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SPECIFICATIONS AND STANDARDS REFORM

ALSO IN THIS ISSUE:

Economic Security

Industrial Base Sector Surveys

Non-Military Electronic Specs

New Industrial Operations Command

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ARMY RD&A BULLETIN

Research Development Acquisition

Professional Bulletin of the RD&A Community

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COVER

One of the essential elements in improving the Defense acquisition process is the reform of specifications, standards and associated processes. A process action team, chartered by the deputy under secretary of Defense for acquisition reform, has provided a start-point to achieve this goal.

Dr. Anita K. Jones

WHERE ECONOMIC SECURITY AND NATIONAL SECURITY INTERSECT

By Dr. Anita K. Jones

Director of Defense Research and Engineering

Introduction

Economic security and national security relate to one another, but they are not identical. One important intersection occurs when they both rely on capable industry that exploits a defense-relevant technology.

Economic security involves the steady creation of quality jobs, globally competitive industry, favorable trade balances, capital creation, and high employee productivity. Many industries can contribute to economic security; not all will contribute to national security.

Consider a nation with an economy based on the extraction and export of a virtually infinite reservoir of raw materials and resources, such as timber, coal, or agricultural products. While this may be a bounteously endowed nation with a strong economy, it would import essentially all manufactured goods. The military technology base of such a country would be exceedingly weak. Any technologically sophisticated military materiel would have to be imported. Even if money were not a consideration, the availability of some items could not be assured. For example, a nation that produces weapon systems or the components that provide them technical superiority may be unwilling to sell them internationally to another nation, despite the fact that the other nation can afford them.

For such a nation, economic security—measured in dollars or jobs—will not assure national security. Leadership in "enough" of the defense-critical technologies is required to assure national security. Today, for example, materials and material processing enable both stealthy military vehicles and high performance fighter aircraft engines. Also, microelectronics, electronics packaging and software enable a competitive military advantage in information. National security relies on the corporations that lead in such technical areas.

Exploiting Technology

National security requires more than assured purchase of parts or materials. It depends upon the presence of industry that exploits the leading edge of the ripe, new technologies. Only a leading edge corporation has the capability to design, to experiment, and to tailor. It requires knowledge of the technology, as well as experienced engineers and scientists to push the envelope of what is known or what has been engineered in the past. Often, this cannot be done without substantial manufacturing capability, as well as control over the end-to-end process from creation of the lowest level components to final integration. Such design, engineering and manufacturing capabilities provide the industrial muscle that serves national security.

Again, assured purchase of parts is insufficient. Technological superiority implies harnessing technology to military needs *as it becomes available.* To do so involves adaptation and experimentation. A nation can't buy off the shelf or out of the catalog and maintain technological superiority. A high-performance

computer may need to be re-packaged to make it fit in the cockpit of a fighter. Communication electronics may need to be radiation-hardened to be used in a surveillance satellite. High temperature material alloys may have to be adapted for use in a high performance aircraft engine.

As an example, consider computer displays. There are two technologies today. One permits construction of personal computers and work stations all across the world. It is the technology that puts a deep box behind the display—i.e. the one that takes too much space on your desk. In contrast, there are several competing technologies that can be used to build what are called flat panel displays—those found in portable, briefcase-sized computers. The most obvious difference between the two is the depth of the box behind the display screen.

Flat panel displays find application in aircraft cockpits; their short depth considerably simplifies inserting them into existing long- lived air platforms. In addition, the Army needs lightweight displays to put in the hands or helmet of a dismounted soldier. In both cases, the military needs not only the flat panel display products, but the industrial capacity to tailor those products to the military application. Military advantage lies in riding the technology curve. This will only be assured if the industry that is riding the curve is available to work with the military and directly serve the warfighter's needs.

Flexibility to React

It is this same ability to experiment with technology that is crucial to avoiding technological surprise. Collectively, the research capability of the country, whether in DOD laboratories, universities or in industry, needs to have the flexibility to react. This reaction can simply be the ability to repeat a reported experiment or act on a hint via an intelligence report that some scientific approach to a problem was found to be fruitful. To react overnight, a laboratory must already exist, be equipped, and be staffed with knowledgeable people in the requisite fields. The bountiful resource country discussed above could not likely reproduce experiments in superconductivity or carbon composite materials today.

It is this same kind of industry that national security requires in order to have the capability to surge production and sustain a war effort in a long-lived, large war. We do not anticipate such a war, but that expectation has always proved wrong in the past.

One challenge for the DOD is to ensure that new technologies that make a difference to national security are developed early so that industry masters application of the technology early. Subsequently, it will be available for defense applications. In addition, it can be the basis for early, competitive, commercial market entry.

Technology Investment

DOD has a history of making an investment in technology and sustaining it. In 1965, DOD purchased more than 60 percent of the semiconductors built in the U.S. Today, it purchases closer to 1 percent of semiconductors produced. In the interim, DOD has made a large sustained investment in semiconductor technology. The defense market has grown in absolute size; percentage decline of the defense portion of the market is a symptom of strength of the industry and the size of its mature, commercial markets.

This story is hopefully repeating itself with another technology, called multi-chip-modules. Today, DOD buys about 40 percent of the U.S. multi-chip-module products on the open market. That is down from a few years ago when DOD bought nearly 100 percent of the marketed products. As with semiconductors, DOD is making a sustained research and development investment in the several competing technologies for bonding the multiple chips to a substrate, as well as in the several competing technologies for creating the communications substrate for multi-chip-modules. Which technologies are ultimately successful for which purposes will be determined by the results of technology exploration and industrial business decisions. Whatever the technology outcome, we look forward to DOD becoming a small consumer in a vastly larger commercial market. Economics of manufacturing scale will reduce item cost as market size grows. Availability of other sources of R&D investment grow with market potential.

A company that creates a commercially successful market based on this or another defense-relevant technology contributes to national economic security, as well as the riches of its stockholders. If that company works with the U.S. military to apply its technology to military systems, then the company serves national security as well.

Conclusion

It is important that the DOD continues to nurture these technologies that hold military promise. The industry that grows to exploit them will contribute to economic security. It will produce products that compete, jobs, and a favorable trade balance. In addition, such industry will serve national security. Such industry has intellectual control of the science and technology ideas that underpin its products. This type of industry also has industrial infrastructure—the production lines, the experimentation laboratories, and the communications between suppliers and primes—that enable flexible reaction to new situations.

It is within such technologically capable industry that economic security and national security intersect.

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Acquisition Reform—Blueprint for Change . . .

MILITARY SPECIFICATIONS AND STANDARDS

By Darold L. Griffin

Background

Declining Defense procurement budgets can no longer sustain a Defense-unique industrial base. Therefore, Defense acquisition reform has progressed from a desirable policy goal to a national imperative. Fundamental acquisition reform is necessary for the Department of Defense to be able to fully use the civilian manufacturing base and replace the capabilities that are being lost as Defense firms are down-sized, converted, or eliminated.

Without access to a broader national manufacturing and technology base, Defense down-sizing could jeopardize basic national security goals. Although the Soviet threat has diminished, the United States cannot be blind to the international risks remaining. Possible conflicts range from a resurgent hard-line Russia or belligerent China to a bevy of well-armed rogue states.

In this uncertain environment, where it is unclear who our enemies might be or what capabilities they may have, maintaining a ready, capable, and adequately equipped force within a severely constrained budget presents a true acquisition challenge. The challenge is to eliminate the barriers to satisfying Defense needs through the commercial research, development, and manufacturing bases.

Program Objectives

Defense standardization is clearly one of the barriers. The Department of Defense Standardization Program was established to:

- Reduce the proliferation of items in the inventory;
- Force national standardization by the Services; and
- Ensure the quality of items procured by the Defense Department.

The first two objectives have been well served by the program; however, the quality issue has become problematic. Thirty years ago, military specifications and standards defined the state of the art. Today, they often trail best commercial practices, raise the cost of Defense procurement, and create a fire-wall between the commercial and military sectors.

Recognizing the urgency for fundamental change, the deputy under secretary of Defense for acquisition reform chartered a Military Specifications and Standards Process Action Team. The team was tasked to develop a comprehensive strategy to change the way that the Defense Department defines its requirements and specifies its needs in order to permit greater reliance on the commercial market and manufacturing base. This article summarizes that team's results.

In earlier studies of the standardization process, and among the profusion of previous reform recommendations (most of which were never implemented), the solid rationale behind the principle of specifications and standards may have been lost. *All major buyers, even commercial ones, use specifications and standards to procure quality products. Standards are a critical component of international competitiveness; they contribute to higher quality at lower prices, increased product safety, and reliable and common production techniques.*

For the Defense Department, the standardization process—the use of commonly accepted specifications and standards across the Services—is a logistical necessity. Standardization ensures that

Defense does not procure different versions of an item which are not interchangeable and which require separate maintenance and support.

Process Barriers

The fundamental problem is not that the Department of Defense specifies its needs, but rather that standardization documents are written and applied inappropriately and are improperly tailored. Two problems generally arise with document content: the technology described is obsolete, or the amount of "how-to" direction prevents other ways of achieving the same result. Additionally, even well-written documents can cause problems if they are improperly applied. Too often, unnecessary and non-value-added requirements find their way into Defense solicitations and contracts.

There are approximately 31,000 military specifications and standards listed in the *Department of Defense Index of Specifications and Standards.* Some of them describe unique military products and technologies—munitions, fuzing, submarines, nuclear weapons and related technologies—that have no commercial equivalents. However, many documents describe commercial products, such as computers or gloves, that are available off-the-shelf at far less cost; obsolete technologies; or management procedures and processes that cannot be satisfied by counterparts in the commercial sector. These documents make it difficult for commercial firms to apply their expertise and capabilities to Defense needs. Requirements specified in these documents also prevent Defense contractors from adopting new manufacturing techniques that reduce cost or enhance their commercial capability.

Specifications and Standards Reform

To focus the specifications and standards reform effort, the process action team identified six priority areas, supported by a comprehensive set of 24 recommendations designed to achieve change in all areas of the Defense standardization process. These six priority areas are:

• **Performance-Based Documents**—The most direct ways to ensure that Defense standardization documents do not impede access to commercial products or processes are to adopt the standards used by industry, and to shift to performance-based military documents describing needs in terms of form, fit, and function. The team recommended that the Department of Defense adopt the policy that performance-based documents be used for new developments, product improvements, and technology upgrades.

Of particular concern were the military management and manufacturing standards (perhaps the ultimate in "how-to" as opposed to performance-based descriptions). These documents constrain the production base because they define an entire development or manufacturing operation which is unique to Defense. The process action team recommended that special priority be given to canceling or converting these standards into non-government standards or performance-based documents and to providing contractors with the flexibility to achieve single-process ("dual-use") manufacturing operations.

