminated environments. In 1989, DOD, the Army, and the Marine Corps consolidated their separate efforts to develop battlefield ground robotic systems and established the UGV/S JPO under the Office of the Secretary of Defense-managed Joint Robotics Program.

The Tactical Unmanned Ground Vehicle (TUGV) Program was the JPO's first program and served as the core robotics program. The TUGV Program was a joint Army and Marine Corps effort to develop, produce, and procure unmanned RSTA systems. This effort included extensive user and project trials with surrogate UGVs to assess operational benefits and liabilities and assist in refining requirements. Several of today's UGV/S JPO programs were developed with the same concepts and by leveraging technologies from this core program. Although unforeseen at the time, this early work provided the foundation for what later became a vision for future forces, including a significant capability in unmanned systems.

The Army is undergoing a radical transformation with an end state of a more responsive, deployable, agile, versatile, lethal, survivable, and sustainable force that is capable of responding to missions across the full spectrum of conflict. Robotics will be a key and critical element to achieve transformation objectives. The Army took the first step in its transformation by initializing two interim brigade combat teams (IBCTs) at Fort Lewis, WA. These brigades are equipped with off-the-shelf equipment to evaluate and refine the operational and organizational (O&O) plan.

Robotics will be part of the IBCT. This unmanned capability isn't mature enough to meet requirements of the objective force, but continues to progress. Validation of the O&O plan and systems concepts and requirements necessary to develop the Army's future force will help shape the evolution of robotics of the future.

Army Transformation Strategy

The common thread in key technology developments for the objective force is the Future Combat Systems (FCS). The Army and the Defense Advanced Research Projects Agency are leading the FCS Program to create a family of systems that is lethal, mobile, and survivable. While emphasis is on the design of the "lightweight" vehicle

Robotics will be a key and critical element to achieve transformation objectives.

family, FCS will provide a common baseline capability with robotics in the forefront.

The FCS Program is pushing the technology envelope to make robotics work in the operational environments necessary to support the objective force. Technologies such as non-line-of-sight communications, intelligent mobility, tactical behaviors, and artificial intelligence are essential for unmanned operations and FCS to succeed.

Navy FNC

Coinciding with the Army transformation is the Navy's FNC, which was established in 1999 by the Department of the Navy (DON) Science and Technology (S&T) Board. The FNC effort will help prioritize applied S&T investments to improve naval capabilities. The DON S&T Board approved 12 FNCs representing the Navy's highest priorities to support future operational forces. The FNC mission is to identify those mature and evolving technologies that, through focused investment, guidance, and management, can provide near-term enabling capabilities for the warfighter.

The Autonomous Operations FNC addresses those critical technologies that would promote the Marine Corps' use of UGVs in an expeditionary warfare campaign. The UGV S&T investment will focus on accelerated development of technologies to fill critical capability gaps; will demonstrate those technologies with operational forces—gaining customer feedback prior to transition; and will transition robotics technologies into acquisition programs. The UGV Autonomous Operations FNC Program is scheduled for execution from FY02 to FY07.

Specifically, the UGV technology product line will focus on technologies that address capability gaps in robotic mobility, survivability, durability, modular sensors, navigation, and communications. Demonstrations will focus on using UGVs to enhance the ability of tactical commanders to rapidly detect, identify, and remotely neutralize a variety of threats. The program's primary transition target is engineering and manufacturing development (EMD) for the Marine Corps' Gladiator system and for emerging concepts for small, autonomous UGVs under the mini/micro RSTA UGV effort.

Current And Future Uses

Unmanned systems are being used by our forces today, albeit in very limited numbers and for very specific missions, such as mine proofing and explosive ordnance disposal. As such, these missions have laid a foundation for the introduction of other mission capabilities. As robotic technologies have matured during the past decade, prototype systems were provided to soldiers and Marines in the field. Some of these systems are used today by our forces in Kosovo, Bosnia, and Germany, while others are in the various stages of further development. The JPO continues to develop and field these systems for use on the battlefields of tomorrow.

Standardized Robotic System (SRS)

Another important effort is the SRS, which is the core of the Panther vehicle teleoperation (VT). Panther is a turretless M-60 tank that pushes track-width mine-proofing rollers. The SRS is a kit that provides teleoperation capability to a variety of existing military vehicles. The SRS is a highly accelerated effort currently in EMD. Early version SRS kits are deployed with our land forces in Kosovo, Bosnia, and Germany—a significantly expanded use of robotics by U.S. forces in the field.

The SRS is being developed using a family of common components or line replaceable units that can be applied on many different platforms with minimal new development efforts. The SRS is transparent to the vehicle operator while the vehicle is being operated manually. These kits are being hardened for use in standard military environments.

Man-Portable Robotic Systems (MPRS)

The MPRS Program provides lightweight man-portable UGVs to support the missions of light forces and special operations units. Current program focus is on reconnaissance during Military Operations in Urban Terrain (MOUT). However, concept exploration for man-portable systems is on the fast track for both maneuver and maneuver-support missions. Exploring different concepts, the JPO recently supported a very successful concept experimentation program (CEP) at the Maneuver Support Center, Fort

Panther in operation

MPRS during CEP

Leonard Wood, MO, for both engineer tunnel and sewer reconnaissance and military police missions.

Robotic Combat Support System (RCSS)

The RCSS recently completed Milestone I, and a Request for Proposal was issued. The objective of the RCSS effort is to develop and deliver systems to perform multiple engineer missions, including anti-personnel landmine neutralization, emplacement of ordnance and munitions, smoke obscuration dispensing, wire obstacle breaching, and logistics transport. Future system upgrades will be added through preplanned product improvements.

A design objective is to develop the RCSS mission-module interface to enable snap-on and -off mission modules. Maximum use will be made of commercial-off-the-shelf hardware and software in achieving the objective. The RCSS will replace miniflails, which, for the last 10 years, have been involved in contingency asset mine-proofing operations in Southwest Asia, Bosnia, and Kosovo.

Gladiator

Gladiator is a Marine Corps effort to fulfill requirements for an unmanned systems capability to meet its most dangerous missions, from Operational Maneuver From The Sea to military operations on urbanized terrain MOUT. The Gladiator system will allow organic unmanned scout/surveillance operation with a day/night capability, and have "plug-and-play" adaptability to change mission modules—not only for RSTA, but also for lethal and nonlethal weapon systems and nuclear, biological, and chemical surveillance. Gladiator is in the Concept and Technology Development phase, with concept validation models being developed. Follow-on efforts to develop mini/micro RSTA UGV capability to meet emerging concepts for small, autonomous UGVs will continue as the technologies mature.

DEMO III

The DEMO III Experimental Unmanned Vehicle (XUV) Program, an Army Research Laboratory Advanced Technology effort, is designed to provide significant technology development for future unmanned systems. New and evolving autonomous vehicle technology that emphasizes perception, navigation, intelligent systems architecture, and mission planning is being developed. Technology developed in the DEMO III Program will serve as the catalyst for future system capabilities and programs.

Conclusion

Developing and fielding effective UGVs that lessen the dangers our soldiers and Marines are exposed to is an awesome and challenging task. The Unmanned Ground Vehicles/Systems Joint Project Office is one of several organizations involved in meeting this joint challenge. These systems have already proven their value for our soldiers and Marines in the field, and their application supporting future operations is both widespread and unlimited.

Developing and fielding effective UGVs that lessen the dangers our soldiers and Marines are exposed to is an awesome and challenging task.

LtCol RICHARD LEVAN is the Project Manager, UGV/S JPO. He holds a B.S. in business from the University of West Florida and an M.S. in management from the University of Southern California.

JAVELIN WEAPON SYSTEM: FROM LEGACY TO OBJECTIVE FORCE

David M. Easterling

Introduction

The end of the Cold War and collapse of the Warsaw Pact prompted DOD to change the way it planned for future conflicts. In issuing its first Quadrennial Defense Review in 1997, DOD looked at the U.S. Defense strategy in relation to the world environment. The Chief of Staff of the Army (CSA) realized that the Army needed to refocus its force structure to address the changing world environment and improve its long-term capabilities to ensure a viable future. He called this process "transformation." The Army's transformation initiatives call for the fielding of an interim force in FY01 to serve as a wedge between the light and heavy forces. Following the fielding of this interim force, the Army's objective force will be developed and fielded in the FY04-10 timeframe.

The accelerated fielding of the interim force dictated that it be equipped with existing or off-the-shelf equipment. In this process, the capabilities of the Javelin Weapon System made it a natural candidate not only for the interim force, but for the objective force as well.

Legacy Force

The Javelin, previously known as the Anti-Armor Weapon System–Medium (AAWS-M), is a fire-and-forget, medium-range, man-portable anti-armor missile system that replaces the Dragon weapon system. It features top-attack and direct-attack modes, a soft-launch capability that enables the gunner to fire from enclosures or covered firing positions, and the capability of defeating current and future armor in day and night engagements at ranges exceeding 2,500 meters. Javelin's two major tactical components are its round (missile sealed in a disposable launch tube), weighing 34 pounds, and its reusable command launch unit (CLU), weighing 14 pounds. A significant advantage over current command-to-line-of-sight missiles is improved gunner survivability because once he fires he can move or refire at another target.

Javelin is a jointly fielded weapon system for both the Army and Marines. Since 1996, Javelin has been fielded to Army units located at Fort Benning, GA; Fort Bragg, NC; Fort Lewis, WA; Fort Stewart, GA; Fort Drum, NY; Korea; and Italy. Additionally, the Marines have fielded 12 battalions with Javelin since 1999.

One of Javelin's earliest tests was in March 1997 during the Advanced Warfighting Experiment (AWE) at the National Training Center (NTC), Fort Irwin, CA. The AWE is a series of exercises aimed at demonstrating progress toward achieving the CSA's vision for the Army—Force XXI. During the AWE, light infantry battalions, armed with 18 Javelin CLUs each, evolved into a highly effective anti-armor force. Their mission was to block strategic passes and deploy Javelin hunter-killer teams around the battlefield. These Javelin-equipped light-infantry battalions were so effective that the "world-renowned" NTC opposing force (OPFOR) changed tactics in an effort to avoid them.

Javelin's success during the AWE gained it both user and public praise as a superb weapon system. Based on this success and the termination of the Armored Gun System in 1996, Javelin was fielded early to the 82nd Airborne Division to provide reliable anti-armor capabilities that the 82nd lacked during its Desert Storm deployment. The affirmation of the decision to field Javelin to the 82nd came during the 82nd's February 1999 NTC rotation. The task force, comprised of 1 tank and 2 airborne battalions, deployed 40 Javelin systems against NTC's OPFOR. Javelin's flexibility, coupled with its tremendous lethality, allowed the task force commander to demonstrate the synergy capability when a light- and heavy-force mix is deployed in what was previously considered a heavy-only environment. During the defensive exercise of this NTC rotation, the airborne battalion that encountered the brunt of the OPFOR attack was able to eliminate the OPFOR's forward security element (FSE).

Using Javelin lessons learned from this battle, the task force leadership incorporated Javelin in its offensive preparations. During the offensive attack, the task force positioned an airborne battalion on a major enemy avenue of approach. Its mission was to strip the enemy of the FSE, which would slow the enemy and allow an armor battalion to attack the enemy's flank. An airborne company equipped with eight Javelin systems caught the OPFOR moving; the OPFOR couldn't find the well-emplaced and dispersed Javelin teams and proceeded to lose their FSE and advanced guard main body.

Throughout this rotation, new doctrine, tactics, techniques, and procedures emerged, showcasing the seemingly limitless potential of the Javelin system. It also highlighted the fact that a properly employed Javelin is virtually invisible on the battlefield.

Interim Force

Javelin demonstrated success and flexibility during AWE and NTC exercises, and with the 82nd Airborne

Division during its 1999 NTC rotation. This made it an obvious choice for inclusion in the Army's transformation plans. One of the Army's first transformation initiatives was the development of an interim force that included brigade combat teams (BCTs) formed as a wedge between heavy and light forces. The BCTs are required to:

- Be deployable by C-130 within 96 hours;
- Be combat capable upon arrival;
- Be decisive in offensive action, even from dismounted-infantry platforms;
- Be optimized for use in close, complex, or urban terrain;
- Contribute to holistic survivability and force protection; and
- Be dependent on reduced sustainment footprints.

Based on these requirements, Javelin emerged as the ideal system for equipping the BCTs. In particular, Javelin has proven to be highly reliable, deployable, and versatile, and inherently capable of destroying bunkers, helicopters, and other materiel. Although its primary role is as an infantry-dismounted platform, Javelin has demonstrated its ability to be integrated with and fired from High Mobility Multipurpose Wheeled Vehicles and light armored vehicles.

Javelin once again demonstrated its capabilities in its latest deployment with the 10th Mountain Division rotation at the Joint Readiness Training Center, Fort Polk, LA. Using Javelin in its surveillance mode, search and destroy teams were able to take the fight to the OPFOR, thus denying them rest. This rotation gave Javelin the opportunity to demonstrate and validate its close-range effectiveness and its ability to be used in Military Operations in Urbanized Terrain.

Javelin was designed to minimize its sustainment footprint. Its "wooden-round" concept means that maintenance is never required on the Javelin round. Currently, its CLU reliability is more than three times better than the requirement. In addition, Javelin's built-in ability to load upgraded software indicates that improvements to the system's lethality can be realized without taking the system out of the field and without hardware changes.

Javelin's advanced fire-and-forget technology and flexible capabilities made it a natural choice for the Army's interim force, but with Javelin's overmatch reputation and potential for future improvements, Javelin was also selected for inclusion into the Army's objective force.

Objective Force

Even with Javelin's current dominance over any known armor threat, there are still opportunities for growth within the Javelin system as it supports the Army's objective force. These growth areas include a Counter Active Protection System (CAPS), CLU improvements, a K-charge warhead (discussed below), extended range, and integration with unmanned ground vehicles (UGVs) and with the Land Warrior System.

The CAPS opportunity entails developing a third-generation CAPS for incorporation into the Javelin round to defeat any future armored vehicle's active protection system.

Improvements to the CLU focus on local area processing and could include electronic zoom, frame integration, and a bigger A-focal. Advantages of these CLU improvements are increased threat detection, increased recognition range, fewer gunner adjustments, and faster lock-on.

A warhead improvement program will replace the current Javelin warheads with K-charge warheads. These new warheads will improve lethality against bunkers, buildings, armored personnel carriers, and tanks. Missile size and weight will remain unchanged.

The Marine Corps is considering an extended-range (4 kilometers) Javelin as a possible solution for its Anti-Armor Weapon System-Heavy, intended for a first unit equipped in 2007. Incorporating an enhanced CLU, a larger flight motor, and a more robust seeker into Javelin will allow fire-and-forget performance at the 4-kilometer range with minimal development risk.

The integration of Javelin on UGVs would lighten the soldier's workload. Additionally, the ability to image and communicate between a Javelin missile and a remote gunner station has been demonstrated. Efforts are planned to validate Javelin compatibility and function with a robotic platform. This integration would allow the soldier to detect, designate, and engage "threat" systems from remote locations.

Finally, integration of Javelin with the Land Warrior System would give the Land Warrior-equipped soldier the ability to fire Javelin from his system. Javelin software would be modified to run on Land Warrior equipment, allowing Javelin-required optic functions to be performed by the Land Warrior thermal weapon sight, thus eliminating the need for Javelin CLU. The CLU would still be required for soldiers not equipped with the Land Warrior.

Conclusion

By including Javelin in the objective force, the Army has placed a vote of confidence in Javelin's versatility and longevity. This has opened real opportunities for Javelin in the areas of Foreign Military Sales (FMS) and co-production with our allies. If our allies choose to provide Javelin to their troops, our interoperability would potentially allow for common repair and re-supply points. To date, more than a dozen countries have requested price and availability information; two FMS assessment cases have been conducted, and a third assessment case is being processed.

During the 1997 Soldier Systems Review conference at Natick, MA, Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology LTG Paul J. Kern stated that "If we are really good, and we are, the soldier of 2025 will be as effective as the tank of 1995." A Javelin-equipped objective force could make this statement true by 2010.

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THE U.S. ARMY FIRE FIGHTING TRAINING SYSTEMS PROGRAM

Raul Ley-Soto and Alexander Fernandez

Introduction

In February 1997, the U.S. Army Simulation, Training and Instrumentation Command and the Office of the Project Manager for Training Devices (STRICOM/PM, TRADE) awarded its first-ever contract for a commercially available training system using commercial practices as defined in the Federal Acquisition Regulation (FAR). Procurement of these systems was the result of the U.S. Army's Fire Fighting Training Systems (FFTS) Program, which was used to meet a congressional mandate to field FFTS at 19 initial U.S. Army installations worldwide. Fielding of FFTS began in September 1997 with funding provided by Congress in FY96, FY98, and FY99, and has been completed at 17 of the 19 initial U.S. Army installations. Because of the success of this FFTS Program, five additional U.S. Army installations were added to the initial Basis-of-Issue Plan in February 2000.

FFTS are state-of-the-art training systems that safely replicate flames, heat, and reduced visibility (using smoke obscuration) during residential or aviation firefighting training scenarios. They integrate proven, commercially available firefighting training technology into structural (mobile and modular/fixed) or aircraft rescue and fire fighting (ARFF) training systems. The modular/fixed structural firefighting training system is a three-story, propane gas-fueled trainer with four burn rooms. The mobile structural firefighting training system is a transportable, self-contained (with built-in propane gas and electrical power sources), two-floor version of the modular/fixed structural firefighting training system. The ARFF trainer is a transportable, self-contained, aircraft mockup (42 feet by 8 feet) with a cockpit fire and exterior, rectangular fuel-spill fire simulation.