• **Eliminating Excessive Contract Requirements**—The way standardization requirements are applied is as important as the content of the standardization documents. Requirements find their way into solicitations for a variety of reasons that have little to do with quality or price. Most military standardization documents reference some other standardization documents, which in turn reference still other documents. The net effect is an unnecessary and expensive tiering of requirements. In other cases, specifications end up on contracts because the procuring activity simply copied a previous solicitation, including specifications or standards that may have been canceled, or superseded in the interim. In yet other cases, requirements are included to reduce risk.

Reforming the standardization process, not just the documents themselves, will be critical in ensuring that future documents retain technical currency and dual-use functions.

The current acquisition system offers no rewards for innovation and risk-taking and no penalties for selecting an obsolete or more expensive approach. The process action team proposed to reverse these incentives by requiring justification for including a military document in the solicitation. An obvious corollary is to offer incentives to contractors and project managers to propose alternatives to military specifications and standards.

• **Overhauling the Standardization Process.** The standardization process, like many of the documents in the index of specifications and standards, has ossified over time. The system is no longer flexible enough to keep pace with technology cycles that are measured in months rather than decades. Reforming the standardization process, not just the documents themselves, will be critical in ensuring that future documents retain technical currency and dual-use functions. The team identified three key needs for reform:

— To work with industry to develop dual-use non-governmental standards;

— To create an electronic feedback system to increase government-industry cooperation in developing and reviewing these documents; and

— To consolidate document preparation and procurement responsibilities into one entity. For the purchase of common items this consolidation will be to the Defense Logistics Agency.

• **Implementing New Management Tools.** New ways of doing business require new management tools. The process action team recommended several innovative approaches that will improve the standardization program. These new approaches include: establishing test and inspection procedures which embody best commercial practices including continuous evaluation, simulation, environmental testing, dual-use test facilities, process controls, and continual process improvement; establishing an acquisition process Corporate Information Management Office to serve as functional proponent for implementing the required automation initiatives; and emphasizing distributed interactive simulations and other advanced

techniques to create a computerized virtual reality in which cost-performance trade-offs, commercial opportunities and manufacturing processes can be explored early in the requirements development process, before any commitment is made to a specific hardware design.

• **Training and Education.** The only way to create cultural change within a conservative system is to institute continuous and systemic training and education programs both for Department of Defense personnel and contractors. The remedy for the automatic application, misapplication, or misinterpretation of uniquely military documents is an educated and informed document preparer and user. The objective of the education process should be the development of a versatile workforce with cross-functional and interdisciplinary backgrounds and orientations.

The process action team recommended that senior acquisition management within the Services implement the new acquisition approach in their major commands which, in turn, will train their field activities — a "train the trainer" strategy. It also recommends that training programs in non-developmental item procurement, market research, activity-based costing and management, acquisition streamlining, integrated product development, performance-based specifications, incentive contracting, quality assurance, and specifications/standards application and development become a mandatory element in career progression.

• **Leadership Commitment.** Clearly, there is an initial phase of changes in acquisition procedures that must flow from the top. Simply issuing new rules, directives, or regulations offers little prospect for success. The failure of past standardization reform initiatives has stemmed, mostly, from leadership's failure to fund and participate personally in the process.

Moreover, there must be individuals within the standardization community charged with implementing the standardization portion of the acquisition reform package. Currently, standardization policy is set by the Office of the Secretary of Defense, the standardization executives, and the Departmental Standardization Offices. However, it is the major commands which provide the workforce and resources to support the standardization program, resulting in a lack of linkage between policy and program implementation. Budget cuts have exacerbated the problem by forcing the major commands to reallocate resources among competing priorities.

The process action team recommended that a standardization improvement executive be appointed by each service, empowered with the necessary resources and authority to implement the proposed changes and maximize the use of commercial products and processes.

General Acquisition Reform

The process action team identified the following general areas as opportunities for significantly improving materiel acquisition.

• Commercial practices should be used for commercial-like items currently being purchased with military specifications. The military Services and the Defense Logistics Agency have developed a number of innovative procedures and best practices that should be shared among buying commands.

• Partnerships with industry should be instituted to embed cooperation into the system and obviate the need for many of the formal reporting requirements, data calls, and procedures that the current arms-length relationship necessitates.

• Activity-based costing systems should be implemented to generate a direct correlation between individual costs and specific requirements, rather than the current practice of simply "spreading" these costs indistinguishably across many diverse contracts. This technique allows program managers to identify the cost-drivers in the acquisition process.

• Integrated product development techniques should be applied to encourage a multi-functional and concurrent approach to address issues in development, engineering, and production.

The team also noted two caveats. First, a comprehensive program of standardization reform requires substantial upfront investment to achieve downstream returns. Too often, it is assumed that these changes can be implemented without resources. The conventional wisdom seems to be that since military standardization documents are bad, they can be easily and immediately converted into some other kind of document. Nothing could be further from the truth. Many Defense needs cannot be satisfied with off-the-shelf items. There are not enough non-governmental standards in existence to substitute for military documents (and sometimes the non-governmental standard represents a lowest common denominator commercial alternative, or the item may be unique to the military). There are no silver bullets or overnight solutions. Reforming the standardization system will require dedicated human and financial resources.

The second caveat is that even if all of the team's recommendations are adopted and implemented, meeting the goal of a dual-use industrial base is not guaranteed. Military specifications and standards are critical barriers to broadening the industrial base, but they are not the only critical barriers. There is a plethora of acquisition laws, regulations and procedures, many of which are rooted in statute, that discourage commercial firms from entering the government market and impede Defense contractors from competing in the commercial marketplace. Military specification and standard reform can only be viewed as one part of a larger acquisition reform effort.

Summary

Reform of the Defense acquisition process is essential if the United States is to achieve a true integration of Defense requirements into the commercial industrial base. The Military Specifications and Standards Process Action Team was chartered to address the strategy and procedures that the Department uses to define or specify requirements.

The process action team's study provides a start-point for reform of specifications, standards, and associated processes, but continuous feedback, improvement, new ideas, and better processes are essential to the ultimate success of the effort.

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THE INDUSTRIAL OPERATIONS COMMAND

By Wayne A. Marshall and Alan G. Wilson

Today—a Reality

During ceremonies on Jan. 31, 1994, GEN Jimmy D. Ross, then commander of the U.S. Army Materiel Command (AMC) (retired March 1994), provisionally activated the U.S. Army Industrial Operations Command (IOC) at Rock Island, IL, and installed its first commander, MG Dennis L. Benchoff.

The IOC merges the resources and capabilities of the Army's two primary industrial base managers, the U.S. Army Armament, Munitions and Chemical Command (AMCCOM) and the U.S. Army Depot System Command (DESCOM), to perform ammunition procurement, installation and environmental management, and centralized execution of ammunition and weapons system production, maintenance, and storage. Concurrently, the armament and chemical acquisition and logistics management missions of AMCCOM will be placed under the command and control of the U.S. Army Tank-Automotive Command (TACOM), but remain in Rock Island. The chemical stockpile management functions of both commands will transfer to the U.S. Army Chemical and Biological Defense Command (CBDCOM).

Even after these realignments, the new organization's mission will be immense in scope. The IOC will:

- Support Army/Department of Defense (DOD) readiness through fabrication, manufacture, overhaul, and disposal of assigned materiel and equipment;
- Manage and operate the Army's organic industrial facilities, both government-owned, government-operated and government-owned, contractor-operated;
- Assure the industrial base can meet peacetime, contingency, and mobilization requirements for production, maintenance and supply of Army materiel; and
- Act as the DOD single manager for conventional ammunition. To accomplish these missions, the IOC will operate 49 installations and activities in 29 states and three foreign countries (Figure 1). Its projected employment of 26,000 DOD civilians, 700 military, and 13,000 contractor personnel will make it the largest AMC subordinate command.

Genesis—1980s Inception

The concept of an integrated industrial base manager for the Army has been under active consideration since the early 1980s. Two separate studies illustrate compelling reasons for creating such an organization.

In August 1988, Battelle Corporation released a Strategic Assessment of the industrial base. The document's major points were:

- The existing management structure and processes were inefficient;
- There was no master strategy for the base;
- There was significant opportunity for duplication in capital investments; and
- The base had limited involvement in weapons system acquisition planning.

The following December, a study by the Production Base Management Review Board also indicated a need for better integration and management. The study similarly concluded that:

- Workload planning for the base is not a coordinated effort;
- Industrial facilities (depots, arsenals, ammunition plants) are underutilized;
- Warfighting requirements cannot be met by the current production base; and
- Program executive officer and project manager decisions on source of repair limit organic base utilization.

Both papers strongly suggested the solution to these deficiencies was a consolidated manager for the Army's organic industrial capability. During the Summer of 1989, GEN Louis C. Wagner, then commanding AMC, proposed such a concept through the Defense Management Review. This was the genesis of the IOC.

In late 1989, facing the post-Cold War drawdown, GEN William Tuttle, the next commander of AMC, initiated an analysis of AMC's missions and structure with an eye to achieving maximum economies while maintaining Army readiness. Called Vision 2000, the analysis resulted in final recommendations which included consolidating AMC's major logistics responsibilities into just two organizations, a Development and Sustainment Command and the IOC.

Vision 2000 was ambitious, projecting significant savings of $250 million to $300 million annually. However, implementation costs were enormous, requiring six years and $2.5 billion up front. The Army could not afford to absorb costs of this magnitude, and there was no other source of funds. Consequently,

AMC divided its realignment proposals into smaller packages and ranked them based on their return-on-investment. With projected costs of $41 million and annual savings of $24 million (payback in less than two years), forming the IOC was right at the top.

With the opportunity identified, the Army needed a vehicle to expedite implementation. Since the reorganizations to create the IOC met the criteria for the Base Realignment and Closure (BRAC) process, the proposal was included in the Army's submission to the 1991 BRAC Commission. The realignment was approved and incorporated in Public Law 101-510. The 1993 Commission, while cancelling several other 1991 Army initiatives, sustained formation of the IOC. A single manager for the Army's industrial base would become a reality.

Transitioning—a Complex Venture.

Establishing the new command was a complex venture. More than 500 positions had to be moved from Letterkenny Army Depot in Chambersburg, PA, to Rock Island, while both AMCCOM and DESCOM continued to execute their assigned missions. Immediately following the BRAC announcements in May 1991, both commands designated transition coordinators to manage the implementation process, and devised a joint Process Action Team (PAT) of managers and employees. The PAT, the Letterkenny and Rock Island Civilian Personnel Offices, and the two staffs jointly developed a transition approach with two fundamental goals: (1) no interruption of service to customers and (2) compassion for the affected employees.

To achieve the first goal—a transition that was seamless and transparent to the customer—PAT members identified those common or similar processes which could be jointly performed beginning in October 1993. For example, starting with the 1993 submissions, the resource managers began preparing a unified IOC budget for fiscal year 1995 and out.

Since November 1992, AMCCOM and DESCOM have conducted joint conferences to include the depot, arsenal, and plant commanders in the planning process. Also, in the Summer of 1993, DESCOM relocated nine employees to Rock Island Arsenal to form, with AMCCOM personnel, an element to initiate IOC strategic and business planning. During 1994, approximately 40 more DESCOM employees will relocate to the arsenal to create functional liaison offices and facilitate the final phases of the transition in fiscal year 1995.

Achieving the second transition goal was also a challenge. Downsizing continues within DOD, and relocating employees must make difficult decisions affecting their futures. Both commands have responded to these concerns by ensuring the free flow of information and a sense of participation.

The commanders held regular town meetings at both locations, providing opportunities for questions and answers. Union leaders have been partners in working out the details. The public affairs offices jointly publish a quarterly IOC newspaper which is distributed to all potential employees. The IOC crest and motto, shown on the front cover, were designed through a contest featuring hundreds of entries from AMCCOM and DESCOM employees.

The transition process itself has been designed to limit unnecessary employee anxiety. The timeline was drawn to concentrate the majority of DESCOM relocations during the summer months. As a result, employees will not have to withdraw their children from school, and they will have time to acclimate before the next school year. Full relocation services will be provided, including assistance with buying and selling homes. So DESCOM employees could learn as much as

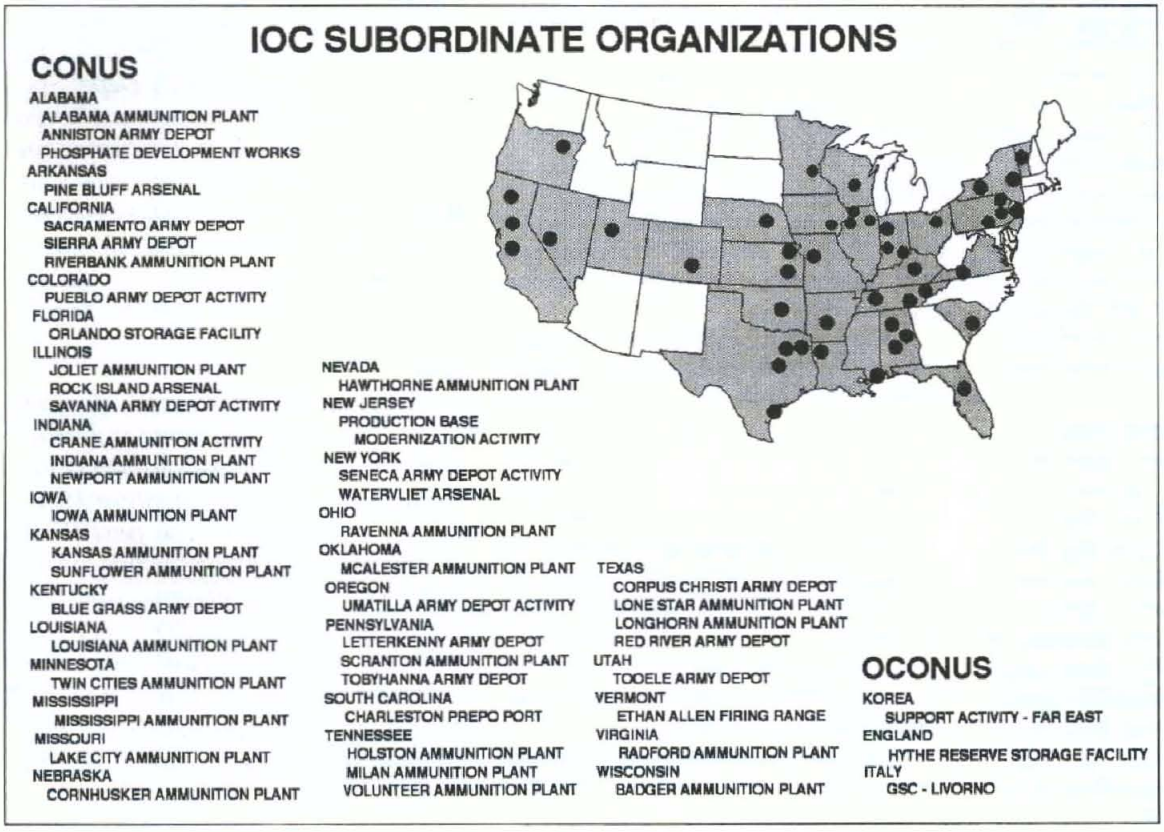

Figure 1.

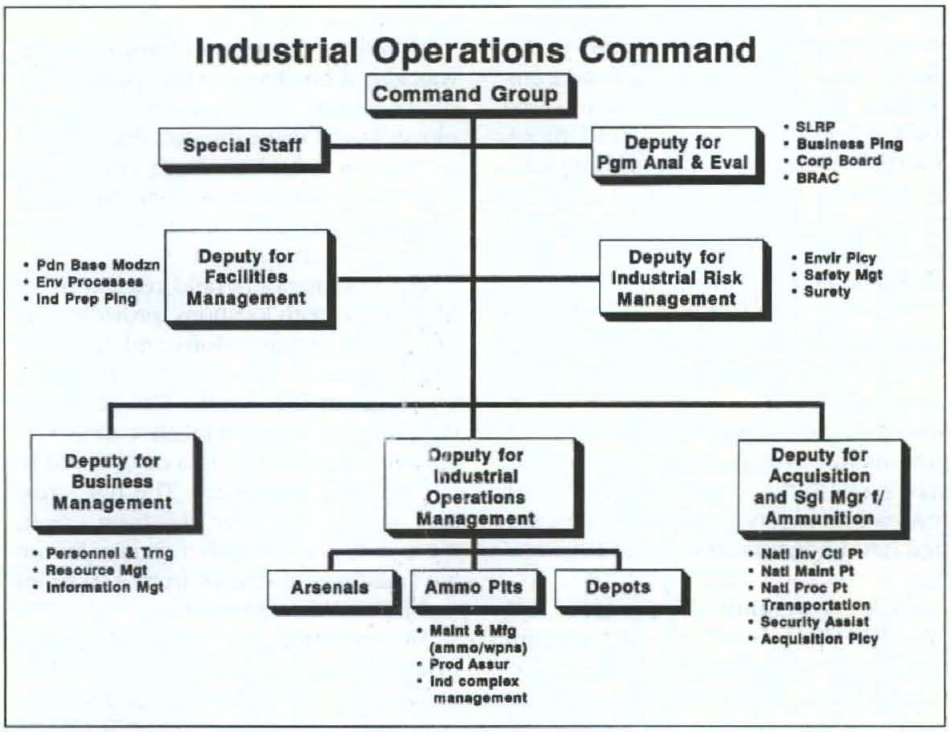

Figure 2.

possible about Rock Island and the surrounding quad cities area of Illinois and Iowa, AMCCOM arranged for two information fairs in Chambersburg. Local realtors, educators, and others furnished valuable data on life in the community.

Finally, although no guarantees could be made, employees at both commands have been assured they will have a job to compete for, and will be informed of that job sufficiently in advance of actually having to move. For those who choose to decline relocation, they can receive consideration under the DOD Priority Placement Program if they wish to continue in federal service, or receive job retraining should they select separation. In any case, management has promised employees its full support, cooperation, and assistance in effecting their decisions.

Organizational Structure

The PAT also developed the IOC organizational structure (Figure 2). Beginning with the BRAC 91 decision, PAT members worked to describe functions and processes, improve them, and design a suitable organization for their execution. The headquarters, currently planned for approximately 2,200 positions, contains 750 fewer positions than previously utilized by the two commands. To accomplish this, the structure substantially reduces the number of organizational layers and supervisory positions, and emphasizes the teaming concept.

Major mission areas of the IOC have been grouped into organizational elements titled "deputy for." The deputy for industrial operations management will be a brigadier general, who will also serve as IOC deputy commander. All other "deputies" are planned as Senior Executive Service positions.

Briefly, the following is delineation of deputies' responsibilities:

• **Industrial Operations Management.** Provide the overall management of the Army's industrial complexes, to include policy, workloading, and product assurance. All depot, arsenal, and plant commanders will report to this organization.

• **Acquisition and Single Manager for Conventional Ammunition (SMCA).** Serve as the DOD National Maintenance Point (NMP), National Inventory Control Point (NICP), and National Procurement Point (NPP) for ammunition and related commodities.

• **Facilities Management.** Manage installations, both active and inactive; in addition to the typical functions of "public works," conduct industrial preparedness planning, manage production base modernization, and oversee stewardship of the environment.

• **Business Management.** Manage the command's personnel, financial and information resources.

• **Industrial Risk Management.** Manage industrial safety, security, surety, low-level radioactive waste, contingency planning, and similar hazard-reduction programs and functions.

• **Program Analysis and Evaluation.** Perform and coordinate the strategic, long-range and business planning for the command and the industrial base, including any mandated or planned realignments and closures.

A Look to the Future

The IOC will be officially established and unfurl its flag on Oct. 1, 1994, but continue to operate at both locations until the employee moves are completed in September 1995. Nonetheless, the command and its employees are already prepared to fulfill the IOC mission: provide world-class logistics support to American and allied soldiers through:

• manufacturing, remanufacturing and maintaining go-to-war weapons systems;

• providing cradle-to-grave management of DOD conventional ammunition;

• maintaining Army war reserve stocks required for power projection;

• acting as a responsible steward of the nation's environmental, fiscal, and human resources.

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ARMY INDUSTRIAL BASE SECTOR SURVEYS

By Kay Ray
and Dr. Joel Morris

Introduction

The viability of the U.S. industrial base is a major concern due to reduced defense materiel requirements. Funding reductions not only affect the industrial base's capability for readiness, it also reflects America's ability to maintain a high level of technological superiority.

Background

In January 1992, Headquarters, U.S. Army Materiel Command requested assistance from five industry associations to survey 13 critical industrial base sectors. The surveys were to determine the effects of the Defense drawdown on these sectors.

Industry associations instrumental in this effort were: the American Defense Preparedness Association, Aerospace Industries Association, Electronics Industries Association, National Security Industrial Association, and Council of Defense and Security Industries Association.

Sectors surveyed were: ammunition, aviation (helicopters), chemical-biological defense, large missiles, small missiles, tracked vehicles, wheeled vehicles, small caliber weapons, medium and large caliber weapons, communications equipment, satellites, sensors, and electro-optics.

Business conditions were grouped into categories. A sector was strong if business was active with enough commercial demand. Acceptable sectors were stable but may need some support. The weak category included sectors with declining business, unable to support major regional contingencies, and included sectors that produced military-unique products.

The industrial base sectors are periodically assessed and updated. The latest assessment shows the ammunition and aviation sectors weak. the tracked vehicle, chemical-biological defense, small and large missiles, small and large caliber weapons, and electro-optics sectors are acceptable. Satellites, communication equipment, sensors and wheeled vehicle sectors are considered strong.

Findings and Actions—By Sector

Findings and actions being taken to address issues are:

• **Ammunition.** This sector is military-unique. It cannot be adapted to commercial applications. The ammunition industrial base consists of government and contractor-owned equipment and facilities. All Services' weapons' platforms are dependent on an adequate supply of high quality ammunition.