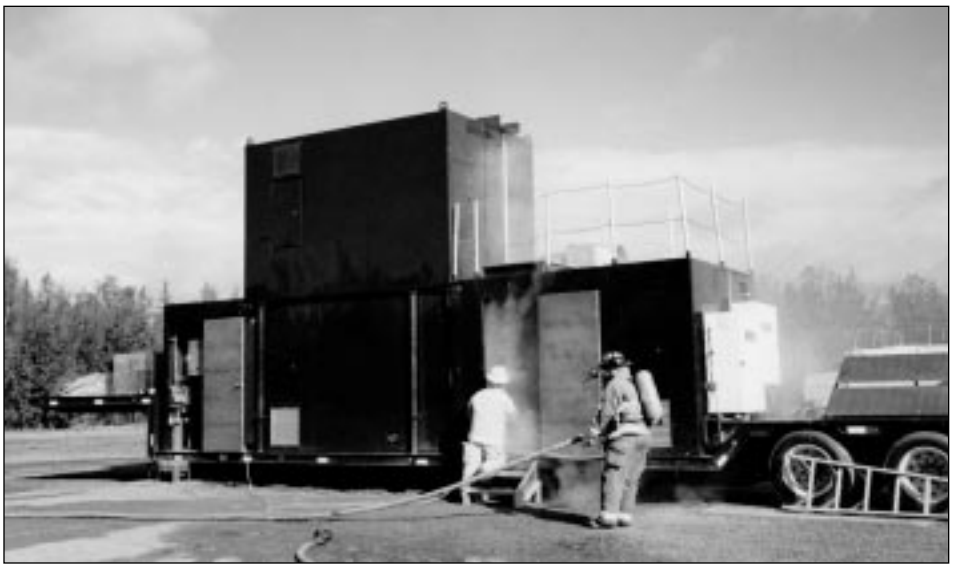
Background

Prior to procurement of the new systems, the U.S. Army was training DOD civilian and military firefighters using fossil-fueled techniques that were hazardous to trainees, not easily controlled or repeated, and in some cases in violation of local environmental regulations. In 1996, Congress mandated that existing fossil-fueled firefighting training be replaced with commercially available, propane gas-fueled, computerized/programmable, logic-controlled firefighting training systems.

Approach

From program inception, STRICOM and PM, TRADE established an empowered integrated product team (IPT) to aggressively work with the users and proponent in developing an Operational

The modular/fixed structural firefighting training system



The mobile structural firefighting training system

Requirements Document (ORD) based on market research. The IPT was also instructed to implement acquisition reform initiatives and streamline to the fullest.

Ultimately, Cost as an Independent Variable techniques were used to finalize the ORD. Market research provided insight to product characteristics, costs, and other customers, which contributed significantly to timely proposal evaluations during source selection. The market research also allowed STRICOM and PM, TRADE to reduce the procurement schedule from an anticipated 12 months to 8 months. Additionally, the IPT streamlined the solicitation, limiting the entire Request for Proposal (RFP) to 17 pages. The RFP contained no reporting requirements and the Statement of Work and Specification combined were only seven pages long.

The contract was structured to allow the government maximum flexibility in exercising its options. Unlike prior contracts in which options were tied to 12-month periods or fiscal years, the FFTS IPT structured its options in a "4-year" period that allowed the government wide latitude in acquiring additional systems as funds became available. *The Commerce Business Daily* announcement release, the RFP release, and responses to offerors' comments were accomplished by the IPT via online communication.

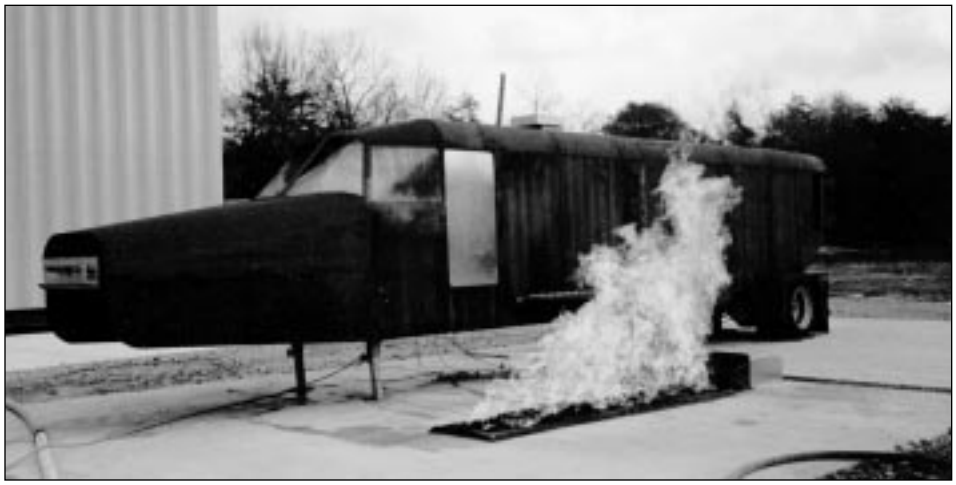
The Team

The FFTS IPT demonstrated the highest degree of teamwork, striving to reduce life-cycle costs. Further, the team consolidated trips and used teleconferences to reduce travel expenses in an effort to maximize the procurement of FFTS hardware. This IPT was fully empowered from its inception in accordance with the guidance contained in AMC-P 70-27, *Guidance for Integrated Product and Process Management.* All IPT members actively contributed to the decisionmaking process.

The team completed just-in-time training at key program intervals including requirements definition, solicitation development, and source selection, which significantly contributed to an environment of openness and goal-oriented success. Fire chiefs from each military installation (i.e., users) are active members of the IPT and are considered partners when systems are fielded at their installations. Through an overarching integrated product team, midlevel STRICOM managers mentored the team throughout the solicitation development and source-selection process. In summary, this team is empowered to fully implement acquisition reform efforts.

Outcome

Source selection was completed in record time, with contract awards issued only 15 weeks after release of the solicitation. The FFTS contract was awarded as a competitive, best-value effort fully using the commercial practices defined in Part 12 of the FAR.



The ARFF training system

The ARFF in use by the Fort Wainwright, AK, fire department

The first modular/fixed structural firefighting training system was fielded at Fort Monmouth, NJ, on Oct. 30, 1997. The first ARFF training system was fielded at Fort Belvoir, VA, on March 6, 1998. The first mobile structural firefighting training system was fielded at Fort Lewis, WA, on June 26, 1998.

The benefits derived from this particular acquisition approach are as follows:

• The per-unit firefighting training system price was lower than the price quoted during the market research. This facilitated the purchase of more units during the initial buy than originally envisioned.

• The life-cycle cost of ownership of the firefighting training system units was kept low by requiring the use of commercially available, industry-proven technology. A comprehensive commercial 1-year warranty along with a 15-year service-life warranty for major structural components (as validated by the market research) were also part of the proposal requirements. As a result, the winning offeror's firefighting training system units have been very reliable, and the cost of ownership has been negligible.

• Close coordination with the users has assured that facility considerations are common for each firefighting training system site. This has ensured the lowest possible setup and maintenance costs for each installation by sharing site preparation design drawings and information among all users.

• Ninety-five percent of the procured FFTS have been delivered on or ahead of schedule because of the close government/contractor partnership.

• Commercial documentation (operator and maintenance manuals) is updated regularly at no additional cost to the government.

• Failed electronic/fire-generation controls are replaced with more efficient components at no additional cost to the government.

The unique and innovative contractor/government partnership taken by the IPT also resulted in several trainer improvements without an increase to the trainer unit prices, as would be the case with traditional engineering change proposals. For example:

• The mobile trainers were given an added capability to connect to permanent/fixed propane and electrical supplies.

• A three-story modular/fixed structural trainer replaced a two-story trainer specified in the contract.

Conclusion

The U.S. Army FFTS Program represents the success that can be achieved through partnering aggressively, streamlining acquisitions, and implementing acquisition reform initiatives. Not only did the government acquire the required trainers at a cost lower than any other civilian or government customer, but the capabilities and training features of the trainer are improved continuously (based on lessons learned throughout the production and fielding phases) at no additional cost to the government. The FFTS Program is also an example of the time and cost savings achieved when acquisition reform and streamlining initiatives are implemented throughout the acquisition process.

Visit STRICOM's Web site at **http://www.stricom.army.mil/PRODUCTS/FFTS/** for more information on the FFTS and other programs.

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2000 ARMY SMALL BUSINESS INNOVATION RESEARCH PHASE II QUALITY AWARDS

Dr. Kenneth A. Bannister and James R. Myers

The 2000 Army Small Business Innovation Research (SBIR) Phase II Quality Awards Ceremony was held Aug. 22, 2000, at the Pentagon. Paul J. Hoeper, then Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT), hosted the ceremony. Hoeper was assisted with the award presentations by Dr. A. Michael Andrews II, Deputy Assistant Secretary of the Army for Research and Technology; Jon Baron, former DOD Program Manager, SBIR/Small Business Technology Transfer (STTR), and now the new Executive Director of the Presidential Commission on Defense and Commercial Offsets; and Dr. Robert S. Rohde, Deputy Director for Laboratory Management, Office of the ASAALT.

Established in 1994, the Quality Awards Program recognizes SBIR Phase II (research and development) efforts that exemplify the SBIR goal of bringing innovative technologies and products to the marketplace. All Army SBIR Phase II companies whose projects conclude in a given fiscal year are eligible to compete for that year's quality awards. Award winners are selected based on the following three criteria: originality and innovation of research; relevance of the research to the Army and its mission; and commercialization potential of the research, reflecting the primary goal of bringing technology and products to the marketplace.

Quality awards are presented to each winning SBIR company as well as its sponsoring Army organization's technical director, technical monitor, and SBIR coordinator.

2000 Quality Award Winners

Recipients of the 2000 Army SBIR Phase II Quality Awards and their achievements are as follows:

Farance Inc., New York, NY. The Student-Centered Learning System, developed by Farance Inc., provides a major paradigm shift in the ownership, maintenance, and security of student records within the education industry. This component-based architecture satisfies the user's privacy, security, administration, and data modeling needs. The system directly supports the Army's Personal Learning Systems Program for student-centered learning and contributes to the Army's Distance Learning Program.

Accepting the award for Farance Inc. was the company's President, Frank Farance. Also receiving awards for the Student-Centered Learning System were Dr. Louis C. Marquet, Director of the U.S. Army Communications-Electronics Research, Development and Engineering Center; James R. Schoening, SBIR Technical Monitor; and Suzanne J. Weeks and Joyce A. Crisci, SBIR Coordinators.

Flow Inc., Portland, OR. Malaria is one of the world's most prevalent diseases and was the leading cause of medical disability among U.S. military personnel in Vietnam and Somalia. Developed by Flow Inc., the OptiMAL assay is a field-ready test that permits the diagnosis of all four forms of human malaria and aids in evaluating multiple drug-resistant malaria so that effective therapy can be instituted. This diagnostic test also has great potential for civilian travelers, international relief workers, Peace Corps volunteers, and many other nonmilitary personnel working in malaria-endemic areas around the world.

The quality award was presented to Dr. Michael Makler, CEO of Flow Inc. Also receiving awards for the OptiMAL assay were COL Martin H. Crumrine, Director of the Walter Reed Army Institute of Research; COL Wilbur K. Milhous, SBIR Technical Monitor; and Herman F. Willis, SBIR Coordinator.

Production Products Mfg. & Sales Inc., St. Louis, MO. Production Products Mfg. & Sales Inc. developed the capability to measure strain-rate information on the inside of lightweight-composite vehicular armor during a ballistic event. This process successfully integrates fiber-optic recording, high-speed demodulation, ballistic testing, and composite materials to bring scientific advancements to practical engineering capabilities. Because of this development, the Army will be able to design armor that will ensure the survivability of future soldiers and their equipment.

Accepting the award for Production Products was Director of Research and Development Kelli Corona-Bittick. Also receiving awards for this project were Dr. Robert W. Whalin, Director of the U.S. Army Research Laboratory; Dr. Bruce K. Fink, SBIR Technical Monitor; and Dean Hudson, SBIR Coordinator.

ThermoAnalytics Inc., Calumet, MI. The Army's next-generation

weapon systems and tactical vehicles must be smaller, lighter, and more maneuverable, yet still maintain a high degree of survivability. Using the latest software engineering practices and techniques, ThermoAnalytics Inc. developed a computer-aided engineering software tool that optimizes a vehicle's performance during the initial design phase. The program can be run on any computer, and its cross-platform functionality and object-oriented programming maximizes integration with other design tools.

Accepting the award for ThermoAnalytics Inc. was Keith Johnson, Program Manager, and Dr. Allen Curran, Principal Investigator. Also receiving awards for this project were Jerry L. Chapin, Director of the U.S. Army Tank Automotive Research, Development and Engineering Center; Teresa Gonda, SBIR Technical Monitor; and Alexander Sandel, SBIR Coordinator.

Cree Inc., Durham, NC. Current and future DOD communication systems will benefit from the development and availability of high-power, high-efficiency, solid-state amplifiers. The high-power GaN/AlGaN High Electron Mobility Transistor (HEMT), developed by Cree Inc., has successfully produced record power densities and X-band efficiency. This technology also has wide potential in the commercial sector and will be strategic to the competitiveness of large business systems in radar, cellular base stations, and microwave satellite communications.

Accepting the award for Cree Inc. was the Director of Advanced Devices John Palmour. Also receiving awards for the HEMT project were Dr. Robert W. Whalin, Director of the U.S. Army Research Laboratory; Dr. Kenneth A. Jones, SBIR Technical Monitor; and Dean Hudson, SBIR Coordinator.

DCS Corp., Alexandria, VA. Vehicular accidents occur during night operations because of perceptual limitations when using image intensifier (I2) devices. The Night Driving Training Aid (NDTA), developed by DCS Corp., provides instruction in the use of night vision goggles (NVGs) for driving. The NDTA addresses basic I2 concepts, NVG capabilities and limitations, driving techniques, and driving hazards. In addition, the training aid provides a variety of scenes and scenarios in an interactive setting and is a viable means of conducting low-cost training at the unit level where time and money are limited.

Accepting the award for DCS Corp. was Carl Dubac, Chairman of the Board, and Dr. John Ruffner, Principal Investigator. Also receiving awards for NDTA were Dr. Michael R. Macedonia, Chief Scientist of the U.S. Army Simulation, Training and Instrumentation Command, and Joseph M. Pellegrino, SBIR Technical Monitor and SBIR Coordinator.

Medical Analysis Systems Inc., Camarillo, CA. U.S. military personnel have significant health concerns about being deployed to malarious regions of the world. Medical Analysis Systems Inc. has developed a rapid assay for detecting malaria parasites in infected mosquitoes. The VecTest can be employed in the field to continuously monitor for the most serious species of malaria. This information is critical to preventive medicine teams as they establish and develop programs for infectious disease control in military operations.

Accepting the award for Medical Analysis Systems was Dr. Kirti Davé, Principal Investigator. Also receiving awards for the VecTest were COL Martin H. Crumrine, Director of the Walter Reed Army Institute of Research; MAJ Jeffrey R. Ryan, SBIR Technical Monitor; and Herman F. Willis, SBIR Coordinator.

Skiametrics Inc., Winchester, MA. The Universal Computed Tomography System (UCT), developed by Skiametrics Inc., is a volume inspection system for rapid, 100-percent X-ray imaging of industrial and military components. UCT is designed to be flexible and easily accommodate objects up to 40 inches long by 9 inches in diameter for total inspection. Selectable inspection sequences provide a range of 100 percent computed tomography imaging within a few minutes at relatively coarse resolution and an hour at the highest spatial resolution and contrast. Using the UCT system, the Army can determine the serviceability of individual munitions quickly and with a high degree of accuracy.

Accepting the award for Skiametrics Inc. was the company's President Dr. Paul Burstein. Also receiving awards for the UCT project were Michael Fisette, Technical Director of the U.S. Army's Armament Research, Development and Engineering Center; Dr. Paul D. Willson, SBIR Technical Monitor; and John Saarmann and Carol L'Hommedieu, SBIR Coordinators.

Conclusion

The small business community plays a vital role in the readiness and effectiveness of our Armed Forces. Its creativity and innovative spirit will enable tomorrow's warfighters to successfully overcome the challenges they encounter on the battlefield. The SBIR Program fosters this innovative thinking, which in turn benefits the Army, the private sector, and our National economy.

Note: An article on the SBIR and STTR Programs begins on Page 33 of this magazine.

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YUMA ROUTINELY TESTS ARMORED VEHICLES AND DIRECT-FIRE MUNITIONS

Chuck Wullenjohn

When it comes to weapon systems and munitions, the people employed at the U.S. Army Yuma Proving Ground (YPG), AZ, take what they do seriously. In a typical year, they fire nearly 170,000 rounds; fly 4,000 air sorties; conduct 3,600 personnel and cargo parachute drops; and drive upwards of 100,000 miles on tracked and wheeled vehicles over rugged desert test courses. They bang, bump, bruise, and rock their equipment, but the end result is materiel they are proud to hand to American soldiers in the field because they know it's the best and most reliable anywhere.

One of the important test missions at YPG involves testing combat vehicles, from their weapon systems to their tracks. Major systems tested by the proving ground's Combat Systems Division include the M1A2 Abrams Main Battle Tank and the M3A3 Bradley Fighting Vehicle, the true workhorses of the Army's mechanized and tank battalions.

Division personnel also work with the Light Armored Vehicle and a variety of other specialized systems. They routinely fire 105mm and 120mm tank weapons, the 25mm chain gun mounted on the Bradley Fighting Vehicle, and TOW (Tube-launched, Optically-tracked, Wire-guided) missiles. All Army production acceptance testing of tank training ammunition, a form of quality control, is performed at the proving ground. YPG is the only Army proving ground with a Nuclear Regulatory Commission license for firing depleted uranium ammunition using direct-fire weapons at extended ranges.

Division Chief Bill Rezin says the work that the men and women of his division do is critical to the national defense. "We're responsible for the complete armored weapon system," he says, "so the importance of what we do cannot be minimized. The performance of the vehicles and the effectiveness of their weapon systems in a future conflict is, in large part, based on what we do right here," he adds.

That has been the case in past conflicts, most recently in the Balkans and earlier during the Persian Gulf War. YPG tested much of the tank ammunition used so effectively against Iraqi tanks on the sands of the Middle East. The Abrams tank, the centerpiece of the Army's tank battalions deployed to the Persian Gulf, underwent more than 100,000 miles of grueling desert road testing at the proving ground while under development in the 1970s and 1980s. That was a good thing too because the air filtration systems of engines installed in early tanks performed poorly in the dusty desert environment.

The combat systems firing range, which is partially completed, is in an area of the proving ground that can be used both for developmental or operational testing. The range encompasses 3,460 acres and contains three lines of fire for either stationary firing or firing on the move. There are also two "bump" courses on the range that allow developers to fully exercise the fire control systems of tested vehicles while driving. A separate combat systems maneuver area covers 5,930

An M1A2 Abrams fires a 120mm projectile during an ammunition production acceptance test at the Red Bluff Firing Range at YPG.

acres. Vehicles operate on the maneuver range as they would in combat, even on a cross-country basis.

"One of the features of these ranges is that they enable us to not only test the vehicle but also the interface between the soldier and the system. By doing this on a relatively small scale early in the development cycle, testers are able to involve soldier-users much earlier than previously. This helps us identify weaknesses sooner, which means we can correct problems and improve the system more efficiently and inexpensively," Rezin explains.