The survey notes the number of types of ammunition needs to be reduced, but some level of active production is essential to ensure the base remains viable to respond to high intensity conflicts. Active production is necessary to retain unique skills, key suppliers and long lead-time components. Portions of the inactive base should be maintained against catastrophic incident or for reconstitution of a larger force.

Actions include a pilot program, Armament Retooling and Manufacturing Support, which allows government-owned, contractor-operated facilities to be used for non-defense work. Production is being stretched out for some rounds.

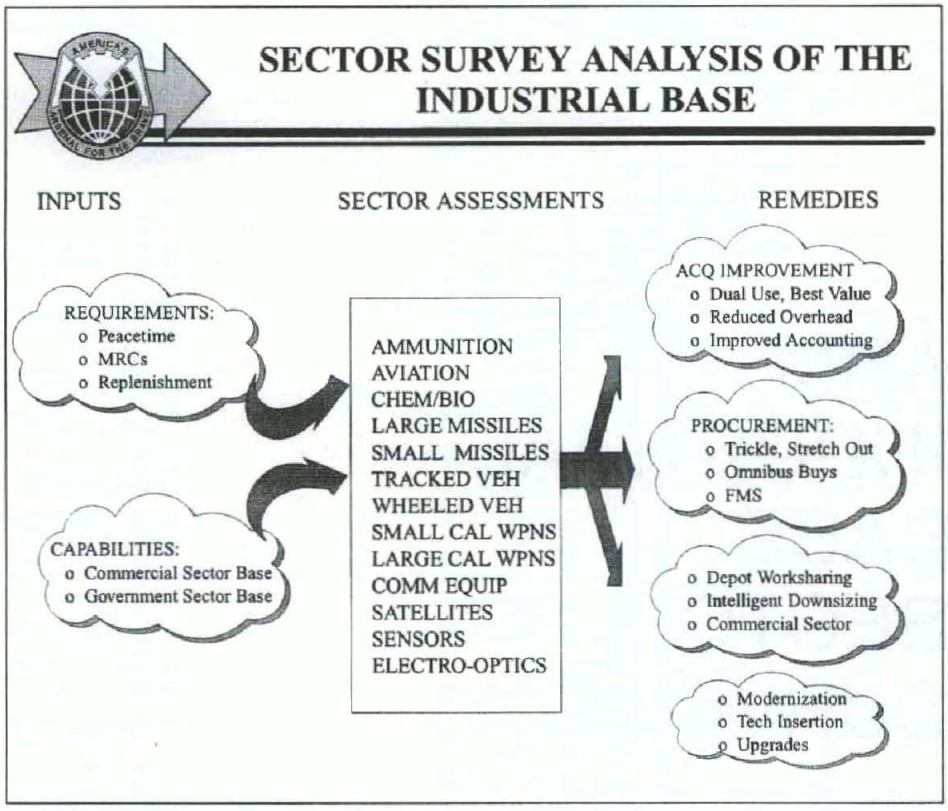
• **Aviation.** The aviation sector's helicopter and turbine engine companies support the helicopter fleets of all Services. The main airframe manufacturers are fully integrated producers.

The survey determined that each manufacturer had its own proprietary techniques and processes, which makes it difficult for one producer to support another's product. A large network of highly specialized companies provides a multitude of subassemblies and parts. These companies would be especially vulnerable to breaks in production and could be the key factor in whether this sector remains viable.

Foreign military sales (FMS) help sustain the base, but orders are made to suit foreign governments, not scheduled to maintain the industrial base. Foreign competitors, with backing from their governments, will make the sales if America does not keep technically current.

Actions include surveying critical subsectors; i.e., precision gears (an instrumented factory for gear manufacturing is being developed); and hydraulics and bearings (vendor base remains viable due to commercial applications). Support for FMS resulted in sales to 10 countries.

• **Chemical-Biological Defense.** Operation Desert Storm (ODS) brought a higher awareness of the need for a strong defense against proliferation of chemical and biological weapons in third



world countries. The chemical defense base consists of small to midsize businesses with a broad range of low to high tech capabilities. Many are government-dependent.

Five main commodities are: individual protection, collective protection, filters and canisters, alarms and detectors, and decontamination. Generally, producers do not have an expansion capacity to meet wartime needs.

Actions include a follow-on study for the joint logistics commanders, led by the U.S. Army Chemical and Biological Defense Command. The study, completed Feb. 2, 1994, is a comprehensive, in-depth assessment of the industrial base capacity to support nuclear, biological and chemical defense equipment requirements for all of the Services. A comprehensive implementation plan is forecast for completion in late summer 1994.

• **Missiles, Large and Small.** The capability to develop and produce sophisticated missile systems is critical to defense readiness and national security. The survey determined that the missiles sector contains large segments that are unique and/or totally dependent on DOD business. There has been a significant shrinkage in the vendor base and many contractors may exit the defense market.

The survey report projected that several front line air defense assets would cease U.S. production in the mid-90s. The large missile industrial base will be largely sustained by foreign sales, and the Strategic Defense Initiative Organization programs.

Actions include omnibus procurements and multi-commodity and multi-Service agreements. Foreign military sales are being pursued to help maintain the base. To encourage FMS, safe air demonstrations have been held. Off-the-shelf technology is being considered for integration into existing weapon systems to show potential customers. A subsector assessment was completed on the propulsion system, and a thermal batteries assessment is near completion.

• **Tracked Vehicles.** The tracked vehicle sector is unique and essential to readiness. Producers are mainly DOD-dependent. Products and technology have little or no commercial application. The base is dominated by specialized, defense required equipment, machining operations and processes, as well as critical core skills; i.e., armor steel welding.

The survey defined 20 critical subsectors. Survey analyses concluded that when production contracts are completed in 1995, the base will be in serious trouble; many critical defense suppliers are expected to go cold; the capability to create spare parts will be lost; and linkage between technology and production will be in jeopardy.

Technology insertion, upgrades and FMS are being used to maintain a viable base. Actions taken include approval and funding of upgrades for the Abrams, Bradley, M113 and M109 Paladin. The U.S. Army Tank-Automotive Command (TACOM) is working hard to share upgrades with prime contractors and the vendor base. Active FMS for end items and other equipment, such as materiel handling equipment and combat construction equipment also play a role. The possible risk of technology transfer must be considered first.

• **Wheeled Vehicles.** The wheeled vehicle sector is supported by a large commercial industry. The commercial truck base has potential to support military truck needs. As the industrial base decreases, or ceases to exist, the capability of subsectors to support production and the responsiveness of the vendor base for spares will become increasingly critical.

The Army normally doesn't own the technical data. End items are produced to performance specifications. The sector and subsectors are dependent primarily on commercial components or modified commercial components. Nine subsectors were studied: engines, transmissions, transfer case, drive shafts, axles, off-road tires, radiators, batteries and wiring harnesses.

Efforts are being made regarding conversion to commercial specifications and standards and use of performance standards. TACOM is working with the Society of Automotive Engineers in this effort. Foreign Military Sales also help keep the base viable.

• **Small Caliber Weapons.** This sector includes individual and crew served weapons; i.e., rifles, machine guns, grenade launchers, sniper weapons and personal defense weapons. The report found this sector is foreign independent.

The sector has been kept to nine producers due to the low level of requirements and large asset levels. During ODS, requirements were satisfied from existing assets; the industrial base mainly supplied spare parts. This capability must be maintained to support high intensity conflicts.

The survey concluded that only one of three government-dependent producers would likely survive during future low level buys. This may lead to sole source situations where there is a tendency for product improvement and less incentive for research and development

(R&D).

Actions being taken include the stretch out of production for the M16A2 Rifle and M9 Pistol. In addition, multi-Service buys help maintain the industrial base.

• **Medium and Large Caliber Weapons.** This sector has modern, flexible world-class facilities. It is comprised of unique capabilities and competencies.

Watervliet Arsenal (WVA) is the sole U.S. producer of cannon for which all Services and U.S. allies are dependent. WVA has flexibility, with specialized equipment and competence, to produce cannon from 40mm up to 16″ naval guns.

Rock Island Arsenal (RIA) is the only U.S. source fabricating artillery recoil mechanisms, and producing artillery chassis. Additionally RIA, with the Detroit Arsenal Tank Plant, has facilities capable of producing hydro-spring gun mounts used in combat tanks.

There is only one U.S. private industry producer of the self-propelled howitzer (turret and chassis). (The company obtains cannon, mounts and recoil mechanisms from arsenals.)

Actions taken: The Paladin Program (the latest configuration of the M109 Howitzer) and partnering of two key producers have increased the stability of the base. A teaming arrangement with Letterkenny Army Depot will be for integration and assembly of the Paladin.

• **Communications Equipment.** This sector is predominantly comprised of companies involved in R&D that are cross-industry dependent, and highly capital-intensive. The survey found that market forces were expected to diminish the industrial base by 1995. Some lower tier suppliers will be going out of business. Those remaining will be consolidating product lines and eliminating military specification components to stay healthy.

Imports have risen substantially, displacing domestic production. Foreign buyers of U.S. companies have increased. There is foreign dependency for some components. American industries are losing the world market share to foreign competitors across the sector.

Actions taken by the U.S. Army Communications-Electronics Command (CECOM) include 79 best value contracts awarded (35 in FY92, 34 in FY93, and 10 thus far in FY94); and omnibus contracts were awarded for business and information systems. CECOM, the Army's battery manager, is evaluating the utilization of dual-use batteries. Presently the Services and Canada are participating in a battery study as part of the North American Defense Industrial Base Organization's sector analyses and activities.

• **Satellites.** This survey concentrated on ground based satellite communication systems. U.S. satellite communications industry is fueled for growth and diversification by a continuing private, service-oriented need to improve productivity.

Actions being taken include promoting the use of commercial specifications and standards, commercial off-the-shelf items and non-developmental items (NDI).

• **Sensors.** This sector includes magnetic, acoustic and infrared sensors and radar. The health of the sensors sector has a direct correlation to the health of the electronic components sector. Defense related technology efforts for electronics, radar and passive sensors, along with commercial endeavors will help maintain the base.

The survey concluded that reduced funding would seriously erode or eliminate vital areas of sensor technology development, especially unique detectors.

CECOM is pursuing the commercial base to satisfy its requirements when possible. Examples of commercial base use are radiosondes and meteorological data systems.

• **Electro-optics.** Key night vision/electro-optics technologies are used in image intensification devices and thermal imaging systems for individual and crew served weapons. The survey noted that four prime contractors were in the business of defense image intensification. Industry could downsize to one contractor.

Army is turning toward thermal technologies. Thermal imaging systems, used in focal plane arrays, are manufactured by many companies. As long as there is a strong R&D base and advancing commercial applications for thermal imaging, industry should be stable through 1995.

Actions to maintain the image intensifier industrial base include: Extending deliveries of second generation detector Dewar contracts, and awarding two five-year omnibus contracts for third generation Detector Dewar devices. Also developed is an NDI third generation image tube for use in second generation systems. In addition, the MANTECH Program is pursuing projects for the next generation of systems; e.g., infrared focal plane arrays.

Future Actions

Many of the surveys' recommendations have been implemented and have helped preserve critical elements of the industrial base. New studies are ongoing or have been completed for ammunition, tactical vehicles, chemical-biological defense and small caliber weapons. This year's review and update will include subsectors selected by the industry and the Army Materiel Command.

The latest sectors to be surveyed will focus on industrial base capabilities from 1997 to 1999. Completion is projected for Aug. 31, 1994. They will identify what must be preserved to provide surge and sustainment to support contingency operations and replenishment of losses after major regional conflicts. Recommendations will address areas such as: possible re-establishment of domestic subsectors if they have moved offshore; capacity for research and development; and technology insertion in order to maintain the Army's technological leading edge.

The surveys, as in the past, will help determine if each sector can sustain itself through a combination of government procurement, commercial compatibility, commercial sales and direct sales or FMS. Sector surveys will continue to be an important tool for evaluating the industrial base as defense budgets, materiel requirements and industrial capabilities change.

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USE OF NON-MILITARY ELECTRONIC SPECIFICATIONS AND STANDARDS IN THE ACQUISITION OF ARMY MATERIEL

By Darold L. Griffin

"We must radically rethink our processes and practices for acquiring goods and services. We have today an acquisition system that evolved through the adoption of myriad rules, regulations, and laws that were intended to address a particular problem or interest. The combined net effect of those rules, regulations and laws is a system which adds costs to the products of defense contractors, making it harder for them to be competitive in the commercial marketplace, and prevents commercial contractors unwilling to change their practices from selling to the government."

—Dr. William Perry
June 15, 1993

Working Group Established

The U.S. Army Communications-Electronics Command (CECOM) has undertaken the implementation of non-military electronic specifications and standards in the acquisition of electronic equipment. This has been undertaken through the efforts of CECOM's Improved "Military" Parts Availability and Selection Working Group (IMPAS-WG). The working group was established after issues were raised by project managers and program executive offices (regarding contractors' inability to procure military type microcircuits and components) focused CECOM's initiatives to enhance the use of non-military devices. The membership of the working group includes representatives of the CECOM Research and Development, Logistics and Readiness, and Acquisition Centers; the Legal Office; and adjunct membership from three program executive offices and the Army Research Laboratory.

The primary objective of the IMPAS-WG is to enhance part and component availability through the use of non-military microcircuits and components. (Note: The term "non-military" means materiel which meets military requirements while not being procured to military specifications. In the electronics industry the term "commercial" indicates components which are generally manufactured to meet environmental performance profiles inadequate for the extremes of military application.) To achieve this, the working group is developing policy including: logistical support concepts, reliability/risk assessment, and contractual implementation. Barriers will be identified with related recommendations and advocacy for their removal. Additionally, the working group recognizes the need to address the obsolescence issue through changing the parts selection process.

Tasks and Roadblocks

The working group is charged to address five specific tasks:

- Collect and provide information and support on parts selection—adaptation of best commercial manufacturing practices and use of non-military electronic microcircuits and components;
- Provide and develop policy guidance for the CECOM parts selection process;
- Serve as CECOM interface for

electronic component selection and standardization issues with industry, Defense Electronics Supply Center (DESC), Army Research Laboratory, and the U.S. Air Force Rome Laboratory;

- Manage and implement change and adaptation of our current way of doing business to the "new reality" of smaller Defense budgets and reduced procurement; and
- Recognize CECOM and DOD's need to address obsolescence issues through the re-invention of the DOD parts selection process.

The working group is chartered to find and remove roadblocks which may result from those within DOD unwilling to accept change and face up to the new reality. The move toward shared values, vision and clear objectives within DOD and the Defense industry requires group members to educate CECOM, our customers and our contractors. This enables all those concerned to develop a clear understanding of current part selection process issues and the need to transition to use of available non-military microcircuits. Aversion to risk taking traditionally has resulted in inclusion of restrictive test requirements in procurements. The current orientation toward full Mil Spec testing must be replaced with one accepting process control, thus adapting the parts selection to current commercial concepts.

The current dearth of practical implementation procedures supporting use of best commercial practices and improved parts selection has restricted working group efforts, but also provided an opportunity for the group to operate creatively. Significant time and effort is devoted to establishing a sound working relationship with DESC, other DOD activities and industry. Additionally, the IMPAS-WG is promoting participation of CECOM engineers in non-governmental standards bodies (i.e., Society of Automotive Engineers, Electronics Industries Association (EIA), Institute of Electrical and Electronic Engineers, American National Standards Institute, etc.) This will help ensure meaningful information exchange on issues of mutual concerns and maximum involvement in standardization efforts of these organizations.

Sustainment Issues

Currently, many of the test, qualification and reliability requirements specified by industry (e.g., MIL-STD-810, MIL-STD-883, MIL-HDBK-217, etc.) are of military origin and there are no generally accepted commercial counterparts. Technical documentation of parts by suppliers is generally insufficient for a third party to reprocure at the component level. This lack of sufficient technical documentation can hamper transition to the use of non-military devices due to the need to adapt provisioning and maintenance processes.

A major impediment to the objective evaluation of component alternatives is the lack of viable field data addressing non-military microcircuit reliability or performance in a military environment. Collection and analysis of such data and establishment of a reliability predictions guide for non-military components, especially plastic encapsulated microcircuits (PEM), would accelerate the use of non-military parts and components. To acquire this knowledge, the working group has expended significant resources interfacing with industry groups such as the EIA and by benchmarking non-military part selection processes used by our contractors.

Design Issues

Currently, contractor part selection is generally made based upon current availability and cost, without addressing future supportability and availability requirements. Non-military part control requires CECOM to change to a more adaptive process with less control placed at the component part level and more at the Line Replaceable Unit/Shop Replaceable Unit levels. We must consider the fact that selection of parts available today, mainly because they enable us to deliver the system on time, may result in future supportability issues which have been designed in. In fact, developmental programs are already experiencing parts availability problems before they even reach initial production.

Shorter device life cycles (down from 10 to five to three years) resulting from rapid advances in device technology necessitates using emerging technology (generally only commercially available) and flexible, robust designs. The end result is that military type devices will be used only on a limited basis (where necessary and available) and commercial devices will be more commonly used. The small quantities of specialized militarized microcircuits procured for DOD (with their related special requirements) will only be available from a small supplier base asking premium prices. Discussions with component engineers indicate

The changing environment creates a rare window of opportunity for us. Necessary adjustments to parts selection and control, procurement practices and maintenance and logistics systems will require significant changes in thinking and operational processes.

that military components, as we currently know them, may not be available for five years.

Adapting the Part Selection Process

The changing environment creates a rare window of opportunity for us. Necessary adjustments to parts selection and control, procurement practices and maintenance and logistics systems will require significant changes in thinking and operational processes. As a result of the IMPAS-WG study, CECOM/C3I has embarked on a three-phased approach to implementing the use of non-military microcircuits and components.

Phase I—This phase modifies current DOD policy, eliminating preeminence of the current microcircuit specification (MIL-M-38510) and adopting the Qualified Manufacturers List (QML) approach delineated in MIL-I-38535 and MIL-H-38534. QML employs a best commercial practices approach to qualify suppliers' processes rather than individual components, as is done in the Qualified Products List (QPL) approach.

In this process, microcircuits are selected IAW MIL-STD-454 requirement 64 which establishes an order of precedence for the selection of devices. The quantity of non-military devices that will be available is only limited by the growth of QML and the creation of Standard Military Drawings by DESC to support the devices. This process is being backed and supported by DESC and the Air Force. The working group feels that this interim process will soon be superseded by the subsequent phases as the Army and DOD transition to a more non-military parts environment. Phase I is already being used in CECOM contracts such as the SINCGARS.

Phase II—This phase allows the contractor to select non-military microcircuit and semiconductor devices using the guidelines of MIL-HDBK-179. The contractor will define its part selection criteria for the intended application in addition to developing and implementing supplier evaluation guidelines to establish a Qualified Suppliers Listing for each device. Both device and supplier selection is documented by the contractor in its internal Parts Control Program Plan. The policy allows use of non-military devices, but stresses use of available QML microcircuits and QPL semiconductors. Parts Control is jointly defined by the Parts Control Program Plan for microcircuits and non-standard semiconductors.

This phase requires the contractor to develop procedures to address Diminishing Manufacturing Source considerations and to consider obsolescence in device selection. This is documented in the contractor's Parts Control Program Plan. Full implementation of this policy requires resolution of the foreseen "roadblocks" to its implementation. These include: extent of and necessity for parts documentation; contractual implementation of the Parts Control Program Plan (pre-award evaluation, post award review); logistics impacts; reliability prediction of non-military devices (PEM); and others. Phase II will be applied on CECOM contracts and solicitations starting in July 1994.

Phase III—This expands on the selection philosophy of Phase II. A Parts Control Program Plan would be developed by the contractor for the selection of all components. Parts selection is based on the concepts of MIL-HDBK-179. The contractor defines selection criteria for both devices and suppliers for each application and documents selection in the program plan. Contractors are not formally required to select from MIL-P-11268, MIL-STD-454, etc., but would use these reference documents for the option of selecting a military standard device (if desired) for the application.

Concerns identified regarding Phase II also apply to this policy and must be resolved. An alternative is to use form, fit and function requirements based on the environmental, reliability and performance required of the higher assembly or end-item. Device selection would only be controlled by the higher level requirements. Selection of devices is solely a contractor responsibility with no government involvement. Technical documentation to the part level would not be required. Higher level performance requirements and parameters would be documented and used for reprocurement.

Conclusion

It must be remembered that the actions taken to date are just a foot in the door of transitioning to commercial processes, specifications and standards. The IMPAS working group is using adaptation of non-military microcircuits and components as a means to identify and remove the roadblocks which restrain CECOM's use of commercial specifications and standards. Other working groups are working on greater use of NDI/COTS procurements and the implementation of international quality standards (ISO 9000/Q-90 Series) documents on CECOM contracts. Reinventing the acquisition process is going to be a journey and IMPAS is just a short excursion on the way.

> *"The use of commercial products, processes and practices in procurement is a fundamental component of the new Army acquisition approaches."*
>
> *—Joint Statement - Nov. 10, 1993:* ***George Dausman*** *(Acting Assistant Secretary of the Army for Research, Development and Acquisition) and* ***GEN Jimmy Ross*** *(Commanding General, U.S. Army Materiel Command, now retired)*

DAROLD L. GRIFFIN recently retired from the position of principal deputy for acquisition at the U.S. Army Materiel Command in Alexandria, VA. He was still serving in this position when he authored this article. Griffin holds a degree in metallurgical engineering from the University of Cincinnati and completed a law program in conjunction with LaSalle University.