Two versions of the much-anticipated Tank Extended Range Munition (TERM) have recently come to YPG for firing on fixed mounts. There are currently two TERM efforts, but only one will be selected for final production and fielding. One is the TERM KE (kinetic energy) built by Alliant Techsystems, and the other is the TERM CE (chemical energy) built by Raytheon. Both have electronic "brilliance" built into them. The TERM competitors came to the proving ground because of the extreme firing ranges offered and the proving ground's ability to reliably recover rounds.

"TERM will offer our tankers a round which not only has the current capability of being able to defeat heavily armored targets in the line-of-sight mode, but will offer a beyond line-of-sight firing capability," says Test Director Terry Miller. "This means less exposure to enemy fire for our soldiers for we'll be able to destroy attacking armor long before they can harm us. TERM will enable us to retain our edge over enemy armored forces in the future," adds Miller.

One of the major intentions of the thinking behind the TERM round is for it to seamlessly integrate into the M1A2 SEP+ (System Enhancement Program) Abrams tank, with electronics encased in the projectile interfacing directly with existing fire control systems via a data link. The round will be transported, handled, loaded, and fired like other 120mm rounds. The TERM will contain multiple seekers that allow it to defeat armored targets in all types of weather. For long-range targets, TERM will enable cooperative engagements with a Scout vehicle or through the artillery fire support network.

A photographer prepares a high-speed camera for test photos at YPG's firing range.

TERM will dramatically expand the battlespace of the tank battalion commander. TERM rounds will definitely let American armored forces "reach out and touch" their opponents—with lethal results.

Testing advanced weapons such as TERM has recently become commonplace at YPG. From global-positioning receivers used to accurately maneuver descending parachute loads to 155mm artillery projectiles that will seek and destroy enemy targets, the expansive 1,300-square mile proving ground has become a vital component of the U.S. military machine.

A framed color photograph near the main door of the Combat Systems Division office accurately summarizes the feelings of men and women throughout the proving ground. The photo shows soldiers and their equipment crossing a wide river in Bosnia on a barge. Large lettering under the photograph proclaims, "This is our customer."

"What we do is serious business, and we know it. Our mission is simply to do the best humanly possible to provide our soldiers with the finest equipment available to defend themselves and our country. Our job is to put our motto and our beliefs into action each day. And I believe we do," Rezin says.

CHUCK WULLENJOHN is Chief of the Public Affairs Office at the U.S. Army Yuma Proving Ground, AZ. He is a graduate of Humboldt State University and has completed postgraduate work at San Jose State University and Hayward State University, all in California. He is a frequent contributor to this magazine and other military publications. He is also an Active Reservist in the U.S. Coast Guard.

A Blueprint For The Army . . .

INTEGRATED COMBAT COMMAND AND CONTROL SOFTWARE UPDATE PROCESS

LTC Bryan J. McVeigh, MAJ John J. Markovich,
MAJ Earl D. Noble, and Ron Bokoch

"Uncontrolled spiral development is chaos."
—MG Robert E. Armbruster

Introduction

This article reflects the experience of the Abrams Tank System, Bradley Fighting Vehicle Systems, and the Force XXI Battle Command Brigade and Below (FBCB2) Program Management (PM) Offices as they integrated the FBCB2 software into weapon platforms. Based on lessons learned, the authors propose a process for the Army to integrate software across platforms and systems. Headquarters, Department of the Army is currently developing and assessing system-of-systems management options.

Background

With our current modernization process, a single unit frequently receives multiple, separate, unsynchronized, and chaotic fielding of various new systems throughout the year. Each fielding adversely impacts the unit's immediate readiness. The process of turning in older equipment, drawing new equipment, conducting new equipment training, and becoming proficient with the new equipment is both demanding and time consuming.

Units are further stressed by periodic updates and upgrades to the software embedded in fielded systems. In the past, software upgrades were fielded based on their software program development schedule. From the perspective of a single PM, the turmoil may not be readily apparent, but the combined effects among several systems become significant. For example, the software associated with the Abrams tank alone includes the following: its own operating software, the Global Positioning System (GPS), the Single Channel Ground and Airborne Radio System (SINCGARS), Enhanced Position Location Reporting System (EPLRS) radios, and FBCB2. Maintaining compatibility among all of these systems within a given unit is a challenge for each of the PMs. Given the interdependencies among these systems, the Army can no longer afford the time and turmoil involved in fielding and maintaining these stand-alone systems. The Army must shift paradigms from a stand-alone to a system-of-systems approach.

With the advent of digitization and completion of the first series of Force XXI experiments, the PMs for Abrams, Bradley, and FBCB2 recognized that many new or improved integrated combat command and control (IC3) capabilities are dependent on specific equipment being fielded simultaneously. To maximize warfighting capability, ensure interoperability, and preclude negative impacts to unit readiness, the programmatic and technical changes for both hardware and software must be strictly managed.

The critical role of software configuration management (CM) demands a system be established that effectively and economically controls the interdependencies and relationships among the host platforms and the IC3 equipment. This article examines these issues with regard to FBCB2 and its integration in the Abrams and Bradley Systems—the Team IC3 approach. This approach accommodates both programmed and unanticipated change while minimizing the impact of those changes on the receiving unit. While this approach is in its infancy, it provides a solid blueprint from which the Army can expand to incorporate a holistic system-of-systems approach to post-fielding software upgrades.

Team IC3 selected this approach because it was the best way to integrate the functionality of FBCB2

within the Abrams System Enhancement Program (SEP) and the Bradley A3, both first-generation digitized weapon platforms. Specifically, the Team IC3 approach is designed to accomplish the following:

• Develop and institutionalize a synchronized and disciplined process for fielding planned and unanticipated software and hardware upgrades that affect command and control (C2) capabilities for the Abrams SEP and Bradley A3;

• Ensure the fielded version of IC3 software is interoperable with the latest version of Abrams SEP, Bradley A3, FBCB2, GPS, Internet Controller software and hardware, SINCGARS, and EPLRS system software; and

• Ensure an open system architecture design to facilitate future upgrades and IC3 modules that are planned for the future.

Concept

The IC3 update approach requires the identification and management of a system-of-systems hardware and software digitization package that includes FBCB2, vehicle and platform digitization, related tactical communications, tactical Internet protocols, and Tactical Operations Center C2 systems. Within those packages, changes are implemented via one of two identified paths: the capability upgrade path or the safety upgrade path. The capability upgrade path addresses preplanned improvements, unanticipated technological advances, and problem fixes not affecting sys-tem and platform safety. The safety upgrade path addresses critical safety-of-use related upgrades.

The following summarizes the IC3 process:

• Each of the PMs with their prime contractors have established plans and schedules to update their software and hardware programs per their user-established requirements. Effective implementation of a controlled change process requires a PM to fully understand each IC3 team member's software and hardware upgrade plans.

The critical role of software configuration management demands a system be established that effectively and economically controls the interdependencies and relationships among the host platforms and the IC3 equipment.

Reviews involving PM Abrams, Bradley, Tactical Radio Communications Systems, and FBCB2 and their respective prime contractors are conducted on a biannual basis. Likewise, requirements development must be oriented on digitization packages and involve all of the respective U.S. Army Training and Doctrine Command's Systems Managers (TSMs). As this process matures, it's envisioned that a prioritized list of proposed capability upgrades will be approved by a General Officer Steering Committee (GOSC). Once a digitization package is defined and funded, materiel developers work hand in hand using the established FBCB2 and platform System Integration Laboratories (SILs) to develop the required package items.

• Safety upgrades are exceptions to this process. Safety upgrades address problems that cannot wait for the next scheduled capability upgrade.

• All digitization package changes are coordinated by a tiered CM approach. The CM process is evolving, but as more PMs and Program Executive Offices become involved, this body will become the key controller of established digitization packages. Experience with early management of Embedded Battle Command configuration indicates changes are best implemented at the lowest level.

• The prime contractors for Abrams and Bradley (General Dynamics Land Systems (GDLS) and United Defense Limited Partnership (UDLP) respectively) receive FBCB2, SINCGARS, EPLRS, and GPS software as government-furnished equipment. The PMs for Abrams and Bradley are responsible for obtaining all of the software updates and changes from the aforementioned PMs and providing them to their prime contractors for integration and testing. Most of the software products undergo independent verification and validation prior to commencing integration efforts. Weapon system prime contractors are responsible for integrating updated software packages into their systems with full C2 system developer support.

• PM, Abrams, Bradley, and FBCB2 participate in a Central Technical Support Facility (CTSF) interoperability certification update upon completing the capability upgrades. The CTSF certifies overall system-of-system software interoperability. This process ensures that all of the software from the respective programs is successfully integrated into the system-of-system software architecture. Safety upgrades will not require full CTSF recertification. Modifications to the safety releases process are sought as appropriate to accommodate both types of changes.

• To maintain control of baseline configurations in the field, GDLS/UDLP incorporates approved FBCB2 software capability upgrades into subsequent programmed system software updates. Coordinated safety upgrades are immediately implemented upon completion of the modified safety release.

While the Team IC3 approach is not a cure-all for the software upgrade challenges facing the Army, it does provide a blueprint to ensure a solid process for configuration control of system-of-systems acquisition and fielding.

The Road Ahead

The Army's Unit Set Fielding Prime Directive is designed to modernize and field a process that will accommodate the system-of-systems nature of the digital battlefield. The IC3 approach is designed to work within that process and could be expanded to encompass a holistic Army approach to system-of-systems block software upgrades. The goal of this process is to provide the users controlled block upgrades every 12-18 months.

The Army faces daunting challenges in integrating more than 100 systems into this approach. This will require decisions that affect system-of-systems requirements, functionality, capabilities, and Internet protocols. The impact of these decisions on all stakeholders must be considered. As a result, the CM process needs to begin by controlling the required capability for each block upgrade. This top-down perspective will ensure that individual platforms will be built to the same "macro" objective.

Digitization packages will initially be defined jointly by the respective PMs and TSMs and approved by a system-of-systems GOSC, headed by the current system-of-systems manager, the Deputy Chief of Staff for Operations and Plans. The system-of-system software upgrades will need to be resourced in bundles (by package) within the current planning, programming, budgeting, and execution system process. Funding to support this approach across all platforms and systems must be tied together. The system-of-systems GOSC would conduct annual budget planning sessions to develop or update a 5-year plan that supports fielding by established packages. To address unanticipated changes, resources also will need to be committed to support post-deployment software support.

A key enabler of this effort is the CTSF, which acts as the final certification authority before a block of field upgrades is released. In applying this model to the Army, the need for a "Super" CTSF is a logical corollary to the Team IC3 process. The Super CTSF will be an expanded version of the current CTSF and will be composed of multiple system-level SILs similar to the IC3 approach. Additionally, the Super CTSF will be the focal point of software configuration and digitization architecture, as well as provide a single responsible authority for software integration prior to a block upgrade being fielded to the Army.

Conclusion

The Team IC3 approach is a seamless, integrated process that ensures successful fielding of planned upgrades to IC3 software and accommodates unanticipated software changes while minimizing impacts to unit readiness. Given the challenges facing the Army today in terms of managing the capability growth of its digital C2 systems, this process is adaptable Armywide. While the Team IC3 approach is not a cure-all for the software upgrade challenges facing the Army, it does provide a blueprint to ensure a solid process for configuration control of system-of-systems acquisition and fielding.

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Shared Challenges, Shared Successes . . .

THE U.S./GERMAN ENVIRONMENTAL TECHNOLOGY EXCHANGE

Raymond J. Fatz

Background

Environmental stewardship in the United States and in Germany presents common challenges to the military missions of both countries. There is a Master Data Exchange Agreement (DEA) between the United States and Germany that provides the framework to exchange data in a variety of research and technology areas. Areas of research and data exchange procedures are more fully described and explained in individual annexes included as addenda to the DEA. The four annexes discussed in this article specifically deal with the challenges associated with resolving environmental problems: hazardous materials/material substitutes/air (dealing with pollution prevention, waste minimization, material substitutes/recovery, and recycling); soil (focusing on soil contamination and remediation issues); water (including water contamination, remediation, and purification); and demilitarization and disposal of conventional munitions.

The key individuals for the U.S./German (GE) Environmental Technology DEA are the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health for the United States, and the Executive Director of the Federal Office of Defense Technology and Procurement (Bundesamt für Wehrtechnik und Beschaffung (BWB)) for Germany. U.S. and GE assistant project officers (APOs) coordinate and oversee the functions and operations of the U.S./GE DEA environmental annexes. U.S. and GE technical project officers (TPOs) for each environmental annex are assigned as technical leads and report through the APOs.

Planning meetings are scheduled every 6 months to discuss technical project results, evaluate progress toward goals, coordinate future goals, and to foster relationships. General meetings are held every 18 months, with the next one scheduled for June 2001 in the United States.

Environmental stewardship represents a vital component of the Army's mission in the United States as well as in Germany.

Challenges

Environmental stewardship represents a vital component of the Army's mission in the United States as well as in Germany. This stewardship supports mission readiness by complying with environmental laws, maintaining the availability of training lands, cleaning up and preventing pollution, improving soldier/family quality of life, and strengthening community relationships. Compliance and restoration continue to be vital components of the Army's environmental program.

Many common challenges are associated with environmental stewardship for both the U.S. and GE military missions. It is important to note that these challenges may be dealt with through joint demonstrated/validated technologies that result in significant cost savings. These technologies are especially valuable in the current climate of close regulatory scrutiny and shrinking technical and budgetary resources.

The first step in a jointly demonstrated/validated technology exchange is to identify locations for possible remediation and to identify

A good example of the type of benefit resulting from the Environmental Technology DEA is the use of electrokinetic treatment of soils.

possible technologies for demonstration and validation. When this is achieved, the mutual technical criteria for the demonstration project must be identified. Identifying these criteria is essential for the technology to be accepted for application in Germany. The U.S. proponents then identify and coordinate U.S. industry, academia, and other parties that may benefit from participating in the demonstration and validation process. The GE proponents then work with their local authorities on the logistics of adopting the new technologies. Maximizing the benefit of these technology demonstrations to the military mission of both countries requires a great deal of communication, coordination, and cooperation between the proponents on both sides of the Atlantic.

Past Achievements

The environmental annexes have been some of the most active within the DEA. For example, technical personnel have regularly attended planning meetings every 6 months, and large delegations of U.S. and GE proponents have met at general meetings to evaluate progress, exchange technical information, and set new goals for ongoing efforts. Since its inception, the DEA has resulted in strong professional relationships and increased knowledge through information sharing. There have been many mutual benefits gained from the data sharing. For example, the DEA has served as a precursor for joint demonstration projects, one of which was a side-by-side demonstration of U.S. and GE technologies to resolve a groundwater problem at Rhein-Main Air Force Base in Germany.

A Case In Point

A good example of the type of benefit resulting from the Environmental Technology DEA is the use of electrokinetic (EK) treatment of soils. EK treatment technology is used in the United States to remediate soils contaminated with heavy metals. Heavy metal contamination is a problem at U.S. military ranges as well as at GE sites.

More than 130 grenade range sites in Germany now receive a high level of regulatory attention. Based on DEA-fostered interaction, the GE Ministry of Defense (MOD) is undertaking the demonstration of an *ex-situ* EK remediation of metal-contaminated soil on a grenade range in Bergen, Germany. The GE MOD funds this technology demonstration. The United States provides technical input and reviews progress for this effort based on prior U.S. involvement in the EK remediation and demonstration programs at the U.S. Army Corps of Engineers Waterways Experiment Station and the U.S. Army Environmental Center.

The EK project clearly illustrates the effectiveness of hands-on sharing of expertise and resources to achieve a common purpose: solving pressing environmental problems associated with military operations. The result is refinement of a technology that could improve environmental cleanup strategies at United States Army, Europe (USAREUR) and GE military sites.

Future Actions

At the most recent planning meeting in early November 2000, attendees decided to continue to focus on the EK demonstration project. Other environmental subjects were also discussed. These included bio-based hydraulic oils and lubricants, test chamber environmental effects, silicon-based surface coatings for ships, plasma arc technology, and inorganic and organic contaminants in soil.

Next Meeting

The next U.S./GE Environmental Technology DEA general meeting will be held in Arlington, VA, June 18-22, 2001. This meeting will allow U.S. and GE counterparts to evaluate the successes and lessons learned from the environmental technologies currently being demonstrated, as well as consider new and innovative technologies for possible inclusion in future demonstration projects.

More Information

Additional information on the focus areas of the Environmental Technology DEA Annexes is available from the U.S. TPO for each annex by contacting Plexus Scientific Corp. in Alexandria, VA, at (703) 845-8492.

RAYMOND J. FATZ is the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health, and serves as the U.S. General Officer for the U.S./GE Environmental Technology DEA. He has a B.S. degree from the University of Maryland and completed graduate studies at the University of Oklahoma.

CREATIVE SOLUTIONS TO MEET DOD'S MARITIME SUPPORT NEEDS

COL Sheila C. Toner

Introduction

In modern logistics, rapid force projection is key to meeting the challenges of international contingency operations. Within the Army, improving deployability is a key focus of the Army Chief of Staff's transformation efforts and vision for the future. The U.S. Army's Military Traffic Management Command (MTMC), which is a component command of the U.S. Transportation Command (USTRANSCOM), has a combined mission of providing both logistical support for peacetime sustainment and contingency mobilization of the Armed Forces. VISA, VCC, and USC-02, described below, represent a highly complex, precedent-setting government teaming effort with industry to develop contractual solutions to strategic issues.

In simple terms, VISA stands for the Voluntary Intermodal Sealift Agreement and VCC for MTMC's VISA Contingency Contract. USC-02 is the common name for MTMC's 2nd Universal Service Contract for worldwide ocean liner transportation services for DOD. Behind these simple acronyms is a complex effort by various groups of professionals to weave several different programs and contractual efforts into a workable whole in support of DOD's peacetime and wartime missions.

While VISA, VCC, and USC-02 are separate, they are designed to link together and support each other to encourage the U.S. commercial maritime industry to support DOD's wartime needs as well as enhance competition for DOD's peacetime ocean shipping and transportation business. Together, they show the power of contracting to support DOD's mission by using recent acquisition reform initiatives.

Let's look at these three contracting resources and how they are linked together. In reviewing DOD contingency requirements, the USTRANSCOM commander in chief (CINC) determined that contractual instruments were needed to ensure a more rapid transition from peace to war. Thus was born the genesis of a unique inter- and intra-agency government teaming effort with industry to develop contractual solutions to strategic issues.

Policy Meetings

USTRANSCOM hosted several policy-making meetings for Senior Executive Service government managers and industry representatives. Agency heads, including administrators, senior military officers, and industry CEOs, met to confer on basic policy determinations. Working groups focused on various aspects of DOD's maritime needs, including pricing methodology, technical requirements, contract drafting, and operations planning. The working groups consisted of acquisition, program, and legal personnel from both government and industry. These groups not only dealt with contingency operations planners but also with peacetime shipping agencies to coordinate VISA contingency contracting needs with peacetime sustainment needs. VISA represents a highly integrated effort between government and private sector elements involved in the ocean transportation industry.

VISA provides for the commitment of strategic sealift capability by the U.S. Flag Merchant Marines under the auspices of the Defense Production Act and the Maritime Security Act. Under this program, U.S. flag ocean carriers, both subsidized and unsubsidized, enter into vessel capacity commitments with the Department of Transportation's Maritime Administration (MARAD). Thus, VISA involves the coordination of several national Defense-oriented programs by both the MARAD and DOD.

Formal Commitment

Once U.S. flag carriers signed a VISA agreement with MARAD, the foundation was in place and there was a formal commitment by U.S. flag carriers to support DOD in time of crisis. However, DOD still needed very specific contractual commitments by the liner industry. As such, DOD built on the VISA foundation. MTMC's mission is to provide commercial liner service for the CINC USTRANSCOM while the Navy's Military Sealift Command (MSC) provides organic and/or commercial vessels. So the next step was for MTMC and MSC to develop contracts to bind industry to specific levels of either liner or vessel support at various stages of a

MTMC's 596th Transportation Group loads military cargo at the port of Beaumont, TX.

Containers are loaded aboard the Chesapeake Bay in June 1999 during Operation TURBO CADS 99 at Sunny Point, NC. The port on the Cape Fear River is home to MTMC's 597th Transportation Group.

contingency operation. For MTMC, the VCC was the next step.

MTMC's VCC is a contract with those carriers that are VISA participants, which establishes the rates, terms, and conditions under which each contractor will provide specific liner capacity in a contingency operation. For MTMC, the goal was to meet the CINC's wartime needs and ensure a rapid activation and good planning data. Thus, a very specific commitment was needed from industry so wartime planners would know the load capacity, vessel speed, etc., that would be available when required. Similarly, the commercial carriers making these commitments needed to know when TRANSCOM would activate specific assets so they too could adequately plan and predict their commercial activities. Preestablished payment rates that will permit rapid delivery of liner cargoes into a theater of operations were also developed. VCC offerors could elect to submit rates pursuant to one of the three approved methods: revenue-based rate, peacetime rate, or negotiated contingency rate. Procedures to implement these various methods required significant oversight effort on the part of the Defense Contract Audit Agency.

The Awards

Each of the 17 VCCs awarded by MTMC was individually negotiated. In addition to basic pricing methodologies, many additional issues arose during the joint DOD/MARAD/industry discussions concerning the specifics of VISA and its implementing VCCs. Companion contracts to the VCC, such as the VISA-Drytime Contingency Contract (VISA-DCC), were developed in parallel by the MSC for vessel commitments.

Pre-Priced Contracts

Thanks to the VISA-VCC contracting agreements, the MTMC now has off-the-shelf pre-priced contracts for liner services during contingency operations that can be activated at any time by the CINC USTRANSCOM. This VISA-VCC effort is similar to the Civil Reserve Air Fleet Program that has successfully provided rapid access to the U.S. commercial airfleet in time of crisis.

MTMC's action, coupled with the parallel VISA-DCC effort by MSC, essentially ensures that DOD is prepared to activate strategic sealift at anytime, anywhere in a seamless transition from peacetime to contingency operations as opposed to the much less efficient prior method of negotiating individual sealift agreements on an individual basis when required.

Incentives

MTMC paid each VCC contractor $1,000 for providing a preliminary contingency plan upon signing the contract. However, this fee is not a significant incentive for the maritime industry to sign these contracts. What incentive did MTMC offer industry? The incentive is the final component of this complex and interwoven acquisition strategy, MTMC's peacetime liner contract—USC-02. Following the signing of the VISA and VCC contracts, MTMC's contracting professionals awarded USC-02 for its peacetime shipping needs. The award was made to 21 ocean carriers to provide an efficient, cost-effective means of shipping Defense Transportation System (DTS) cargo on approximately 76 individual routes worldwide. DTS cargo is transported on the awardees' regularly scheduled commercial routes, thus ensuring uninterrupted service in global ocean transportation for DOD. In addition, USC-02 provides for the movement of military equipment in support of actual military contingencies and exercises. The USC-02 contracts made extensive use of acquisition streamlining. The solicitation was issued under the guidelines set forth in Federal Acquisition Regulation Part 12 (Acquisition of Commercial Items).

Contracts were awarded on the basis of "best-value" evaluation criteria rather than the "low-cost/technically acceptable" method employed previously under USC-01. These awards were made on time and without protest. This complex contracting action, with an estimated value of $400 million over the life of the contracts, supports both DOD's peacetime and wartime transportation missions by using VISA-VCC participation in the best-value evaluation process. As part of the best-value evaluation process, award preference for these USC-02 peacetime contracts was linked to a carrier's commitment to meeting military requirements during contingency operations via enrollment in the VISA and VCC. The preference given to VISA participants in the awarding of DOD's peacetime shipping requirements under the USC-02 contracts is seen as an incentive to encourage carrier participation and commitment to meeting DOD wartime transportation needs.

Conclusion

This unique forward-looking, multifaceted effort shows the benefits of several government organizations working together in a multidiscipled team focused on long-term strategic planning requirements. The involved agencies abandoned outdated procurement techniques at all stages in the process and crafted business solutions to Defense problems using tailored modern commercial acquisition techniques. This effort also showcases the ability of Army Acquisition Corps (AAC) professionals to serve as wartime enablers and force multipliers for our combat forces.

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ADDRESSING SOLDIER NEEDS THROUGH INNOVATIVE PARTNERSHIPS

Dr. Kenneth A. Bannister, MAJ Lyndon F. Wrighten, and John H. Ruehe

Introduction

The primary mission of the U.S. Army is to fight and win the Nation's wars and protect its vital interests. The Army conducts a wider array of missions and is deployed in more areas than in any time in recent history. Recognizing this, the Army's recent vision statement says, "We will provide to the Nation an array of deployable, agile, versatile, lethal, survivable, and sustainable formations, which are affordable and capable of reversing the conditions of human suffering and resolving conflicts decisively." The key to the Army's transformation is to maintain technological dominance and to leverage emerging technologies available in the commercial market. Soldiers, the most important Army resource, should be enabled, not encumbered by the explosion of new technologies. The correct technology in the hands of well-trained soldiers and combat leaders facilitates mission accomplishment.

The Army maintains its technological edge by partnering with industry and academia. Agile, free-thinking, small (fewer than 500 employees), high-tech companies often generate innovative and significant solutions to meet soldiers' needs. The Army seeks to harness these talents through three innovative research and development (R&D) programs: the Small Business Innovation Research (SBIR) Program, the Small Business Technology Transfer (STTR) Program, and the Advanced Concepts and Technology II (ACT II) Program.

The SBIR and STTR Programs involve small businesses in early-stage R&D projects. These two programs provide timely investment capital, enabling small businesses to rapidly develop dual-use technologies, products, and services to bring to the marketplace. Dual-use technologies are defined as those that, first and foremost, benefit the soldier and are commercially viable.

The ACT II Program encourages businesses of all sizes to apply technologies that are mature, or those that are reaching maturity in the commercial sector, to address Army mission needs. Ultimately, the Army SBIR, STTR, and ACT II Programs benefit the Army, the private sector, and the national economy. Brief descriptions of each of these programs follow.

SBIR Program

In 1982, the U.S. Congress established the SBIR Program in response to growing concerns in the late 1970s and early 1980s about the underrepresentation of U.S. small businesses in federal R&D. Since that time, the purpose of the SBIR Program has been to increase the participation of small businesses in federal R&D. Currently, the Army must reserve 2.5 percent of its extramural R&D budget (that part of the R&D budget that goes "out of house" for contracts to private companies) for competitively selected SBIR awards to small businesses. The goal of the dual-use SBIR Program is to tap into the innovation and creativity of the small-business community to help meet Army R&D objectives. As an added incentive, these small companies simultaneously develop technologies, products, and services that can be commercialized through sales in the private sector or sales to the government (e.g., the Army).

Successful SBIR projects move through three phases. Army scientists and engineers develop SBIR solicitation topics that address current and anticipated warfighting technology needs. These topics are subjected to rigorous reviews by the U.S. Army Training and Doctrine Command (TRADOC) Battle Labs and the Army logistics community. Senior DOD R&D managers also review the topics for compliance with national defense priorities and requirements. Small businesses enter the SBIR process by submitting concepts in the form of Phase I proposals against these topics.

Phase I is the entry point where a company receives up to $70,000 for 6 months to prove the feasibility of its concept. An option for a company to receive up to $50,000 is available to fund interim Phase I/Phase II activities if the project is selected to receive a Phase II award. Phase II is a substantial R&D effort where a company gets up to $730,000 for 2 years to develop a dual-use technology, product, or service. SBIR is very competitive; about 1 in 10 Phase I and 1 in 3 Phase II proposals are selected for an award.

Phase III, the commercialization phase, is the goal of every SBIR effort. During Phase III, the successful company markets its dual-use product or service to the government, the private sector, or both. No SBIR funding is provided in Phase III.

The Army participates with the Navy, Air Force, and six other DOD agencies under the overall DOD SBIR Program; however, as is the case with the other DOD components, the Army program is autonomously managed and seeks to support Army-specific goals

within the framework of the DOD SBIR Program.

STTR Program

The STTR Program, like the SBIR Program, is a government-wide program that was Congressionally mandated by the Small Business Research and Development Enhancement Act of 1992 in response to concerns raised by the U.S. academic community.

The STTR Program shares the same objectives as the SBIR Program regarding increased involvement of small businesses in federal R&D and the commercialization of innovative technologies. STTR projects also require participation by universities and colleges, several so-called Federally Funded Research and Development Centers (FFRDCs) (such as the U.S. Department of Energy's national labs), and certain other nonprofit research institutions.

Specifically, the STTR Program provides an incentive for partnering small companies and researchers at academic institutions, FFRDCs, and nonprofit research institutions to move emerging technical ideas from the laboratory to the marketplace. Each STTR proposal must be submitted by a team that includes a small business (as the prime contractor for contracting purposes) and at least one research institution, which have entered into a written agreement for the STTR effort. Also, the project must be divided so the small business performs at least 40 percent of the work and the research institution(s) performs at least 30 percent of the work. The remainder of the work may be performed by either party or a third party. The STTR budget is determined by an assessment of 0.15 percent of the Army's extramural R&D budget.

STTR moves through a three-phase process similar to that of the SBIR Program. By law, STTR Phase I can be up to a 1-year effort with a maximum contract value of $100,000. However, Phase I efforts are currently limited to 6 months, but still valued at $100,000. Phase II STTR projects are 2-year efforts involving an award of up to $500,000. Because of the strong focus on forming partnerships among academia and other nonprofit research institutions, the Army Research Laboratory's (ARL's) Army Research Office (ARO), the Army's lead agency for funding academic research, is the executive agent for the STTR Program.

ACT II Program

The ACT II Program was established in 1994 by the then Assistant Secretary of the Army for Research, Development and Acquisition (now the Assistant Secretary for Acquisition, Logistics and Technology). The ACT II Program sponsors projects that would not otherwise be supported under the traditional Army R&D mission because of risk, unconventional approach, or lack of funded efforts. Each year, the Army selects industry's most promising technologies, prototypes, and nondevelopmental items for realistic demonstrations, in most cases with operational Army units, and then assesses the results. The ACT II Program, as an example of recent U.S. federal reform initiatives, represents one of the most responsive acquisition strategies in the U.S. Army. Again, the ACT II Program is open to all U.S. businesses.

Using a two-stage selection process designed to minimize the burden on industry, the Army first solicits two-page ACT II concept papers responding to mission requirements. Second, those firms providing the most promising concepts, as judged by the TRADOC Battle Laboratories and Army materiel developers, are invited to submit full proposals. Firms submitting successful proposals are awarded ACT II contracts to demonstrate their solutions to the Battle Laboratories in environments that address rigorous battlefield conditions.

Successful ACT II technology solutions then enter the Army's traditional R&D program, are selected for consideration for support by the Army Warfighter Rapid Acquisition Program, or transition directly to end items as new starts or product improvements. The annual ACT II Program budget of $10-20 million targets 12-month projects costing a maximum of $1.5 million each. The goal is to develop demonstration projects to meet Army requirements.

Conclusion

The Army SBIR, STTR, and ACT II Programs involve aggressive outreach efforts to "get the word out" to the commercial marketplace regarding opportunities to help the Army meet its mission needs. In part, the Army gets the word out through participation in national, regional, and local conferences with industry across the United States. Additionally, the Army has gone to great lengths to provide online access to comprehensive information about these programs via the World Wide Web. For more information about these programs, visit the ARO-Washington (ARO-W) Web site at **http://www.aro.army.mil/arowash/rt**. Administered by ARL's ARO, these programs have proven to be an integral part of the U.S. Army's successful commitment to invest in today's emerging developmental and "off-the-shelf" technologies to give our soldiers the advantages they need.

Note: An article on the 2000 Army SBIR Phase II Quality Awards begins on Page 22 of this magazine.

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SIMULATIONS: CHANGING THE PARADIGM FOR OPERATIONAL TESTING

CPT Andrew E. Yuliano

Introduction

Although May 2000 was ordinary by most standards, it was extraordinary for the U.S. Army Operational Test Command's Air Defense Artillery Test Directorate. During the PATRIOT Advanced Capability-Phase 3 (PAC-3) Limited User Test (LUT) conducted at Fort Bliss, TX, simulation was the main vehicle in an air defense operational test. Over the course of approximately 4 weeks of testing, crews of the test player unit, the 2nd Battalion, 1st Air Defense Artillery Regiment, engaged multiple simulated air breathing threat (ABT) and tactical ballistic missile (TBM) targets in 120 realistic threat air battle scenarios. During this phase of operational testing, not a single live aircraft or missile took to flight. At the same time, however, all testing was effective in terms of data adequacy and cost reduction. In fact, with simulation at the helm via the PAC-3 Mobile Flight Mission Simulator (MFMS) test tool, the cumulative cost of creating and engaging the enemy totaled approximately $600,000—less than the cost of firing a single PATRIOT missile.

The MFMS Tool

At first glance, the MFMS appears to be an ordinary military vehicle, but its capabilities extend far beyond that. The PAC-3 MFMS is a hardware-in-the-loop test system for PATRIOT that can simulate a variety of enemy air vehicles through pre-programmed threat air battle scenarios. These threats include various types of TBMs, ABTs, and air-to-surface missiles. The threat targets have programmable arrival times and designated ground impact points that require the PATRIOT system to engage multiple targets simultaneously. The scenarios are not a random generation of targets but rather a true-to-life representation of known PATRIOT threats across the globe. This feature significantly increases the realism factor of the air battle in each developed scenario.

While the mobility aspect of the simulator is relatively new, the origins of the system are not. The Raytheon Corp. PATRIOT Program Office originated the flight mission simulator (FMS) in 1974 to create a tool for engineering and development. Eventually, Raytheon intended to use the FMS tool for system developmental testing. The goal was to exercise and test the PATRIOT system without altering its tactical configuration. The fire unit equipment was set in normal configuration and connected via the PATRIOT radar to the FMS for artificial target insertion. Initial success came later that year when the first version of the FMS was able to inject radio frequency (RF) signals into the system radar for one simulated target. Within 4 years, the FMS had the capability to stimulate the radar with up to 10 targets. Numerous software and hardware improvements have followed. The test tool is now capable of stimulating the PATRIOT system with the maximum number of targets allowed by the tactical system software.

Raytheon added mobility in 1995 by creating a truck-mounted FMS—this was the evolution of the MFMS. Although engineering, development, and testing were the original goals of the FMS, this mobility allowed increased flexibility for use in operational testing. After an extensive verification, validation, and accreditation process, the MFMS was certified as a viable test tool.

The engagement control station (ECS) is tactically hard-wired to the radar set (RS), and the RS is hard-wired to the MFMS. Additionally, the communications relay group (CRG) van is linked by wire to the ECS. The Information Coordination Central communicates with the ECS via the tactical PATRIOT Digital Information Link and communicates with the Communications, Control, and Command Engineering Environment System (a communications simulator) via Tactical Digital Information Link-J (TADIL-J). This emulates a joint defense network and ensures the system is capable of communicating in a joint environment via the TADIL-J messaging system.

The Battery Maintenance Center wires into the ECS to collect system maintenance and status data via its remote maintenance monitor on the PATRIOT Automated Logistics System computer. Simulating the PATRIOT launching stations are two data transfer units (DTUs). One DTU in the ECS simulates local launchers. The other DTU, located in the CRG, simulates remote launchers which, in reality, may be located 10-30 kilometers from the rest of the fire unit.

To create the scripted targets for each scenario, the MFMS stimulates the RS by inserting the RF signals necessary to emulate an actual track of that type

Mobile Flight Mission Simulator

in the RS search sector. When the radar is operating in "active radiate" mode, a combination of both MFMS-generated and real tracks will appear on the PATRIOT man stations (operator scopes). Visually, the graphic representations of MFMS tracks are no different than those of actual tracks. The operator can differentiate between real and simulated tracks by observing the identification friend or foe (IFF) response of the track if it has a working IFF system. Simply stated, a real aircraft will generate an interrogation response, whereas the simulated aircraft will return no response.

PATRIOT radar and MFMS configured for operation

Why Simulation?

Testing of any new or upgraded system entails two inevitable requirements. First, testing must accurately mirror the system's operational environment as it would exist during a wartime mission. Second, and perhaps more challenging, is that the first requirement must support the data collection required for system evaluation and the corresponding test schedule. In the case of the PAC-3 system, the absolute best test environment would be one of multiple live TBM, ABT, and ASM targets in flight while being tracked and engaged by a mix of live PATRIOT missiles (PAC-2, Guidance Enhanced Missile, PAC-3, etc.). This meets the first requirement as it mirrors PATRIOT operations in a wartime environment. The stumbling block is that costs would be monumental. With live missiles and aircraft flights as costly as they are, simulation is the natural alternative. Additionally, the continued proliferation of threat TBMs since Operation Desert Storm makes the development of accurate threat representative targets even more costly and challenging. The one simulation tool that effectively satisfies much of the two operational testing requirements for PAC-3 is the MFMS.