ECONOMIC SECURITY AND THE ARMY

By Joe Sites
and Caroline Kettlewell

Introduction

The American public no longer views the military threat to our nation as a concern which rates a high national priority. Today, we are more concerned with economic issues. This shift resulted in large measure from the success of our military in confronting the Cold War threat. The Army can take justifiable pride in contributing to this success. However, this achievement brought a change in mission emphasis along with a new set of problems. This article provides a short review of the Army's role in supporting national interests with emphasis on the increased need to stress economic security.

Economic Security

The first question this article must ask is: "What is economic security?" It is generally agreed that national security is the protection of our nation as a whole, therefore, economic security is the protection of the economic well-being of our nation. To see how economic security fits into the overall picture of national interests and how the military is affected there is a need to have a common understanding of our "national interests."

National Interests

Repeatedly, we are told that a course of action was taken because of our national interests. The term has been used so often, particularly in the wake of Viet Nam, that it has begun to lose its meaning—it is becoming old hat to say that an action was taken in our national interest. If the term national interest is used, we need to relate it to something concrete and there should be a relative value attached.

To assist in defining national interests and their relative importance, Hans Morgenthau prepared a very useful list. The following is based on his work, however the exact wording may have changed in several transcriptions:

National Interest	Importance
Defense of Homeland	Survival
Economic Well Being	Vital
Favorable World Order	Major
Promotion of Values	Peripheral

A Paradigm Shift

Morgenthau's list is extremely logical. The most important national interest is defense of the homeland. Recent changes in the world order have not lessened the importance of this national interest. These changes, however, have reduced the fear of an attack to such an extent that it is almost non-existent for the majority of Americans. This shift in perception results in a new paradigm—a focus on the economic well being of the United States.

LTG Stephen B. Croker, 8th Air Force commander, in his article, "Rethinking America's Defense Needs" in *The Retired Officer Magazine,* March 1994, page 26, presented his view of the effect of this paradigm shift. "In today's environment, we can no longer talk to Washington policy makers and the public solely in terms of military strategy, national policy, or military accomplishments. . . "Some of the people who are currently making decisions and legislation think in structural terms, not strategic terms."

LTG Croker describes those who think in strategic terms as those who look at deterrence as a strategic goal. Those who think in structural terms are focused on the industrial base, jobs and fiscal policy priorities. As representatives of the American people and as a primary instrument to protect the national interest, the Army must also focus on the nation's economic well-being.

The Military Response

To put into perspective the changes required of the military by the paradigm shift, it is important to examine the past military support of the national interests as defined by Morgenthau. Throughout the Cold War, the military focused on the defense of the homeland. Even our forward-based troops were there to engage the enemy prior to a possible attack on the United States. Offensive weapons were in place to ensure that the enemy would not use its forces. Efforts required to counter the Cold War threat were so massive that few military resources were available for national interests other than defense of the homeland.

Recent history has clearly shown that the military must be prepared to support the entire range of national interests. However, it must now emphasize economic security. This change requires the military to be prepared for more contingencies and at the same time to accomplish its mission with fewer resources, smaller forces and reduced forward basing. Military support of the nation's economic security includes both preparation for and conduct of military operations as well as conduct of its day-to-day peacetime functions in such a manner that they support economic security.

Military support for economic security can come primarily from two sources: the field Army and the research, development and acquisition community. The following discussion provides some examples of potential actions from both of these sources.

Army in the Field Contributions

In preparation for a wide variety of

missions, the Army will need to find ways to reduce costs. One of the most effective ways which the Army has already undertaken is in simulating the battlefield and integrating simulations with actual troop activities. Despite this achievement and future expansion of simulation, soldiers will still need to train with live fire.

Thought should also be given to "dual purpose" training. For example, ammunition is used in peacetime for training and for testing. In many cases, it could be used simultaneously by troops for training and by testers for measurements. This may not be an optimum solution for either party, but it may help when resources are limited.

Key to a nation's well-being is a well trained labor force. The Army has demonstrated that it can effectively train people with average abilities to perform exceptionally complicated tasks. Either through the training of reserve organizations or training of non-career personnel, the Army can make valuable contributions to the nation's economic security in improving the quality of the labor force.

High on our national priorities, is the desire to expand our health care system. Although our military medical system is heavily tasked today, it is possible that with additional limited resources the military could provide the civilian community greater services than it could obtain from other sources, for the same funds. Examples of services include immunizations and use of medical facilities.

The military has already demonstrated its capability to support our nation's efforts to combat drugs. This role could be modified to include boot-camp training of offenders, camp opportunities for inner city youth, and sharing of recreational facilities.

Disaster relief assistance is essential in restoring portions of the nation's economy which have been impacted. The Army has performed well in recent disaster areas and should be able to take on even greater responsibilities.

The Army in the field must be alert to how its activities can be modified to provide help in securing our nation's economic well-being. What, at one time, was considered extra work or "nice to do" may well become key work. The Army will have to be innovative and find ways to work out its initiatives. While the Army's operational units are making their contributions, the Army's RD&A community can make even more immediate and high-impact contributions to the economy.

RD&A Contributions

Saying that the military must do more with less has almost become a cliché. Cliché or not, it is true. As discussed earlier, the military must deal with a variety of new missions. Not only must field forces have equipment for major land battles, they will require a wide variety of equipment to deal with different contingencies. There will be a need for nonlethal weapons, mine resistant vehicles, special communications, special transportation, and support facilities for indigenous populations. This equipment must be provided from a smaller budget. In addition, care must be taken to help preserve the nation's industrial base.

One of the first ways to stretch the Army budget is to buy more efficiently. Generally, the Army pays up to 35 percent more for specific items than civilian industry. The reason is no mystery. Laws and regulations complicate the acquisition process and someone has to pay industry for these complications.

The Army Materiel Command conducted an extensive Acquisition Improvement Training Program (Roadshows) to train its acquisition personnel to operate as effectively as possible under current restrictions. DOD is reviewing the entire acquisition process. Improvements in capabilities to address the past performance of vendors, "color of money" restrictions, and maintenance of essential manufacturing capability could all be helpful.

The military can make a direct contribution to the industrial base through greater emphasis on mutual sharing of research.

The military can make a direct contribution to the industrial base through greater emphasis on mutual sharing of research. This would reduce duplication of national research effort, allow civilian and military research to be complementary, and reduce overall funds for specific efforts. The National Automotive Center, which brings together the U.S. Army Tank Automotive RD&E Center and the automotive industry, is an example of shared research efforts.

With the many new requirements for special equipment for special missions, there is an even greater need to carefully examine requirements. Are they nice to have? Do they materially improve the capability to perform a mission? A particular issue which needs to be addressed is the point of diminishing returns. A 10 percent increase in capability of a weapons system may not justify an additional cost of 50 percent. Users in the field may think that it does, but they must be aware of the costs and the sacrifice required in other systems.

The performance of our equipment in Desert Storm demonstrated that our research, development and acquisition community performed its mission in a superb manner. Now, there is a new mission which calls for new approaches.

Summary

Our nation has shifted its focus on national interests from defense of the homeland to economic security. The Army must also make an identical shift. Concurrently, the Army must continue to support all of our national interests. The imagination and initiative used in meeting past challenges will allow the Army to meet current ones.

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REENGINEERING:

RECONFIGURING TO THRIVE IN A CHANGING CLIMATE

MAJ Robert M. Serino

Introduction

Success is often a catalyst for change because the resolution of "Problem A" allows an individual—or a nation—to refocus attention to "Problem B."

For the majority of this century, and certainly following World War II, the emergence and threat of Eurasian Communism has required a monumental concentration of national energy and resources on maintaining a balance of power. Words such as "mutually assured destruction," "Fulda gap," "retaliation in kind," and right to "first use" speak of a time when we as a people were oriented toward fighting and winning the Cold War.

Now the wall has fallen and we see a shift in national priorities, a shift that should not surprise us. As any student of history will tell you, post war eras such as those of World Wars I and II, Korea and Vietnam saw a refocusing of national attention to matters of domestic concern. Not with great surprise, there was also a serious degradation to our nation's military power.

If history tells us anything, it is that we must not focus on declining defense budgets and military power, rather we must focus on preserving our nation's ability to protect its vital interests in the face of reduced resources and national attention. In the words of GEN Gordon Sullivan, Army chief of staff, there must be "no more Task Force Smiths." That is, the Army must not become a hollow ineffectual force. Rather, the Army must be lean, flexible, and fully capable of mission success.

Of course, the Army does not fight and win wars in a vacuum. In reality, there is a partnership with the industries that provide the materiel so necessary for the conduct of operations. Thus, as the Army has undergone a "right-sizing" in the last few years, so too has our industrial base. Moreover, change taking place in industry is noteworthy and instructive for our own use. In the course of this article and in the context of a case study, we'll look at how one member of the industrial base—Martin Marietta Electronics and Missiles—is recognizing a new era, and reconfiguring to thrive in a changing climate.

The Changing Climate

There is little question that the post Cold War era has brought forth a significant reduction in defense manpower and resources. In essence, by our successfully winning the Cold War, we have catalyzed the nation to reallocate a greater percentage of resources toward domestic concerns. Thus, we now see mandated defense reductions of approximately one-third from the highs of the Reagan Presidency; reductions that have sent waves of change throughout the Army and the industrial base. Furthermore, when reductions are combined with an ongoing mission to fight and win two near-simultaneous major regional conflicts (MRC), the challenges of protecting this nation's vital interests become awesome. They become awesome in view of the fact that specific and current threats to our vital interests are at times vague.

Concurrently, members of the industrial base today find themselves configured for the 1980s with huge production and engineering facilities, and very large staffs. Overhead has become a heavy anchor in the current resource-constrained business climate.

How do we configure ourselves to deal with such vague and awesome challenges? Also, how can the industrial base remain profitable in order to sustain itself?

With the climate changing dramatically over the previous five years, and the near and long term views being negligible to non-existent growth, both the Army and the industrial base have the options either to adapt and thrive in a dramatically different climate, or to be overcome.

To Reengineer or Not

Adapting and thriving require bold moves rarely satisfied by a salami-slice approach. That is, it is often better to reengineer an organization than it is to pare down individual elements either to meet budget constraints, changes in the marketplace, or new mission requirements.

Reengineering, as described by Michael Hammer and James Champy in their seminal 1993 book titled *Reengineering the Corporation,* is a process by which "American corporations must

undertake nothing less than a rapid reinvention of how they do work." What the authors seem to be advocating, and Martin Marietta Electronics and Missiles seems to be developing, is a process-oriented culture. Specifically, the work processes necessary to produce the final products are given intense scrutiny in the context of their value added to that final product. Processes that do not add value to the final product are either altered to add value, or eliminated.

In the final analysis, the question "to reengineer or not?" is best answered when considering the size of the challenge in the context of available resources. The greater the difference between the two, the closer an organization should move toward reengineering.