The Bottom Line

The basic costs between a live PATRIOT missile firing and use of an MFMS differ immensely. Based on PAC-3 FY01 live-fire test projected costs, the funding required to fire a single PATRIOT missile at White Sands Missile Range, NM, is approximately $2 million plus the cost of the interceptor and target. This primarily includes firing range time and equipment maintenance. Because of the close proximity of White Sands to Fort Bliss, equipment transportation is not costly. However, live missile firings at alternate locations, such as the Kwajalein Missile Range in the South Pacific, require up to three times the funding because of increased transportation and range operation costs. Additionally, the following factors cause overall costs to rise even further:

- Research and developmental testing of the target missile flight profile,
- Multiple types of target missiles and target aircraft required,
- Extensive aircraft flying time required, and
- Significant wear and tear on the system as a result of live-missile firings mandate extra repair parts and maintenance personnel.

Based on PAC-3 LUT figures, the cost of one MFMS scenario with 8 to 30 simulated target engagements is approximately $45,000. This includes operational costs of the equipment and creation, verification, and validation of the scenario for target adequacy. Significant resource conservation is a direct result of factors such as the following:

- Simpler and more cost-effective verification and validation of target flight profile for both missiles and aircraft; threat missile motion modeling is easier than reproducing a real flying vehicle.
- Significantly less system wear and tear and maintenance personnel requirements.
- No physical reloads.
- No flying-time requirements.

Lessons Learned

The success of PAC-3 LUTs reinforces the feasibility of simulation in operational testing. The MFMS test tool allows for required data collection and enables conservation of multiple resources. With test costs always a factor throughout the projected fielding and evaluation of any system, funding consistently weighs heavily on the mind of any test officer. The MFMS has demonstrated a proven capability to correctly simulate the flight of threat aerial vehicles that allows the operational tester to collect system performance data. Additionally, the only critical limitations of the MFMS are the inability to simulate clutter and to stimulate more than one fire unit at a time. The FMS is also unable to adequately simulate missile performance and lethality, thus necessitating hardware-in-the-loop, a flight test program, and other performance analysis tools. Despite these shortcomings, it is an outstanding tool that has lifted strains on funding, personnel requirements, and man-hours for the PATRIOT system. The contributions of the MFMS will allow for continued usage as a paradigm of a successful operational testing alternative.

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FROM THE DIRECTOR ACQUISITION CAREER MANAGEMENT OFFICE

First let me introduce myself. On Feb. 1, I assumed duties as Director of the Acquisition Career Management Office, having served previously as the Director of the Acquisition Strategy and Customer Support Division at Headquarters, Defense Contract Management Agency. I consider myself both fortunate and honored to have been chosen to work with the dedicated professionals in the Army Acquisition and Technology Workforce (A&TWF), formerly called the Army Acquisition Workforce.

Why was the name changed? Simply to recognize the breadth of occupations and skills that are directly involved in the acquisition of our warfighting and support systems. The new name more accurately reflects the contributions of all those dedicated professionals who are involved in every aspect of system development, requirements determination, technological innovation, logistics support, and financial and acquisition management.

Acquisition is a multifaceted process that requires the skills of many to ensure the best possible systems are developed and fielded to our Army. The combined talents and dedication of all participants are necessary if we are to achieve the goals and objectives set forth in the Army transition plan and the objective force concept. A highly competent Acquisition and Technology Workforce is absolutely essential to ensure a successful transformation of the Army.

At the annual Army Acquisition Career Management Workshop in Austin, TX, in January, we discussed numerous ideas to support the continued success of the A&TWF. We need innovative approaches to get where we need to go and, once they are defined, we need to *make it happen*! This year we will focus on the number of acquisition career management programs and policies we have and the technology support we have in place to carry out these programs and policies.

I want to ensure that we have the right solutions, the best tools, and responsive, user-friendly systems to support the workforce. At the workshop, we also introduced our new *Army Acquisition Career Management Handbook 2001*. This important resource is available from your Acquisition Career Manager and can also be accessed on the Army Acquisition Corps (AAC) home page at **http://dacm.sarda.army.mil/**. I encourage you to look for the article on the annual workshop in the next issue of *Army AL&T*.

I would like to extend my congratulations to the winners of the annual Acquisition Career Management Advocate and Acquisition Career Manager of the Year Awards. The winners were announced at the workshop in Austin. The Acquisition Career Management Advocate of the Year is Glenn Buttrey, who is employed in the Program Executive Office, Aviation at Redstone Arsenal, AL, in the Southern Region. Christi Steiner received the Acquisition Career Manager of the Year Award. She serves at Rock Island Arsenal, IL, in the Central Region. Congratulations to these outstanding, dedicated professionals who are helping us *make it happen*!

As you read this, the Army Acquisition 2001 Roadshow will be well underway. The roadshow is a valuable vehicle to obtain the information you need to advance your acquisition career goals and to answer your acquisition career management questions. Be sure to find out when the roadshow will be in your region! The current schedule is on Page 38 of this magazine and can be found on the AAC home page at **http://dacm.sarda.army.mil/news/2001roadshow.htm**.

We have many challenges. I need your feedback on current issues and more importantly your ideas for better solutions and tools. I look forward to working with you.

COL Frank C. Davis III
Director
Acquisition Career
Management Office

Career Management Handbook, AETE Catalog Available

The *Army Acquisition Career Management Handbook 2001* and the *Acquisition Education, Training & Experience (AETE) 2001 Catalog* are now available from your Acquisition Career Manager. Be sure to get your copy of these important resources! The handbook provides basic information you need to both plan your career and take advantage of the unique opportunities available to you as an acquisition professional. The *AETE 2001 Catalog* serves as an important reference for career development information and outlines all training, education, and experience opportunities available for military and civilian personnel. The catalog may also be accessed at **http://dacm.sarda.army.mil/careerdevelopment**.

Recruiting Briefings Supplement Roadshow Visits

Army Acquisition 2001 briefings began in February in the National Capital Region. If you are a member of the Army Acquisition and Technology Workforce (A&TWF), you are invited to attend these "roadshow" briefings scheduled throughout the country this year. A team of experts from the Acquisition Career Management Office is prepared to provide assistance to workforce members, including help with updating Acquisition Career Record Briefs, Individual Development Plans, and acquisition career goals.

In conjunction with many of the roadshows, acquisition officer recruiting briefings are being held simultaneously to give officers the chance to learn about the Army Acquisition Corps (AAC) and the wide variety of professional and personal opportunities. In particular, captains interested in accession into the Army A&TWF are encouraged to attend. Additionally, supervisors from all branches and other Army acquisition professionals are encouraged to attend the briefings themselves and to support the attendance of quality military officers. Please watch for announcements of a recruiting briefing in your area and consult the AAC home page at **http://dacm.sarda.army.mil/news/2001roadshow.htm** for the current roadshow schedule.

Prior to attending a recruiting briefing, officers may want to visit the AAC home page or the Total Army Personnel Command's Acquisition Management Branch Web site at **http://www-perscom.army.mil/OPfam51/ambmain.htm** for general information. Specific questions regarding recruiting may be directed to Army Acquisition Recruiting Officer MAJ Jeannette Jones at (703) 604-7136, DSN 664-7136, or e-mail **JonesJJ@sarda.army.mil**.

The roadshow schedule for March and April 2001 is as follows:

APG, MD	March 6-8
Fort Detrick, MD	March 19
Natick, MA	April 18-19
CECOM, Fort Monmouth, NJ	April 24-25
ARDEC, Picatinny Arsenal, NJ	April 25-26

31 Graduate From MAM Course

In December 2000, 31 students graduated from the Materiel Acquisition Management (MAM) Course, Class 01-001, at the Army Logistics Management College, Fort Lee, VA. The Distinguished Graduate Award was presented to MAJ Karen D. Tomlin, who is assigned to the Program Executive Office for Command, Control and Communications Systems at Fort Hood, TX.

The 7-week MAM Course provides a broad perspective of the materiel acquisition process and includes a discussion of national policies and objectives that shape it. Areas of coverage include acquisition concepts and policies, research and development (R&D), test and evaluation, financial and cost management, acquisition logistics, force integration, production management, risk assessment, and contract management. Emphasis is on developing midlevel managers to effectively participate in managing the acquisition process. New DoD 5000 policies were incorporated into the materials presented in this class offering.

R&D, program management, testing, contracting, requirements generation, logistics, and production management are some of the work assignment areas offered to MAM Course graduates.

Organizational Name Change

The Center for Professional Development and Training at The University of Texas at Austin is now called The Center for Strategic Analysis (CSA). The CSA General Officer Review Board, chaired by Director of the Army Acquisition Corps LTG Paul J. Kern, approved the name change Oct. 13, 2000. According to Dr. Jerry Davis, Center Director, the new name better reflects the center's mission that has evolved as a result of contractual taskings with the Acquisition Corps, the Army, and DOD to focus on long-term planning and future Army and Defense strategies.

Using the university's vast capabilities and those of Army War College fellows and Defense advisors, the CSA will place greater emphasis on strategic studies, long-range planning, transition, military analysis, and innovative acquisition processes. Many of the ongoing programs, such as the Army Senior Service College Fellowship Program, will integrate the new strategic emphasis.

For additional information regarding CSA, contact Jerry Davis at (512) 232-4554, e-mail **jerry_davis@iat.utexas.edu**; or Jim Pollard at (512) 232-4560, e-mail **jim_pollard@iat.utexas.edu**.

Russo Becomes First DLAMP Army Graduate

Late last year, David J. Russo, Director of Program Integration in the Program Executive Office for Air and Missile Defense, Huntsville, AL, became the first Department of the Army employee and the first member of the Army Acquisition Corps (AAC) to graduate from the Defense Leadership and Management Program (DLAMP). DLAMP is the Congressionally mandated premier Senior Executive Service development program for senior DOD leaders.

Russo received his diploma from then Deputy Secretary of Defense Rudy de Leon at a ceremony held in the Pentagon. He also received a congratulatory letter from then President William J. Clinton.

Russo has more than 26 years of active federal service, is Level III certified in the AAC, and is a lieutenant colonel in the U.S. Army Reserve.

13 Officers Selected For Advanced Strategic Art Program

Thirteen officers from various military Services were recently selected to participate in the Advanced Strategic Art Program (ASAP) at the U.S. Army War College, Carlisle Barracks, PA. Among the selectees was COL Genaro Dellarocco, the first Army Acquisition Corps officer chosen for the program. The ASAP is a rigorous program designed to provide commanders-in-chief with the finest campaign and theater strategists in the world. The ASAP class will graduate in June 2001.

The ASAP joint-warfighting curriculum prepares students for planning positions on unified command staffs, on the Joint Staff, and for other demanding planning assignments.

"The program focuses on the nexus between national wartime strategy and theater strategy. The course will provide students with a solid intellectual foundation in history, theory, and strategy to develop a rich professional perspective on theater operations," said COL Michael Matheny, ASAP Director.

The ASAP, now in its second year, is a key element of the vision for the U.S. Army War College—the center for study of strategic landpower issues—educating senior officers of the Armed Forces in leadership and landpower. Each ASAP graduate will be awarded the additional skill identifier of 6Z–Strategist.

Acquisition Candidate Accession Board Results

The annual U.S. Total Army Personnel Command (PERSCOM) Acquisition Candidate Accession Board (PACAB) convened Nov. 6-9, 2000, to review applications of officers for accession into the Army Acquisition Corps (AAC). The PACAB reviewed the records of 234 officers requesting consideration for the AAC. Below is the list of 121 officers from year groups 91-95 recommended for accession. These officers are now controlled as Functional Area 51 (Acquisition Corps) and are managed by PERSCOM's Acquisition Management Branch.

NAME	YEAR GROUP	BRANCH
Agustin, Gene Ariel	1994	IN
Aleandre, Rodrigue	1991	SC
Ancira, Samuel Salanda Jr.	1994	FA
Anderson, Joseph Scott	1993	IN
Atkins, Thomas Joseph	1993	AD
Beall, Scott Thomas	1993	AV
Borja, Ralph Taitano	1994	FA
Brennan, William Torrance	1992	AR
Byrd, Christopher M.	1996	TC
Caldwell, Jeffrey Lamont	1994	AR
Calhoun, John Clifton	1993	OD
Cannaday, Robert Lawrence Jr.	1994	SC
Chambers, Floyd	1991	QM
Clark, Philip Rhea	1993	FA
Cockerham, John Lee Jr.	1994	AR
Comasdiaz, Angel Luis	1992	SC
Conatser, James Loren	1994	IN
Correia, Carlos Albert	1994	QM
Crank, Terry Gene	1994	OD
Crespo, Luis	1993	MI
Cude, Clarence Craig Jr.	1992	AD
Culclasure, Harry Raysor	1991	FA
Debany, Richard Burke	1992	AV
Desilva, Roy Austin	1992	SC
Devine, Craig	1991	SC
Devine, Michael Joseph III	1992	SC
Dills, Jack Eric	1992	SF
Durant, Jon Riley	1993	FA
Edens, Clayton Warren	1991	SF
Edwards, John Kennedy	1994	CM
Ellis, Bruce E.	1992	FA
Everton, Michael Scott	1994	AG
Fisher, Richard Joseph	1994	MI
Franklin, Francene Marie	1993	OD
Gonzalez, Tarolyn Y.	1993	MI
Greany, Peter Nikolay	1992	IN
Green, Lance Brandon	1992	IN
Greig, Amanda Pearson	1992	EN
Hamilton, Ronald Glenn	1994	MI
Hanner, Frank Edward Jr.	1994	TC
Harris, David Thomas	1994	IN
Hatchett, Barry M.	1992	OD
Hearon, Robert Wesley	1991	FA
Hetzel, Gregory Theodore	1994	IN
Hofmann, Daniel Michael	1992	AD
Holmes, Angela M.	1991	AD
Howald, Charles Oliver	1994	AD
Howe, Jason Alan	1993	AV
Huff, Tom Takashi	1993	AV
Hunt, Kristen L.	1991	SC
Hunt, Philip Dwight	1991	FA
Ireland, Katherine W.	1991	SC
Jackson, William D.	1992	AV
Jacobson, Kathleen Jeanette	1993	EN
Johnson, Ellsworth Ken	1993	AR
Jury, Matthew Alan	1993	AV
Kinn, Daniel David	1994	AV
Kioutas, Nickolas T.	1994	AV
Klopotoski, Dean Tadak	1993	SC
Kram, Anthony Shane	1994	AV
LaChance, Eric M.	1991	EN
Lackovic, Christopher Joseph	1993	FA
LaFlamme, Mark Henry	1991	IN
LaFontaine, David Ricardo	1993	IN
Laughlin, Kelly D.	1992	FA
Lawless, Richard Jeff	1993	MI
Lindquist, Robert B.	1993	QM
Lowrey, Douglas Scott	1994	IN
Lozano, Francisco Javier	1993	AR
Ludwig, Eric Wilber	1992	AV
Lynch, Ingrid Winslow	1992	AV
Martin, James Edward Jr.	1994	AD
Mazure, Paul David	1993	IN
McGowan, Dennis Michael	1993	IN
McGuire, Keith Quentin	1991	IN
McLeod, Gary Scott	1994	AG

Messer, Kevin K.	1991	AD
Mills, James Christopher	1993	AV
Momon, James Jr.	1994	FA
Munster, Matthew G.	1991	AR
Nakano, Victor M.	1991	EN
O'Connor, Ryan Patrick	1994	IN
Oderkirk, Andrew David	1991	IN
Olmstead, Michael Gregory	1993	AV
Oquendo, Gregory	1992	AD
Paige, Matthew Norman	1991	TC
Pasion, Angelito Galvez Jr.	1993	AR
Pearson, Mollie Anne	1993	EN
Perkins, Russell Bryan	1991	IN
Phillips, Jeffery Eugene	1994	MP
Phillips, Lewis Herschel	1993	SC
Qualls, Teddy Donald	1993	IN
Ramos, Robert	1993	OD
Ransom, Audrey	1991	OD
Ransom, Wilton	1991	OD
Rew, Scott A.	1991	OD
Riddick, James A.	1991	MI
Rivera, Jose Manuel	1994	MP
Robison, Bryan Scott	1991	IN
Simpson, Jeffrey Scott	1993	AD
Skeen, Ricky Lyn	1994	QM
Smith, Granville Ronnell	1994	IN
Smith, Keith Allen	1991	IN
Snodgrass, William James Jr.	1993	SC
Starks, Teresa Lavall	1994	QM
Stevison, James M.	1994	OD
Stewart, Donald George	1993	OD
Stewart, Laundette Alexandra	1994	QM
Stone, Jeffery Clark	1993	AG
Stiner, Mark Thomas	1993	AG
Talbot, Mark Edward	1993	IN
Teran, Dora Elia	1994	AD
Tschida, Carol M.	1991	AV
Vanderschaaf, Reid Evan	1992	EN
Varnadore, Marcus Ladell	1993	AV
Verser, Garrett Jacobey	1994	OD
Warner, Timothy A.	1992	QM
Watts, Robert Earl	1994	IN
Webber, David Elliot	1993	AV
Williamson, John Klip III	1991	IN
Woodard, Guy Melvin III	1992	SF

Defense Acquisition University, Beyond 2000

The Defense Acquisition University (DAU) is continually moving forward in transitioning traditional resident DAU courses to distance learning via the Internet. This initiative provides individuals wider access to courses and a cost savings to DAU in travel and per diem. Many courses have already been converted totally to online participation or transitioned to a hybrid configuration (part online and part resident). Below is a list of courses currently available online or hybrid.

ACQ 101	Fundamentals of Systems Acquisition Management (online)
BCF 102	Fundamentals of Earned Value Management (online)
BCF 211	Acquisition Business Management (hybrid)
CON 237	Simplified Acquisition Procedures (online)
IRM 101	Basic Information Systems Acquisition (online)
LOG 101	Acquisition Logistics Fundamentals (online)
PMT 250	Program Management Tools Course (online)
PQM 101	Production and Quality Management Fundamentals (online)
PQM 201	Intermediate Production and Quality Management (hybrid)
SAM 101	Basic Software Acquisition Management (online)
TST 101	Introduction to Acquisition Workforce Test & Evaluation (online)

DAU will convert other courses in the near future. For example, at the time this article was written, ACQ 201 was due to be released as a hybrid course in March 2001. This will require applicants to take the first part via the Internet and attend a 1-week resident class. Hybrid courses require the individual to first register for the resident class. Once enrolled, applicants are automatically enrolled in the online portion and notified by e-mail with the necessary instructions.

Another DAU initiative involves re-engineering PMT 302. Plans call for splitting the course into two separate parts: PMT 302 and PMT 352. PMT 352 will be the new course required to obtain Level III certification in program management (4-5 weeks). PMT 401 will be a new course designated for personnel who have been selected or desire to become a program manager. The prerequisite for PMT 401 will be PMT 352.

A source for information on the conversion of DAU courses is the Army Training Requirements and Resources System Internet Training Application System (AITAS) located at **https://www.atrrs.army.mil/channels/aitas/**. The AITAS bulletin board displays current information on DAU courses.

Army personnel must use AITAS to apply for all DAU courses, whether they are Internet, hybrid, or resident. Army acquisition workforce personnel must also have the DAU course(s) approved on their automated Individual Development Plan before applying via AITAS.

PERSCOM Notes . . .

FY00 Acquisition Corps Resident Command And Staff College Officer Selection Results

The FY00 Command and Staff College (CSC) Selection Board results for Academic Year (AY) 01/02 were released Nov. 29, 2000. More than 70 Army Acquisition Corps (AAC) officers from year groups (YGs) 89 and 90 were selected for

resident attendance, and 55 AAC officers from YGs other than 89 and 90 were revalidated.

The CSC Selection Board has now completed the transition from a four-look to a two-look selection process. Under the two-look system, 50 percent of each YG was selected to attend the resident Command and General Staff College (CGSC). Thirty percent of YG90 was selected this year. The remaining 20 percent of YG90, along with 30 percent of YG91, will be selected by the FY01 board.

Allocation of seats for AY 01/02 has not been finalized, but the U.S. Total Army Personnel Command's Acquisition Management Branch anticipates approximately 60 seats against the total population of 135 selectees, including deferments from other YGs. At the time this article was written, slating decisions were expected to be finalized around mid-February 2001.

Congratulations to the following officers selected for AY 01/02 CGSC resident attendance.

Adomatis, Dennis Paul
Anderson, Larry Scott
Bailey, William James
Broek, Harold Dale Jr.
Brown, Sharon Lavonne
Buhl, Harold Allen Jr.
Bush, Michael John
Cauley, Timothy Mark
Coleman, Willie Deron
Conway, John Patrick
Crick, Michael Dean
Daniels, Mark Richard
Deakins, Thomas Andrew
Dease, Charles Patrick
Dunlap, Ernest Lee Jr.
Dupont, Joseph Peter
Farmer, Michael Patrick
Fischer, William Dennis
Franks, Gregory Charles
Gaare, Dennis
Glenn, Eric Sean
Graham, Gordon Lee
Grauel, David William
Green, Gregory Sean
Gresham, Shawn Patrick
Gutierrez, Moises Mota
Helm, Eric Gordon
Hornstein, Richard John
Hossack, Timothy Clark
Howard, Paul Dekle
Ingram, John Matthew
Jackson, Hope Michaela
Jamison, Vernon Louis
Jernigan, Lafonda Faye
Jones, Michel Gerald
Kaczmarski, David Matthew
Kimbrough, Robert Shane
Kiser, Douglas Jerome
Klinkhammer, Ian Bradley
Kros, Todd Christopher
Lind, Susan McMurdy
Lockard, William MacLean
Long, Robert Derek
Lozis, Peter Paul III
Lucas, Alex Pendleton III
Marr, Charles Arthur
Matlock, John Wayne Jr.
McNulty, James Francis Jr.
Milton, Stephen Thomas
Mortlock, Robert Fred
Murphy, Brian Patrick
Murray, Randy
Pardew, Paul Hamilton
Peel, Kevin Sayre
Perry, Christopher Douglas
Pickering, Raymond D.
Robinson, Willie Earl
Ross, James Patrick
Sanchez, Anthony John
Shelton, Robert Wayne
Sosinski, Margaret Anne
Stein, Charles Michael
Stroyan, Richard Jay
Thomas, Brent Allen
Thompson, Brian Lee
Tice, Michael Jay
Todd, Thomas Hiram III
Vannoy, John Marshall
Vinson, Timothy James
Walls, Charles Sebastian IV
Weaver, Mickey Eugene
Webb, Erik Christopher
Wilson, Terry Mac Jr.
Wolons, David Scott
Woods, Jeffrey Kurt
Zybura, Martin Adam

FY00 Colonel Promotion Board Results

The release of any promotion list is always followed by an exhaustive data analysis to "map" the characteristics of the considered and selected populations. This article summarizes the analysis of the Army Acquisition Corps (AAC) population for the FY00 Colonel Promotion Board.

Overall Acquisition Corps Results

The selection board chose 37 AAC officers for colonel from all zones of consideration. Board members reviewed the files of 53 AAC officers in the primary zone. From this population, 29 were selected for promotion. The resulting selection rate of 54.7 percent was above the Army Competitive Category rate of 52 percent. Seven officers were selected above the zone, a selection rate of 15.9 percent. The above-the-zone Army Competitive Category selection rate was 9.5 percent. Additionally, one officer was selected below the zone, a selection rate of 1.3 percent. The below-the-zone Army Competitive Category selection rate was 3.8 percent.

Primary Zone Promotions

Of the 29 officers selected in the primary zone, 27 (93 percent) were either current or previous centrally selected product managers (PMs) or acquisition commanders (ACs). Only 5 of the 37 selectees (14 percent) had not been previously selected for Senior Service College resident or corresponding studies prior to the FY00 Colonel Promotion Board. These five officers were in the primary zone for promotion.

Twelve officers had DA 67-8 command Officer Evaluation Reports (OERs) in their file. Eleven of these officers had one DA 67-8 report; one officer had two DA 67-8 reports. The split between above-center-of-mass (ACOM) reports and center-of-mass (COM)/center-of-mass-plus (COM+) reports was about 50 percent. The 12 officers who had DA 67-8 reports in their files also had DA 67-9 command reports (average of three reports) in their files as well. The average number of DA 67-9 command reports for the officers selected was two. The officers selected had ACOM and COM+ reports.

Five of the officers previously served as assistant program managers (APMs), three officers previously served as deputy product managers (DPMs), and three officers previously served as deputy directors. Eighteen of the officers (62 percent) had not previously served in any of these positions.

Almost 70 percent of the officers selected have served tours in the Military District of Washington (MDW). The next two most common previous tour locations were Alabama (41 percent) (Fort Rucker, Redstone Arsenal, and Huntsville) and New Jersey (28 percent) (Fort Monmouth and Picatinny Arsenal).

Nearly 66 percent of the officers selected have served in the Army Materiel Command (AMC). The next three

most common commands where officers served were the Army Acquisition Executive Support Agency (AAESA) (59 percent), the Defense Contract Management Agency/ Defense Contract Management Command (24 percent), and the Training and Doctrine Command (TRADOC) (21 percent).

Above And Below The Zone Promotions

All officers selected above and below the zone were current or former PMs or ACs. Almost 88 percent of the officers selected have served in AMC. The next three most common commands were AAESA; the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology; and TRADOC.

Trends

Based on these statistics, officers competitive for promotion to colonel generally are serving or have served a successful tour as a PM or AC and have received at least one ACOM OER under the new DA 67-9 form—with strong supporting narratives from senior raters. Overall file quality was ACOM or COM (i.e., performed well in any positions they have held). Other than tours as a PM or AC, there does not appear to be a pattern of duty positions or locations that indicates selection.

Who Was Not Promoted?

Of the 24 officers in the primary zone not selected for promotion to colonel, 5 were either current or former PMs or ACs. Nineteen officers not selected for promotion had not served as a lieutenant colonel level PM or AC.

Six of the officers had served tours as APMs, and two had served as DPMs. The remaining officers had not served in either position.

Between 55 and 60 percent of the officers had served a tour in the MDW. The next most common previous tour location was Alabama (Fort Rucker, Redstone Arsenal, and Huntsville). The three most common commands where officers served were AMC, TRADOC, and AAESA.

Trends

Officers with straight COM OERs are not competitive for promotion to colonel. Officers with COM+ and ACOM files are competitive if they have performed well (COM+ or better) as a lieutenant colonel PM or AC. Late selection for PM or AC can result in nonselection if the officer does not have any, or a significantly less than average number of, PM or AC reports in their board file.

Duty positions (with the exception of PM or AC), duty locations, and specific commands do not appear to influence selection.

General Observations

The file quality of officers selected for promotion continues to be strong. Because of the tough competition, not all successful PMs/ACs will get promoted. Early selection for lieutenant colonel PM or AC can improve the chances of selection simply because of the additional command evaluations available for the board's review (assuming the evaluations support promotion). COM evaluations should have substantive narrative comments provided by senior raters that focus on an officer's potential.

Summary

Competition for promotion to colonel remains very high. Strongly documented duty performance is the key to selection. Additionally, it is important for officers in all zones to personally review their Officer Record Brief and microfiche to ensure the information is accurate and complete. Photos that are more than 2 years old, are in full-length format, are not current (e.g., awards), or that are not particularly good should be replaced. The bottom line: promotion to colonel is very tough, and overall file quality in addition to ACOM or COM+ performance while in lieutenant colonel PM/Command is crucial.

FY00 AAC Colonel Selectees

The following is a list of acquisition officers selected for colonel by the FY00 Colonel Promotion Board:

Beatty, William Darryl III
Bianca, Damian Patrick
Bianco, Stephen Gerard
Boshears, Steven Ross
Bowman, Michael
Buck, Stephen Duane
Burke, John Dennis
Conley, Joe Edward
Crosby, William Timothy
Cox, Steven John
Davis, Lauren Steve Jr.
Defatta, Richard Philip
Dietrick, Kevin Michael
Ernst, Adolph Henry III
Fox, Steven Grant
Gavora, William Martin
Groller, Robert Louis
Grotke, Mark Lyndon
Heine, Kurt Matthew
Hrdy, Russell James
Janker, Peter Stanly
Kallam, Charles Thomas
Leyva, Gabriel Figueroa
Mancuso, August Rodney III
Martin, Edwin Harry
McCoy, Curtis Lynn
McClellan, Harry Watson Jr.
Mills, Ainsworth Bliss
Noonan, Kevin Shaun
Padgett, Michael Gary
Pallotta, Ralph George
Pecoraro, Joseph Edmond
Price, Nancy Lee Sherk
Rasmussen, Valerie Ann
Schmidt, Rodney Hunter Chapman
Smith, Michael
Sledge, Nathaniel Hawthorne Jr.

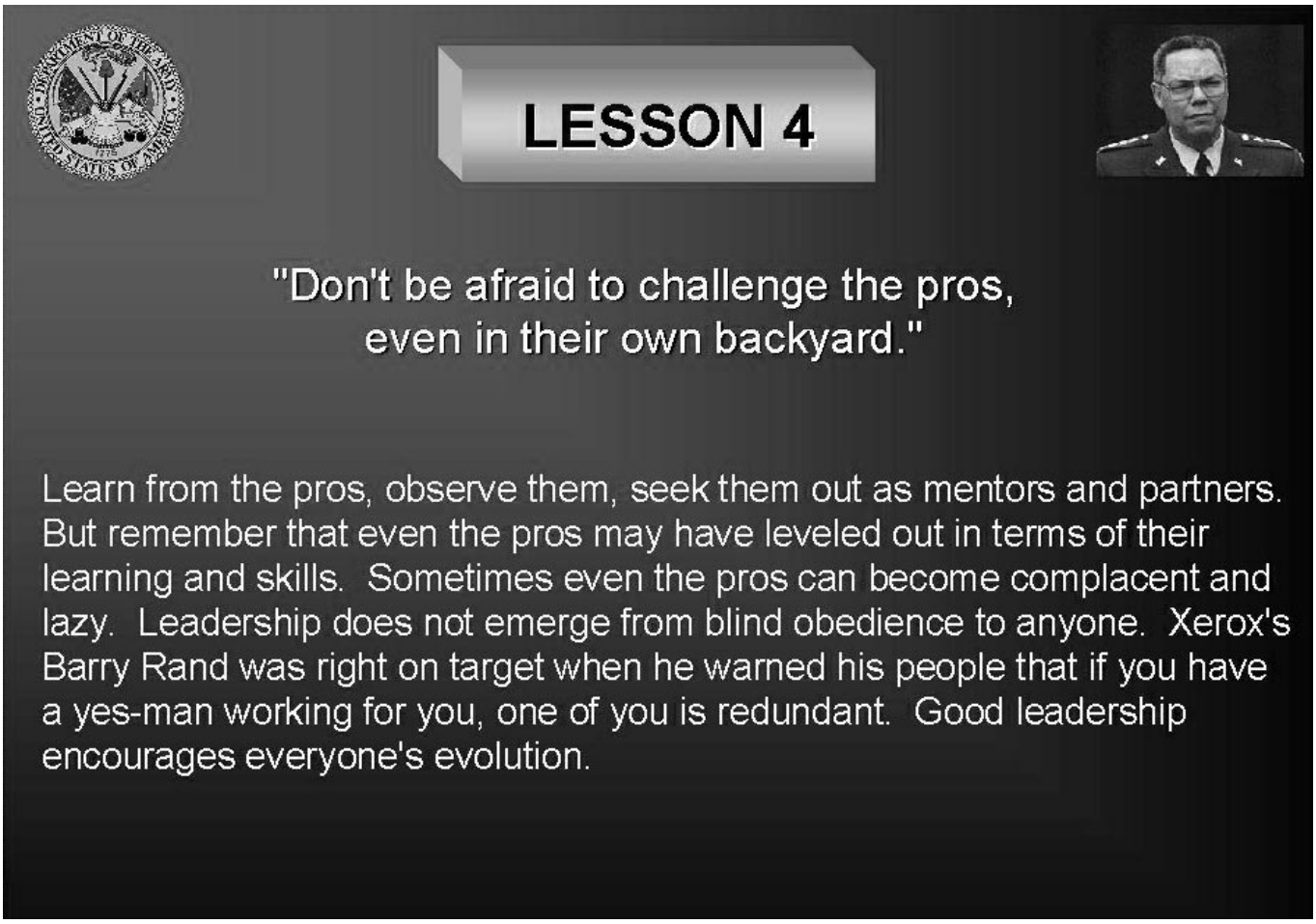
Force Protection Equipment Demonstration III

The Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, in conjunction with the Joint Staff, the Joint Non-Lethal Weapons Directorate, the National Institute of Justice, and the Department of Energy, is hosting the Force Protection Equipment Demonstration III (FPED III), May 8-10, 2001, at Quantico Marine Base, VA.

The U.S. Army Product Manager, Physical Security Equipment, Fort Belvoir, VA, is coordinating the demonstration of state-of-the-art commercial off-the-shelf (COTS) components and systems with DOD and other federal agencies, state and local law enforcement personnel, corrections agency decisionmakers, and others responsible for force protection. The May 1999 FPED II attracted more than 350 U.S. and foreign vendors with more than 1,000 items of anti-terrorism and force protection COTS equipment demonstrated.

FPED III will showcase blast protective barrier systems and windows, personal protective equipment, explosive ordnance disposal equipment, unattended ground sensors, ballistics mitigation equipment, night vision devices, first-responder equipment, unmanned aerial vehicles, and waterside security equipment.

Major command and installation-level commanders and their representatives are encouraged to attend and see firsthand the latest technological innovations from industry. FPED III is not open to the general public and requires preregistration. Persons desiring to attend may register online at **http://www.monmouth.army.mil/smc/pmpse/fped**.



The Social Life of Information

By John Seely Brown and Paul Duguid Harvard Business School Press, 2000.

Reviewed by LTC Kenneth H. Rose (USA, Ret.), a Management Consultant in Hampton, VA, and former member of the Army Acquisition Corps (AAC).

Editor's Note: This book was chosen for review from the AAC reading list that appeared in the September-October 2000 issue of Army AL&T. The list was provided by LTG Paul J. Kern, Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology and Director of the AAC.

Every now and then, a book comes along that can change the way you see the world and how you view the future. *The Social Life of Information* by John Seely Brown and Paul Duguid is a current example. The authors are neither naysayers nor evangelists, but rather self-described technology enthusiasts who seek to temper what could be overly optimistic predictions of technology-based change with consideration of nontechnical forces that will also influence the application of technology to human needs.

The book comprises eight essays that address the social context of information from different perspectives. The essays stand alone and may be read independently or as a whole.

The authors begin with a caution about the infocentric view of technology's potential effects that often defines the world in terms of information. They describe "6-D vision" as a one-dimensional view that predicts the applica-tion of information technology will break down society into its fundamental components of individuals and information. This will cause the six "Ds" of disaggregation, demassification, decentralization, denationalization, despacialization, and disintermediation.

This view, rather than being one of greater clarity, is really one of social and moral blindness. It isolates information from the informational aspects of life and disregards everything else. It tends to take the most rapid point of change and extrapolate it grandly into the future without regard for peripheral forces that are coming together. Nuclear power is a good example. The optimistic predictions of the 1950s did not consider the rise of environmentalism or a few thorny technical problems.

Brown and Duguid tackle electronic autonomous agents, popularly known as "bots," that now roam or otherwise operate in just about every known computer domain. Optimism abounds about the abilities and roles of these bots in everything from simple ordering transactions to complex negotiations. Bots are assumed to learn as they go, but the authors advise that even if this were really possible, the bots would still lack the rich stimuli from which humans acquire judgment. Bots "live a wretchedly impoverished social existence." Simply put, human and digital domains are distinct; human planning, coordinating, decisionmaking, and negotiating are significantly different from automated information searches or following digital footsteps.

Information technology is supposed to be the key that will unlock the office gates and allow, even push, more people to work in their homes. Yet, office occupancy rates continue to rise. And home workers drift back to office environments, sometimes rather quickly. Offices provide not only essential social interactions, but also powerful learning environments that exploit incidental learning, not just that which is formally structured and delivered. Workers also soon discover that because a cooperative network is absent in the home, simple tasks become time-consuming burdens that spill into private and family life. A better approach may be to determine how technology can reinforce access to social networks and thereby enable people to work alone. But the real contribution of technology may not be to allow people to work separately, but to support people who work together and make their interactions more efficient and productive.

The authors contrast the role of *processes*, the usual targets of automation and re-engineering, with informal, improvisational *practices* that actually keep an organization going. They suggest that informal collaboration and narration are the keys to problem solving—not a technical road map that seeks impossibly to define all conditions and responses, but a rich, unstructured network that addresses novel situations. It is a matter of routine, standard processes and unpredictable, fuzzy practice. One should not be ignored in favor of the other; rather, the two should be combined to balance the formal and informal, the structured and spontaneous.