Reconfiguring to Thrive

Reengineering appears to have three ingredients necessary for success: setting the vision, reconfiguring for execution, and maintaining a focus. Setting the vision seems to be essential in moving a company forward in the reengineering process.

In our case study of Martin Marietta Electronics and Missiles, the company's president established a clear vision of where they were going, and how they planned to get there. Numerous company publications outlined his thrust to become a "Center of Excellence for electro-optic systems, anti-armor and air defense." They further indicated that his "...intent is to meet the challenge by creating new markets, demonstrating preemptive technology, pursuing adjacent markets, developing greater efficiencies; and performing flawlessly on existing programs." Describing how that would be accomplished, he went on to state, "...engineering is no longer a stand alone activity. Engineering, Manufacturing, Quality, Procurement and Business are now integrating their organizations in order to be product focused."

This new vision was viewed as being necessary for survival. Over the previous year, Martin Marietta Electronics and Missiles had lost five major contracts in a row because their cost for doing business was 18 to 40 percent higher than their competitors' costs. Not surprisingly, operating costs were targeted for reduction. There had to be a better way.

Using the Air Force Materiel Command's May 25, 1993, *Guide on Integrated Product Development* as an institutional driver for cultural change, the company set forth on a simultaneous and parallel reconfiguring process. The focus seemed to be a complete reengineering of how the company operates; to include support functions, production, engineering, management structure and physical plant. All of this was based on the philosophy of integrated and concurrent teaming.

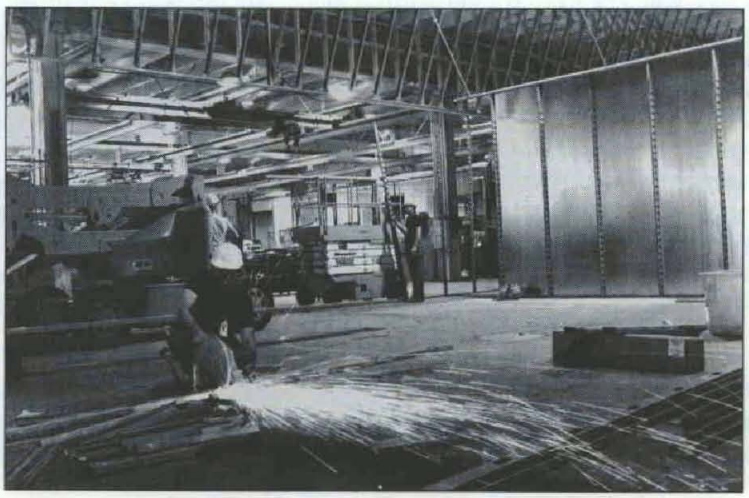
Support functions such as business, finance, personnel and procurement were deemed crucial to the successful operation of the enterprise. In reengineering support functions, the corporate leadership looked to make support an integrated component of product development teams. By doing so, support functions would become multiplexed and pooled. The net result was a relative reduction in the Support: science/engineering ratio to less than 2.5:1.0, and the employment of fewer specialists for each specific contract. For example, PATRIOT support staff decreased from 500 to 200;with no change to production rate.

Production reengineering was being looked at in terms of what to produce, and how to produce it. The company chose to limit internal production to those components requiring precision machining or specialized company knowledge. Non-precision components would be purchased from preferred suppliers participating in the company's Variability Reduction Program. This approach would facilitate overhead cost reduction, and at the same time afford quality non-precision components.

Similarly, the company continues working toward a core production workforce composed of multi-talented individuals (generalists) such as "flexible machinists" and "flexible engineers." That is, a core group trained in a discipline capable of superior performance across a discipline's spectrum. For example, machinists capable of operating many of the different machines within their manufacturing cells, not just one or two machines. Another example would be engineers capable of superior performance in industrial, quality, production and mechanical engineering, not just a single branch of engineering. The key personnel thrust seems to be the routine employment of capable and enthusiastic individuals on integrated teams for the purpose of developing a product or solving a problem without great consideration to organizational structure.

Because organizational structure is viewed somewhat as an impediment to integrated product development team success, management layering within the company is seen as a liability rather than as an asset. Thus, the number of management layers between the shop floor and the company president's office is being reduced from eight layers to four. The corporate leadership believes that these changes will facilitate teamwork at all levels, empower employees, enhance worker product ownership and improve individual accountability. Most of all, they believe these changes will foster long term creativity and imagination.

In a Jan. 17, 1994, company newsletter, Martin Marietta Chairman and Chief Executive Officer Norman Augustine mentioned that the current period is "the toughest time I've seen in my career," that "the hard-core defense businesses will start to disappear, or die, or merge," and that "we've established ourselves as one of the survivors." In this context, major change to facilities is ongoing at Martin Marietta Electronics and Missiles. When considering both production and office floor space, nearly two-thirds of the facility is undergoing reconstruction and consolidation over a 10-month



Martin Marietta plant facilities being modified to improve precision machining and production.

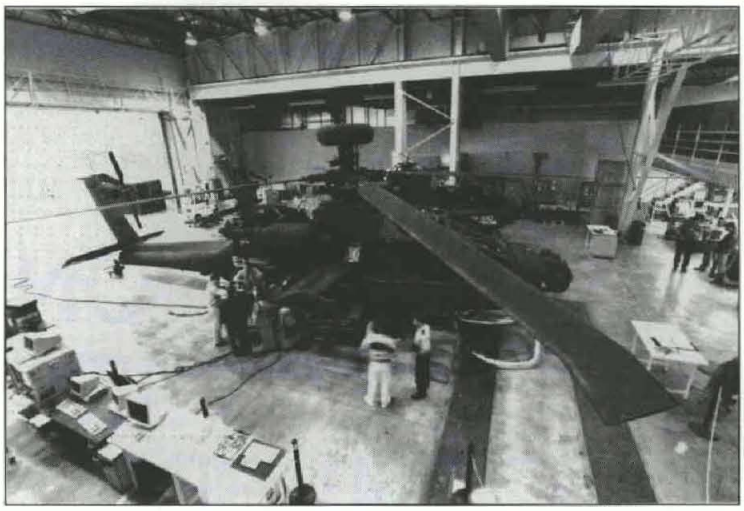
period as the company reconfigures for the future. What we see taking place is the development of a facility where programs are allowed to thrive in an environment characterized by flexibility of support, production, and engineering.

Maintaining A Focus

Of course, maintaining a focus is fundamental to reaching goals set forth by a leader's vision. Reengineering is a response to the realization that procurement dollars will not be as bountiful as they were in the 1980s. Moreover, while production volume is constricting, science and engineering continue to push "state of the art" into shorter and shorter lifetimes. As a result of shortened lifetimes and reduced dollars, the company believes that they must be postured to win and keep new business, bolster foreign military sales, and rapidly exploit and prototype advanced technologies into state of the art weapon systems.

Reengineering efforts to reduce costs in order to win and keep new business are resulting in significant personnel turbulence and losses, while at the same time streamlining production and strengthening the organization. For example, over the last year, PATRIOT production rates did not change, 2,000 people left the company, and the number of "touch labor" hours for PATRIOT missile production decreased 20 percent per missile. Quite a dichotomy, but indicative of reengineering.

Foreign military sales (FMS) are being relied upon to a greater extent in order to boost production volume. In fact, FMS may reach 50 percent of company volume. With respect to Army acquisition, economies of scale will clearly benefit Army programs.



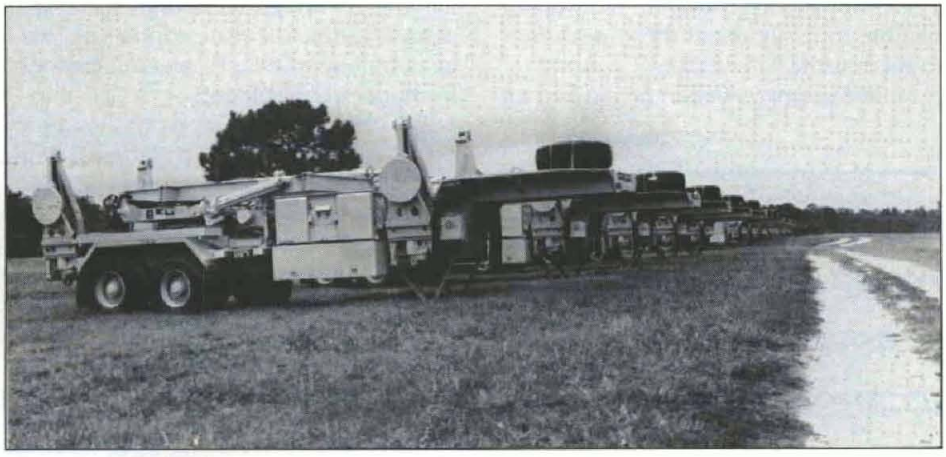
Two AH-64D Longbow Apaches at the Engineering and Prototype Laboratories Hangar undergoing reconfiguration and checkout.

Advanced technologies are fundamental to providing the very best hardware to U.S. Forces. Martin Marietta Electronics and Missiles has chosen nine key electro-optic and millimeter wave technologies for exploitation and integration into fire control and missile systems. That is, the company is developing a clearly defined niche which could likely remain viable for the next two decades. For example, Martin Marietta's contribution to the LONGBOW APACHE program with respect to the Fire Control Radar and the LONGBOW/HELLFIRE missile are standout examples of developing expertise and integrating that expertise into a critical state of the art system.

Conclusion

Learning is a painful process often catalyzed by success. Our winning of the Cold War—in partnership with the industrial base—has placed us into a time of trial and excitement. While it is difficult to say with certainty what the future will bring, history tells us that we must focus on preserving our nation's ability to protect its vital interests in the face of reduced resources and national attention.

Using the context of a case study, I have attempted to outline how one member of the industrial base—Martin Marietta Electronics and Missiles—has recognized a new era and is undergoing significant reengineering. As we look at this industrial base example of reconfiguring to thrive in a changing climate, let us work to insure that there are no more Task Force Smiths.



PATRIOT M901 semi-trailor mounted launching stations awaiting shipment to FMS customers.

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COMMON SENSE CONVERSION

Closing the gap between profit and performance in the post cold-war industrial base

By Wayne K. Wheelock
and Roger W. Mayfield

Introduction

Each of us in the acquisition profession has a responsibility to define problems in our area of proponency, establish and analyze alternative solutions, then make decisions which positively impact the welfare of our organizations. Unfortunately, the really big issues like "defense conversion" often defy this logical process. We are tempted to skip the "define" part of the problem-solving process in our hurry to implement apparent solutions.

It is clear that we must construct a new structure to sustain our defense capability. Common sense indicates that a well-reasoned foundation is essential if our process is to support future national security burdens in the new world order.