Learning and knowledge are gaining importance as differentiators of organization performance as technology duplication time decreases. According to Brown and Duguid, learning and knowledge in organizations require cultivation of knowledgeable works, and a tight information focus makes that difficult. Focusing on information, explicitly stated in documents and databases, ignores the central role of tacit knowledge that resides only inside workers' heads. The development, retention, and transfer of knowledge depend on the interactions of people in "communities of practice," not just adherence to prescribed processes.

The authors counter predictions of massive decentralization via the World Wide Web with descriptions of "networks of practice" and "clustered ecologies" that indicate regional technology clusters are not only alive and well, but also essential in creating a proximal critical mass of needs and skills. They also suggest that the predicted demise of the organization in favor of self-organizing entrepreneurs fails to recognize that formal organizations can also be extraordinarily productive. The two approaches are complementary and probably are here to stay as partners, not competitors.

Even the ubiquitous paper document, always on the soon-to-disappear list, gets a boost for longevity because it is a useful medium in a social context, not just a carrier of information. The practicalities of its predicted decline? A digitized library project in the United Kingdom (U.K.) is approaching 10,000 documents on file after 30 years of work; meanwhile, during 1999, 100,000 new documents appeared in print in the U.K. alone.

In their final essay, the authors take on education, perhaps a topic of special interest for the U.S. Army with its efforts in distance learning. They describe *enculturization*—interacting with communities of practice and concepts—and peer support as requirements for learning. Neither is met by a technology-driven information delivery approach. Technology

BOOKS

can overcome geographic distance, but social distance is a harder problem. And, currently, technology is focused on interactions across time, not space. The authors suggest a reconfiguration of educational constituencies and components that will adapt technical opportunities to basic goals and constraints.

Brown and Duguid close with a recapitulation of common threads that interweave throughout the book: resources and constraints, tunnel-vision focus on information, and institutional evolution.

Information is an increasingly important part of what people do. It is a building block. As such, it has little value until people extract raw material, shape it to fit some need, and then stack it together in an organized way to fit an intended purpose. To do that, *The Social Life of Information* offers a cogent discussion of principal issues that clarifies the roles of cooperating forces. It offers a holistic foundation for a practical understanding of information technology potential and a more complete design for the future.

This book is available online from Harvard Business School Press at ***http://www.hbsp.harvard.edu***.

NEWS BRIEFS

Army Enterprise Agreement Expanded

The Army and the Parametric Technology Corp. (PTC) recently concluded negotiations to expand the upgrade provision of the Army Enterprise Agreement for the Pro/E suite of engineering design automation software, DAAB07-99-A-H009, to include PTC's Flexible Engineering Package. This will enable Army Pro/E users to purchase another productivity-enhancing software tool at substantial discounts over its General Service Administration (GSA) schedule costs.

The Army Enterprise Agreement was negotiated in September 1999 by the Product Manager, Small Computer Program (PM, SCP), Fort Monmouth, NJ, in response to an Army Materiel Command (AMC) directive. This directive resulted from an initiative to provide Army activities with a contract vehicle to acquire state-of-the-art software tools to employ simulation-based acquisition techniques to accelerate development and reduce the cost of new Army systems for the 21st century.

The Pro/E software is a premier computer-aided design/computer-aided manufacturing (CAD/CAM) package used extensively by engineering personnel from the government, industry, and academia. Army users of the CAD/CAM package include personnel from AMC laboratories and research, development, and engineering centers; Army depots and ammunition activities; Army Corps of Engineers' laboratories; Army Test and Evaluation Command activities; the National Ground Intelligence Center; and the Army Transportation and Engineering Agency.

Key provisions of the Army Enterprise Agreement for the Pro/E include the discounted purchase (5-15 percent off the GSA price) of an Army Pro/E Enterprise configuration, "a la carte" purchases of the components of the Enterprise configuration as well as other selected Pro/E modules/extensions, and upgraded software. The Army Pro/E Enterprise configuration consists of the Pro/E Foundation with the Advanced Assembly, Advanced Surface, and the Design Management (now called Pro/INTRALINK Workgroup Manager) extensions. The upgrade provision allows Army Pro/E owners to upgrade their legacy licenses to the Army Enterprise Configuration for a nominal cost of $1,350 each.

The negotiated expanded provision allows for the upgrade of all Army-owned Pro/E license packages to PTC's newly released Flexible Engineering Package. In addition to the components of the above Army Enterprise configuration, this package includes PTC's Behavioral Modeling, Mechanical Design, and ModelCHECK extensions. The cost of this complete package for Army Pro/E owners is $2,000. However, those who have already upgraded their licenses to the Army Enterprise configuration may obtain this expanded package for $650.

The above provisions of the Enterprise Agreement are good through Dec. 17, 2002. All provisions are open for use by authorized Army support contractors as long as the software in question is installed, maintained, and used at federal facilities to support Army programs.

PTC subject matter experts are planning a series of roadshows at key Army installations to demonstrate the capabilities of the Flexible Engineering Package.

The entire Army Enterprise Agreement for the Pro/E, including complete ordering instructions, is available on PM, SCP's Web site at **http://pmscp.monmouth.army.mil/contracts/p-eds/p-eds.htm**.

For further information or to schedule a PTC roadshow at your site, contact Emmanuel Nidhiry, (703) 617-5809, e-mail **enidhiry@hqamc.army.mil**.

Yuma Dedicates New Mine-Detection Range

On Oct. 25, 2000, a specially designed state-of-the-art mine-detection range was dedicated at the U.S. Army Yuma Proving Ground. The new Department of Defense Desert Countermine Testing and Training Range will enable Army test professionals to fully examine the very newest mine-detection hardware in a realistic desert environment, officials said.

Located on the Kofa Firing Range, the new multimillion dollar facility covers 455 acres and is surrounded by a

4-mile-long perimeter chain-link fence. Closed-circuit television cameras provide 24-hour surveillance. The new range is a result of a cooperative partnership between the Army Mines, Countermine and Demolitions Project Office and Yuma Proving Ground. A similar facility, featuring different soils, vegetation, and a more moderate climate is under construction at Aberdeen Proving Ground, MD.

The primary mission of the new range is to test sensors that detect buried mines. While "real" buried landmines will be used at the range, they will be neutralized in advance by removing explosives from the fuse mechanisms.

The new range incorporates a number of fixed assets. These include a 3,600-square-foot operations center, miles of fiber-optic cable to connect activities on the range with the proving ground network, covered vehicle and system storage areas, 35 miles of access roads, and nine improved vehicle lanes. All access to the lanes will be strictly controlled to prevent accidental traveling on a mined test lane.

The mine-detection sensors developed and tested at the proving ground will have a direct application to military tactical and humanitarian mine-clearing efforts throughout the world.

Test Pilots Reap Benefits Of Multi-Service Partnership

Training pilots to test military aircraft and their systems is no easy task. Teaching students from different backgrounds and Services adds to the challenge but also yields more rewards for all involved.

The U.S. Naval Test Pilot School (TPS) in Patuxent River, MD, is the official training facility not only for sailors and Marines, but for Army soldiers as well. Here, military personnel from all branches of the U.S. Armed Forces and some foreign military services come together for one purpose—to learn to be test pilots.

The test pilot school at "Pax River" began 55 years ago with primarily a fixed-wing program. Soon after, the school's leaders realized the need for a rotary-wing curriculum, which was officially established in 1961. The Army has been an integral part of the rotary-wing curriculum at TPS since its beginning.

The Air Force has the only other test pilot school in the country, located at Edwards Air Force Base, CA, but it does not have a rotary-wing curriculum. Because the Army does not have its own school, all Army test pilots go through TPS at Pax River. "We are the Army's test pilot school," says CDR Bob Stoney, TPS Commanding Officer.

In 1965, a Memorandum Of Understanding was signed by the Army and Navy officially establishing the partnership.

Army aircraft have been flown at TPS since 1964. Between 1965 and 1981, soldiers worked alongside sailors to maintain the school's aircraft. When the school's maintenance operation was turned over to DynCorp, the Army continued to support its aircraft by providing money, instead of people, for maintenance.

An Army instructor joined the TPS staff in 1969. Soon after, another Army instructor position was added. MAJ Mike Switzer has been assigned to TPS as the Senior Army Instructor for more than a year.

According to Switzer, "The strong common goal of safe developmental flight testing through detailed and comprehensive curriculum found here at TPS, which is second to no other test pilot school, has benefited both the Army and Navy over these 35-plus years. The Army's involvement and commitment with aircraft and instructors brings a different aspect to the school as well as assets. The Navy aircraft and instructors provide the Army with a look at mission areas that the Army has only recently become involved with like flying off decks of various Navy aircraft carriers."

TPS graduates two classes every year. Each class lasts 11 months and usually has 36 students. Nine Army students are admitted to TPS every year—four in one class and five in the other.

The Air Force and the Navy also exchange students for each class. An Air Force student attends TPS at Pax River while a Navy student studies at Edwards AFB. Students from foreign military services, like the Italian navy and the Canadian air force, also attend TPS.

"There are huge benefits to this arrangement. It's a classic win-win situation for everyone," Stoney says. Eleven Army aircraft are assigned to TPS with three UH-60A BLACK HAWKS serving as the core of the school's helicopter curriculum. The Army also provides four OH-58C Kiowa helicopters and four C-12C turboprop airplanes. Sometimes other Army aircraft like a CH-47 Chinook, an AH-64A, or an OH-58D are also used for specific evaluations and training.

The two Army instructors on the TPS staff have slightly different testing backgrounds than their Navy counterparts and can offer the students a different perspective on testing issues.

"We produce graduates for the Army and the benefit to the Navy is having a wider variety of aircraft and staff at the school. Diversity is a good thing and the Army instructors bring diversity to the program," Stoney says.

From this partnership, the Army gets qualified graduates who are able to perform experimental flight tests. The Army requires its test pilots to be dually qualified. When Army test pilots graduate from TPS, they specialize in helicopter testing and are fixed-wing, test-pilot rated.

According to Stoney, "learning by osmosis is an unwritten part of the school's curriculum. Students are exposed to a lot of different backgrounds from instructors as well as their fellow students. Fundamentally, it's a good two-way street for everyone," he adds.

For more information, call Renee Hatcher in the Public Affairs Department at the Naval Air Station, Patuxent River, MD, at (301) 342-7710.

Army Organization Wins Dual-Use Science And Technology (DUS&T) Achievement Award For 2000

Dr. Delores Etter, Deputy Under Secretary of Defense for Science and Technology, presented the first annual DUS&T Achievement Award on Nov. 8, 2000, at the Commercial Technology for the Warfighter Conference in Tysons Corner, VA. The DUS&T Achievement Award was established to recognize successful dual-use projects and to honor DOD employees responsible for their initiation and execution.

This year's award (for FY00 accomplishments) was presented to Project Manager Brad McNett and Project Engineer and Team Leader Mark A. Mushenski, both from the U.S. Army's Tank-automotive and Armaments Command's (TACOM's) National Automotive Center (NAC), for work done on the DUS&T project, Electronically Controlled Active Braking System for Medium Duty Vehicles. McNett and Mushenski both received trophies and will share a $5,000 cash award. The TACOM project was selected from 12 projects that had been submitted by the Army, Navy, and the Air Force. Navy and Air Force runners-up also received trophies and cash awards of $2,500.

The DUS&T Program was established by the National Defense Authorization Act of FY 1998, which made dual-use technology development an acceptable alternative to traditional development processes used by military departments. Through the DUS&T Program, a DOD agency partners with industry to develop state-of-the-art technologies that are both commercially viable and militarily relevant. Since its creation, the DUS&T Program has funded more than 300 projects totaling more than $900 million, with industry funding more than half of the development costs.

Etter told the conference's 250 attendees, "Our mission is to be sure that we are developing affordable and superior technology for the warfighter." She went on to say that affordability is essential to provide "the superior technology needed by our warfighters."

Contributions by the winner and runners-up are described below.

Winner—Electronically Controlled Active Braking System for Medium Duty Vehicles—TACOM/NAC and Continental Teves. The Electronically Controlled Active Braking System for Medium Duty Vehicles project was designed to advance the state-of-the-art technology for the Antilock Braking System (ABS) and the low-speed Traction Control System (TCS). The project also demonstrates the feasibility of integrating these technologies on a variety of commercial vehicles including the High Mobility Multipurpose Wheeled Vehicle (HMMWV). Specific tasks included determining size and characteristics of the HMMWV brake system platforms; developing requirements for the booster, master cylinder, and hydraulic control unit; designing and building the components; and integrating and demonstrating the performance of the systems in winter and summer test conditions. The braking system will provide the soldier with greater stopping capability while maintaining control of a vehicle, something already available in the private sector.

AM General, the current manufacturer of the HMMWV and commercial Hummer, notified Continental Teves (NAC's industry partner) that it was selected to adapt ABS/TCS to the next generation A4 HMMWV version and the commercial Hummer. With the HMMWV's needs designed into the commercial product, the Army benefits directly by having their ABS units manufactured along with the commercial components. Because the military ABS units will be using common commercial parts and both ABS systems can be manufactured together on the same production lines, the resulting savings will be passed along to the Army. Between 3,000 and 4,000 HMMWV A4s will be produced each year. Without a commercial base to fall back on (estimated to be more than 50,000 units per year starting in mid-2002), this will be a costly effort. The estimated cost for the ABS/TCS is less than $500 to $700 per vehicle with a commercial base and $2,500 per vehicle without a commercial base, a savings of $1,800 per vehicle.

Continental Teves plans to manufacture MK50 ABS units worldwide as well as provide product support. This benefits the Army by providing a readily available ABS system, thereby easing the logistics burden.

Runner-Up—Renewal of Legacy Software Systems—Charles D. Caposell, Electronics Engineer, Naval Air Systems Command; and CPU Technology. This Navy project has the potential of saving the Navy $1 billion in operations and support costs over the next decade. The project has resulted in a family of configurable processor frameworks called CFrame that will allow aging and obsolete hardware to be updated without costly software rewrites and validation. Initial applications of the technology involve modernizing a radar processing system and an airborne radar computer for the F-16. The company is currently seeking opportunities in the commercial aerospace community.

DUS&T Award recipients (left to right) are Joel Arnold (USAF), Charles Caposell (Navy), Brad McNett (Army), and Mark Mushenski (Army).

Runner-Up—Future Air Navigation and Traffic Avoidance Through Integrated Communications Navigation & Surveillance—Joel Arnold, Project Engineer, Air Force Research Lab; and Rockwell Collins. This Air Force project has resulted in

development and demonstration of a cost-effective solution for upgrading tactical fighters and general aviation (private aircraft and business jets) to comply with FAA requirements that all aircraft be capable of reporting their Global Positioning System position, altitude, heading, and airspeed. The product is transitioning to both the military and commercial sectors.

MANPRINT In The Joint LW155 Howitzer Program

Each year, the Army's Deputy Chief of Staff for Personnel sponsors a Manpower and Personnel Integration (MANPRINT) Symposium hosted by the Director for Personnel Technologies. Last year's event was held in Crystal City, VA, Sept. 27-28. Based on feedback from the more than 170 attendees, it was a huge success. The theme was "MANPRINT in Support of the Army's Transformation Campaign Plan," and the keynote speaker was GEN John M. Keane, Army Vice Chief of Staff.

Keane addressed some of the major issues facing today's Army. He highlighted the need for MANPRINT and its role in the acquisition and modernization process, and stressed that the Army is committed to MANPRINT because "we have to get it right for our soldiers." Following presentations by other senior Army officials, LTG Timothy J. Maude, then Army Deputy Chief of Staff for Personnel, presented the annual 1999 MANPRINT Awards.

It is notable that one of the awards recognized the success of a joint program. A MANPRINT Practitioner of the Year Award was presented to the Lightweight 155mm (LW155) Howitzer MANPRINT Team consisting of Timothy Kogler, Diane Mitchell, Richard Kozycki, Charnetta Baugham, and Jim Faughn, all from the Army Research Laboratory's Human Research and Engineering Directorate (ARL-HRED); and Marine Corps Gunnery Sergeants Anthony Nicholas and Jeffrey Altman.

The LW155 Howitzer MANPRINT Team represents one of the first truly joint teams to establish and effectively integrate a strong MANPRINT program. The LW155 Howitzer MANPRINT Program is managed by Marine Corps COL Steve Ward and executed by a Joint Army-Marine Corps staff as part of the Army's Program Executive Office for Ground Combat and Support Systems. The LW155 prime contractor is BAE SYSTEMS from the United Kingdom, which recently selected its U.S. partners to conduct more than 70 percent of LW155 production in the United States.

The program is currently in the engineering and manufacturing development (EMD) phase, having undergone a Milestone I/II review in FY96. The XM777 (the developmental version of the LW155) will replace the M198 155mm Howitzer. It will meet or exceed all capabilities of the current M198 Howitzer while reducing the system weight from 16,000 to 9,000 pounds. The LW155 Program entered formal acquisition status through a combined Milestone I/II review, bypassing the traditional program-definition and risk-reduction phases. The LW155 team had to work aggressively to complete the human factors engineering (HFE) evaluation and address human factors concerns early in the EMD phase of the program.

A total of 64 HFE concerns were identified. Currently 60 of these concerns have been resolved, and solutions to the remaining 4 are being sought. The ARL-HRED team members and the USMC gunnery sergeants used modeling tools including TRANSCOM-JACK and the Improved Performance Research Integration Tool (IMPRINT) to assess the XM777's performance and usability during EMD before weapons were constructed. Together, these modeling efforts represented an aggressive approach to reducing program risk by using state-of-the-art human factors modeling tools.

MANPRINT has been a critical element in the program's success to date. The application of MANPRINT tools and techniques to assess the howitzer's design and performance early in the EMD phase is estimated to have saved more than $6 million in design and development costs.

Defense Secretary Honors Army Science Board

During a special Pentagon ceremony on Jan. 8, 2001, then Secretary of Defense William S. Cohen paid tribute to the Army Science Board (ASB) and its Chairman Michael Bayer for significant contributions to the future Army and joint ground forces. Bayer was personally presented with the Defense Distinguished Civilian Service Award. The role of the ASB is to provide independent outside advice on future technological trends and other warfighting issues. Members include distinguished individuals from industry, academia, and non-DOD government agencies.

Secretary Cohen termed the ASB an exceptional group of individuals who have helped educate the Army and DOD while "keeping us considerably ahead of catastrophe as we race into this century." Cohen further credited the board with tackling a daunting array of topics critical to our future defense and with transforming a Cold War Army into a lighter, more lethal, and better-equipped force.

Bayer was individually cited for exceptional distinguished public service as ASB Chairman and for significant contributions to the transformation of DOD's joint ground forces and joint capabilities. Said Cohen: "Mr. Bayer consistently distinguished himself by providing inspirational leadership and visionary guidance to the Department of Defense through leading numerous study efforts directly impacting on the success of the Department's transformation efforts."

Defense Manufacturing Technology Awards Presented

Introduction

The second annual Defense Manufacturing Technology Achievement Awards were presented late last year at the Defense Manufacturing Conference in Tampa Bay, FL. Two awards were presented at the conference. The Army had the distinction of participating in both of the award-winning projects. One award honored an Army/university/industry project on Advanced Optics Manufacturing. The other award recognized a tri-Services/industry project on Flexible Manufacture of Microwave Vacuum Devices. The awards are sponsored by the Office of the Deputy Under Secretary of Defense for Science and Technology and the Joint Defense Manufacturing Technology Panel.

These awards recognize those individuals most responsible for outstanding technical accomplishments in achieving the vision of the DOD Manufacturing Technology Program (MANTECH). That vision calls for a responsive world-class manufacturing capability to affordably meet the warfighters' needs throughout the Defense system life cycle.

Listed by project category, recipients of the award, their duty stations, and a description of their achievements are as follows:

Advanced Optics Manufacturing

Team members in this category are Stanley P. Kopacz, U.S. Army Tank-automotive and Armaments Command's Armament Research, Development and Engineering Center (TACOM-ARDEC); Robert T. Volz, U.S. Army TACOM-ARDEC; Walter N. Roy, U.S. Army Research Laboratory; Harvey M. Pollicove, Director, Center for Optics Manufacturing, University of Rochester; Dr. Stephen D. Jacobs, Center for Optics Manufacturing, University of Rochester; Donald Golini, President, QED Technologies, LTD; and William I. Kordonski, QED Technologies, LTD.

Achievements: Optics are vital to DOD for precision guidance, reconnaissance, situational awareness, fire control, and autonomous weapons operation. Traditional optical shapes and materials are inadequate for next-generation systems such as the Objective Individual Combat Weapon, Comanche, and advanced missiles and night-vision devices. The range, accuracy, and imaging resolution of optical systems are directly related to surface accuracy and finish. This team is credited with developing a revolutionary technology called magnetorheological finishing (MRF), which takes the mystery out of precision finishing. Optical surfaces are polished in a computer-controlled MRF slurry. This process provides extreme accuracy and stability that makes possible the fabrication and polishing of exceptionally precise spherical, aspheric, and nontraditional freeform optical shapes.

This technology will have a positive effect on every military system that requires the fabrication of nonspherical optics. A cost avoidance of more than $100 million is forecast for applications to include Stinger, Comanche, the Daylight Targeting System, the Advanced Precision Kill Weapon System, the Joint Standoff Weapon, and the Objective Crew Served Weapon.

As a result of this project, conducted through the Army MANTECH Program, the Q22 MRF machine is commercially available and has received industry-wide acclaim. MRF is now a fully accepted, standard manufacturing process and is receiving widespread industrial-base application. In its first year of commercial availability, MRF won the optical industry's two most prestigious awards for technology innovation and achievement: the Photonics' Circle of Excellence Award and the Laser Focus World Commercial Technology Achievement Award.

Flexible Manufacture Of Microwave Vacuum Devices

Team members in this category are John Reinhardt, U.S. Army Aviation and Missile Command's Aviation and Missile Research, Development and Engineering Center; Walter F. Spaulding, U.S. Air Force Research Laboratory; John J. Olewnik, Office of Naval Research; Phillip H. Davis, American Competitiveness Institute (ACI); Peter Kolda, Communications & Power Industry (CPI), Palo Alto, CA; Bartley M. Gannon, Northrop Grumman; and Joel A. Christeson, Teledyne Electronics Technologies.

Achievements: Traveling wave tubes (TWTs) are critical components for ground-based radars and missile seekers such as the PATRIOT Advanced Capability-3 (PAC-3) guided missile. This team is credited with improving the manufacturing processes and reducing the cost of producing the millimeter-wave class of devices. The projected cost avoidance to PAC-3 alone is expected to be more than $19 million. The Flexible Manufacture of Microwave Vacuum Devices project is a tri-Service/industry effort that included $1.6 million from the Army MANTECH Program.

Three companies—CPI, Northrop Grumman, and Teledyne—led by ACI, a nonprofit organization, shared their findings on manufacturing improvements for devices used in critical segments of the power/frequency spectrum. CPI focused on the higher frequency (millimeter wave) used in the PAC-3 TWTs, developing a manufacturing capability for cost-effective coupled cavity devices. Northrop Grumman focused on the development of manufacturing improvements for lower frequency devices using new automation to greatly reduce cost and increase yield. Teledyne focused on the manufacturing process for the midfrequency (Ka and Ku Band), specifically the manufacture and test of the critical helix element, leading to significantly improved yield and reduced cost.

Conclusion

The MANTECH awards discussed in this article are just two examples of how cooperative efforts among DOD, industry, and academia can produce revolutionary processes and products that fulfill military needs while greatly benefiting the private sector.

The objectives of the Army MANTECH Program are to advance the state-of-the-art in manufacturing technologies, improve end-item quality through process control, leverage multiple system needs, reduce costs and program risks of Army materiel acquisitions, and transfer technology to the industrial base. Further information on the Army MANTECH Program can be obtained from the Web site located at **http://www.armymantech.com/**.

The preceding article was written by Carol Gardinier, U.S. Army Materiel Command Program Manager for the Army MANTECH Program.

LETTERS

Dear Editor:

We come today not to honor Caesar but to bury him or, in this case, certification in the Army Acquisition Corps.

Several years ago, after numerous onerous articles appeared in major newspapers and magazines concerning military acquisition blunders, Congress mandated that the Armed Forces develop a group of professional acquisition specialists. These specialists would be a group of select, trained, certified individuals who would enable the Armed Forces to procure materiel in a professional, efficient manner. This would guarantee that the government would get superior value for the ever-shrinking financial resources.

Certification requirements were developed and training programs designed to produce these highly competent professionals. It was impressed upon employees how critical this certification and training was for career development and advancement. For the first few years, the programs proceeded smoothly and this highly trained corps began to spread out in the ranks of public service. There were even some positive results.

Then, as with all admirably conceived government programs, things began to go awry. Acquisition education professionals who deemed that certain courses required a minimum of 3 weeks to teach were told that 2 weeks would have to suffice and, later, 1 week. All this was done in the name of cost cutting.

I don't want to sound totally negative. All the cost-cutting initiatives were not ill conceived. A concerted and admirable effort was made to turn the introductory courses into Web-based self-study courses. This was an excellent decision to preserve and maximize scarce resources to dedicate to the more advanced learning opportunities.

Now bureaucracy has endeavored to stick its hands into this noble process. Where certification once required completing the required courses and obtaining endorsement from the proper superiors (that the experience requirements were met), we must now traverse the paper trail to receive the needed certification. Papers must be filled out, records obtained, initials (not signatures) acquired, documentation of complete work history of related experience, etc., etc., etc., all must be routed through the proper channels.

I know I sound facetious and condescending here, and I mean to. I am no stranger to education. I came to the government with two bachelor's degrees (engineering and economics) and obtained a master's while employed—paid for, I might add, by myself and attended at night because "it wasn't job-related." (While I dispute this considering that my job entails, and still does, making investment decisions for the military. I have also been told, after applying to another training program (the Master of Science/Industry Work Study) that I was already more educated than the Army desired.)

I know this sounds like a case of sour grapes, but it all boils down to this: the government mandated an admirable program, designed a comprehensive course of study, and attached a prestigious reward to completing the requirements. What we are now left with is a mandated program, with a gutted curriculum and a bureaucratic nightmare to obtaining the rewards of completing the requirements.

One of the nice things about college and university courses and degrees is that the requirements are pretty straightforward. Take the required classes, do the work, pass, and you get the degree. There were no courses cut from a full term to a third of a term and no need to document course completion to unrelated authorities. And a simple audit of your records can prove that you have obtained the proper course credits.

To the Acquisition Overlords who decree, "You must get certified!," I respond—why bother? I'd rather go back to college.

Yours truly,
Curtis G. Becker
Clifton Park, NY 12065-5120

Response:

Dear Mr. Becker:

The certification process you refer to is the original process whereby your supervisor, the first Senior Executive Service (SES) individual, or the General Officer in your chain of command could complete your certification. Changes were made to that process to improve it, not to make it more difficult. Because many of the supervisors, SES personnel, and General Officers were not certified in the same career field in which you were seeking certification, or were possibly not even in the Acquisition Corps, many certifications were completed erroneously. These erroneous certifications, while not intentional, diminished the validity of those that were certified correctly.

In conjunction with the Functional Chiefs for each career program, the Army Acquisition Corps established a new process whereby individuals seeking certification would be certified by someone in the same career field who has achieved Level III certification themselves. These certifying officials were selected by the Functional Chief responsible for certification in each career field and provided specific guidance on the process. This new procedure brings more discipline into the process and goes a long way to ensure the validity of each certification identified on Acquisition Career Record Briefs (ACRBs).

The process is actually quite simple. Individuals seeking certification must only provide their ACRB and a copy of their work experience (resume or DA Form 2302) to their acquisition career manager (ACM). The ACM coordinates with the appropriate certifying official and the finalized certification is returned to the individual.

Certification policy and procedures are outlined on the Director for Acquisition Career Management (DACM) home page at **http://dacm.sarda.army.mil/policy**. A list of ACMs can be found on that same home page at **http://dacm.sarda.army.mil/contacts**.

Sandy Long
Acting Deputy Director
Acquisition Career Management Office

LETTERS

Dear Editor:

I recently read LTC Patrick Forrestal's article titled "Army Astronauts Energize The NASA Mission." I found it to be exciting and really neat to see the Army and NASA working together through the astronaut program. My goal is to become a full-fledged astronaut after college—and the route I have always wanted to take is a military one. I am interested in LTC Forrestal's e-mail address or postal address so that I may write to him to inquire about the opportunities that the military offers for "wannabe" astronauts. Further, if your office has info that would be helpful concerning this matter, please e-mail it to me. Thank you!

Scott Jones

Army AL&T Response:

Dear Mr. Jones,

There are several ways to enter the astronaut program. Three types of crewmembers serve onboard the space shuttle: payload specialists, pilot astronauts (the shuttle commander is also a pilot), and mission specialists.

Payload specialists have a thorough knowledge of a particular shuttle's mission. They are usually neither NASA employees nor career astronauts. Becoming a payload specialist is not usually a career that can be easily planned. An individual must have the right skills and be in the right place at the right time. This career path also depends on what mission the shuttle will have 20 years from now. Setting one's sights on this position is not recommended.

Pilot astronauts are typically military fighter pilots (they must be jet pilots) who graduated from at least one test pilot school and have thousands of hours of flight time with many combat missions and distinguished flying crosses, etc. The bare minimum requirements are 1,000 hours of flight time and at least a Bachelor of Science (B.S.) degree in engineering, biological science, physical science, or mathematics. They also usually have some type of advanced degree in addition to a B.S.

Mission specialists are the most common type of astronaut. They are usually engineers and have at least a B.S. degree in engineering, biological science, physical science, or mathematics and a minimum of 3 years of technical work experience. The average mission specialist typically has at least one Ph.D. in a technical field and typically has some flight experience.

The Army astronaut (there are also Air Force, Navy, and other types) typically falls into one of the above categories but is not a NASA employee. Rather, an Army astronaut is assigned to his or her duty station through the Army chain of command, much like a transfer. Most Army astronauts are high-ranking officers (major or above) and qualify for the position based on one of the above categories. However, most military astronauts are fighter-jet test pilots. There are some helicopter pilots who are mission specialists. Every 2 years, the opportunity arises for an astronaut candidate to apply through his or her own unit. Eligible applicants must have an advanced college degree (i.e., not engineering technology, but an actual engineering degree or a degree in physics, chemistry, etc.). Applicants must make sure that their supervisor states on his or her officer evaluation report or noncommissioned officer evaluation report that the best place for the applicant to serve the Army is as an Army astronaut. These reports actually contain a section where the senior rater or someone can suggest the best location for this individual within the Army.

An online NASA factsheet is available at **http://spaceflight.nasa.gov/shuttle/reference/factsheets/asseltrn.html.** This site has information on the astronaut application process and other requirements. The page also links to astronaut biographies.

The best way to become an astronaut is to build a great resume and keep applying yourself. Make sure that you select your career based on what you want to do in life and not because you think that it will help with the astronaut selection.

For more information on astronauts and the astronaut program, contact Lucy Lytwynsky in the Astronaut Appearances Office at **lucy.lytwynsky1@jsc.nasa.gov**, or call (281) 244-8857.

Dear Editor:

I have read the last two articles on contingency contracting ["Does The Army Need A Contingency Contracting MOS For NCOs?"; see September-October and November-December 2000 issues]. I am an NCO in the National Guard. I am also an excepted technician, which means I am a civilian wearing military clothing. During the day, I have a warrant of $10 million. On the weekend drills, in military status, I can't purchase a thing.

We are always told that we need to be emulating industry and thinking out of the box, and MAJ Metts and MAJ Castrinos have done that and I compliment them, but I would suggest that they might even think a little further outside the box.

The DOD and OPM have strapped new educational requirements on to contract specialists. They must have both a degree and 24 hours of business training. This makes it hard for the people who are currently in the contracting field. The NCOs will be required to have the same credentials, which means it will be even harder to find NCOs that qualify.

I suggest that we reach for the stars and create a whole new career ladder that would take the NCO through to the officer corps. This would create incentives and challenges for those who are interested, but at the same time, it would create a very elite organization. I know that NCOs were given commissions as Warrant Officers based on their experience after Vietnam. And I know that if a comprehensive plan were put into action, a career plan could be devised that would include the

LETTERS

ascension to the officer corps. This would, perhaps, solve another problem—the dwindling supply of Acquisition Corps officers.

As you see, this is only in the embryonic stage and a radical concept to some. But Army regulations already make allowances for direct commissions for procurement personnel. The problem with this regulation is that it does not take into account that a person must be a captain or higher to become a member of the Acquisition Corps and the direct commission is restricted to the rank of lieutenant, with age restrictions as well as others.

The National Guard is aging as is the regular Army. The world is very competitive and is drawing experienced and government-educated people away at an alarming rate. We must be competitive if we are to be mission capable.

Please pass this e-mail on to the majors as food for thought.

Thanks
Mike Belovsky
Contracting Officer

***Army AL&T* Response:** Thank you for your letter. It has been forwarded to Majors Metts and Castrinos.

ACQUISITION REFORM

FORSCOM Conducts First Reverse Auction

The Third Corps and Fort Hood Contracting Command recently conducted the Army Forces Command's (FORSCOM's) first reverse auction, using the software available on the U.S. Army Communications-Electronics Command's (CECOM's) Interagency Business Opportunities Page Web site. Fort Hood used this innovative e-commerce tool to obtain a 10.67-percent savings over the estimated product price and significant quality increases.

The requirement was for 40 Pentium III, 650 MHz, 8-GB hard-drive-capacity CPUs, each with a 250-MB Zip drive and optical mouse, estimated to cost $1,500 each. Subsequently, 40 Gateway Pentium III, 733 MHz, 15-GB hard-drive CPUs, each with a 250-MB Zip drive, a 1-MB video card, an Internet keyboard, and an optical mouse, were purchased at a final cost of $1,340 each. All minimum requirements were met, and exceeded in many cases.

Fort Hood conducted a private auction with four small-business General Services Administration (GSA) vendors. The vendors were selected through a market research process. To keep a level playing field, each company was classified as either a small or small-disadvantaged business. Fort Hood spent approximately 6 days preparing for the reverse auction and made the delivery order award on the day the auction was completed. Offerors were informally debriefed the day after the award.

Fort Hood was satisfied with the reverse auction and plans to hold other auctions for future requirements that are acceptable for the auctioning process. In addition, Fort Hood foresees using reverse auction procedures to augment other procurement methods, such as a two-step sealed bid process. During the first step, technical requirements are negotiated with the offerors. In the second step, a reverse auction is conducted to determine the final contract price, and ultimately, the contract winner.

CECOM has placed this new software on the Army Single Face to Industry Web site (**http://acquisition.army.mil.default.htm**) so the entire Army can use it. Many companies that offer only low-bid reverse auction software charge a percentage of sales, whereas CECOM's program is available to the entire Army at no cost.

ARMY AL&T WRITER'S GUIDELINES

http://dacm.sarda.army.mil/publications/rda/

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Purpose

To instruct members of the AL&T community about relevant processes, procedures, techniques, and management philosophy and to disseminate other information pertinent to the professional development of the Army Acquisition Workforce.

Subject Matter

Subjects may include, but are not restricted to, professional development of the Army's Acquisition Workforce, AL&T program accomplishments, technology developments, policy guidance, information technology, and acquisition reform initiatives. Acronyms used in manuscripts, photos, illustrations, and captions must be kept to a minimum and must be defined on first reference. **Articles submitted to *Army AL&T* will not be accepted if they have been scheduled for publication in other magazines.**

Length of Articles

Articles should be approximately 8 double-spaced typed pages, using a 20-line page, and must not exceed 1,600 words. **Articles exceeding 1,600 words will not be accepted.** Do not submit articles in a layout format or articles containing footnotes or endnotes.

Photos and Illustrations

A maximum of 3 photos or illustrations, or a combination of both, may accompany each article in a separate file from the manuscript. Photos may be black and white or color. **Illustrations must be black and white and must not contain any shading, screens, or tints. All electronic files of photos must have a resolution of at least 300 dpi (JPEG or TIFF). If they do not meet this requirement, glossy prints of all photos must be submitted via U.S. mail, Fedex, etc.** Photos and illustrations will not be returned unless requested.

Biographical Sketch

Include a short biographical sketch of the author/s that includes educational background and current position.

Clearance

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

Offices and individuals submitting articles that report Army cost savings must be prepared to quickly provide detailed documentation upon request that verifies the cost savings and shows where the savings were reinvested. Organizations should be prepared to defend these monies in the event that higher headquarters have a higher priority use for these savings. All Army AL&T articles are cleared through SAAL-ZAC. SAAL-ZAC will clear all articles reporting cost savings through SAAL-RI.

Submission Dates

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

Submission Procedures

Article manuscripts (in MS Word) and illustrations/photos (300 dpi JPEG or TIFF) may be submitted via e-mail to **bleicheh@aaesa.belvoir.army.mil**, or via U.S. mail to the address in the first paragraph at the top of this page. All submissions must include the author's mailing address; office phone number (DSN and commercial); and a typed, self-adhesive return address label.

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