Considerations

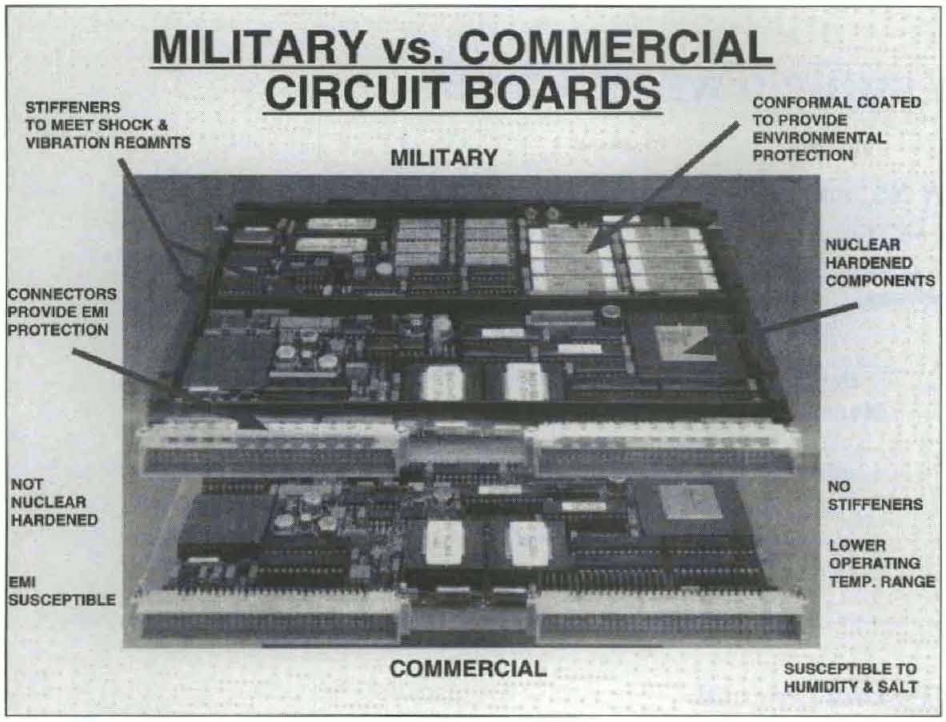
The market for unique military equipment is diminishing. Army procurements will be $5 billion in 1997 vs. $14 billion 10 years earlier. During the same time frame, the talents of approximately two million military and civilian personnel who used to help us solve our problems and produce unique components for our military systems will be displaced to the commercial marketplace. This process is irretrievable. We will not be able to easily recall these resources to meet future challenges.

Military preparedness is dependent on the existence of a manufacturing capability. Entire industries have developed to provide products for a singular military customer who, until recently, could be counted on to sustain viable profits in order to meet a continually increasing military threat. We cannot sustain an Army without adequate sources of quality components which meet military performance requirements.

It is clear that we must construct a new structure to sustain our defense capability.

We can't afford to layaway all unique production facilities in readiness for future procurements. The costs are too high. Layaway of just one M1 production facility is estimated at $900 million (including personnel benefits). Maintenance of the facility in mothball status would cost an additional $40 million per year. This approach, multiplied against our current number of unique production facilities, would quickly exceed the available $5 billion procurement budget.

Starting from scratch at a later date won't work either. It takes six to seven years to start up a system production line. This will not support our need to



rapidly take a needed technology off the shelf to meet the next threat evolution.

Challenge

These facts present us with a significant challenge. We must find ways of sustaining a technologically superior military force within the realities imposed by marketplace economics. The challenge is to determine how to eliminate reliance on unique military facilities, find civilian market sustenance for equipment produced in these facilities, or achieve workable compromises between the two.

Profit and Performance

Whatever methodology we develop will have to reconcile basic differences between factors driving military and commercial product design and production.

Business is the organized effort of individuals to produce and sell, for a profit, the goods and services that satisfy society's needs. Despite the unquestionable patriotism of those who work in the defense industry, ultimately the industrial base is driven by the opportunity to generate profit. No profit—No production.

We in the military seek to apply our available budgets to best effect in promoting national security. Despite cost awareness, performance, not profit, is our primary motive. No performance—No win.

Fortunately for the military customer, national security requirements and annual procurement funds have been sufficient to sustain the profits of an industrial complex serving military unique needs since World War II.

These two separate motivations, once complementary, have clearly started to diverge. Traditional military industries are now seeking, with government support, to convert their business to achieve profitability in the commercial marketplace. This "defense conversion," while bolstering America's economic security, has already begun to negatively impact our ability to acquire unique military items which have no commercial sector counterpart.

Defining the Problem

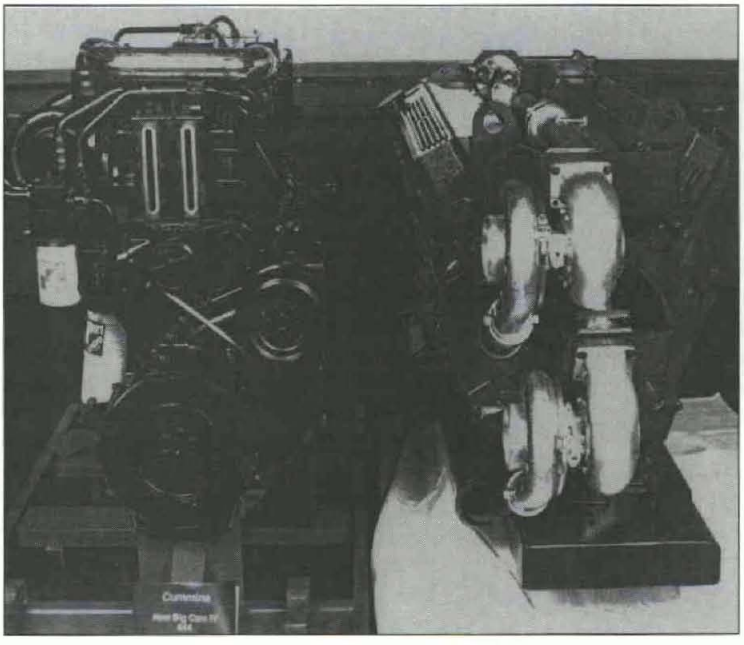
Why is military equipment different? How did we come to be so dependent on unique production facilities and a process which differs so much from the commercial sector? The answer lies in the special performance and environmental factors which have influenced the evolution of our military systems.

The Military Environment

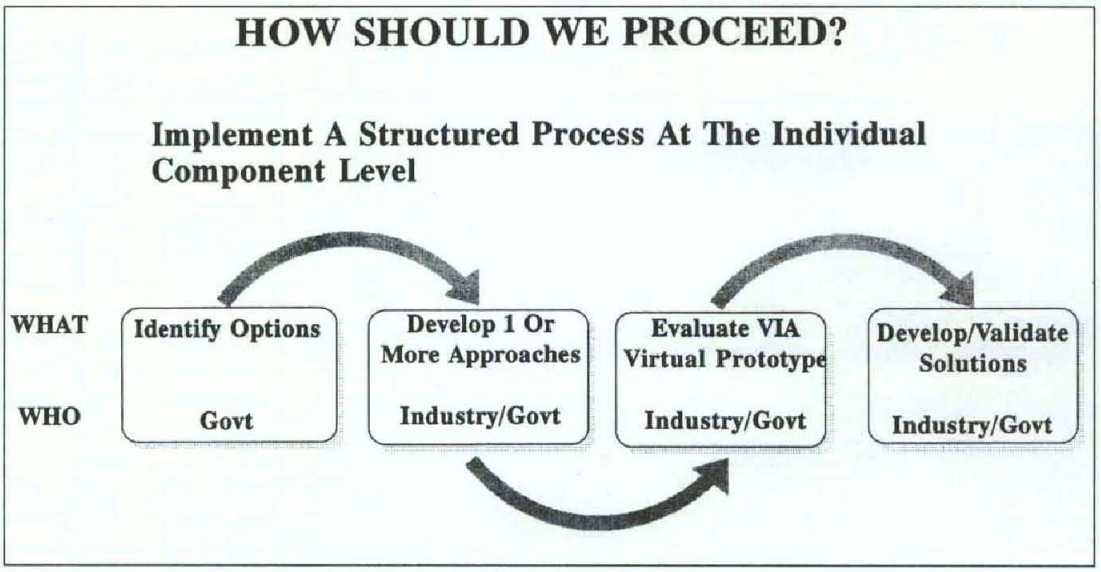
Commitments of the U.S. military in areas that span the globe have required adaptations to meet a broad range of soil and climatic conditions. Temperature extremes range from -53 C to 49 C. Military vehicles must remain mobile in rough and mountainous terrain, sand, mud, snow, and swamps. Severe climates and continuous exposure challenge components with conditions conducive to corrosion and fungus growth.

Man-made conditions make the environment even more severe. Nuclear, biological, and chemical technologies require additional protection for the personnel of combat and tactical vehicles in the form of sealed and protected personnel compartments, the use of recirculated air, and provisions for sustained crew operations buttoned up and on the move. Nuclear blast and EMI effects have the potential to destroy the capability of advanced electronics on which our equipment is increasingly dependent.

Military propulsion systems are



The 1500 horsepower tank engine on the right occupies less space than the 445 horsepower truck engine on the left.



challenged by ever increasing power supply and conversion demands to support NBC, advanced communications, firepower, and other special mission equipment while maintaining a compact underarmor envelope.

Mounts, circuit boards, displays and controls are subjected to high shock and vibration loads caused by cross-country travel in rough terrain, high explosive blast, ballistic impact, and airdrop operations.

Military equipment is often stored for long periods in readiness for reactivation in the event a crisis erupts. These long periods of inactivity present a design challenge to batteries, seals, bearings, and elastomers which commercial duty cycles do not require.

The need to support units overseas far from manufacturing facilities drives the military toward standardization and a need for a high degree of interchangeability to reduce the logistics burden of deployed forces.

Another factor, perhaps the most important, is the nature of the man-machine interface on the battlefield. Military vehicle operators are often young, inexperienced and stressed from the rigors of the battle environment. Failure of the machine and operator to properly interface can have life threatening consequences. Military vehicles must be designed to enable their crews to continue sustained operations in a demanding environment. Key design parameters involve simplicity of maintenance and operation and reduction of crew workload associated with vehicle tasks.

Lessons Learned

The development of our military vehicles parallels the history of our country. Sudden involvement usually resulted in crash programs to revise and modify existing material. Each modification added to cumulative stock of military lessons learned from operations on terrain and conditions which by the end of World War II spanned the globe.

These lessons are most often expressed to industry in terms of unique military specifications and standards. These unique standards represent a collective memory detailing fixes to problems discovered during past wars. We need to proceed with deliberation and make well-reasoned choices when changing or eliminating our specifications. The lessons were often learned the hardest way by soldiers who paid the highest price.

Unique Design Characteristics

As a result of the characteristics of the military environment, the design emphasis for military vehicles differs greatly from the emphasis displayed by commercial designers on next year's new car model. Some of the more unique features and characteristics standard on military vehicles are:

- Fully waterproofed, fungus-proofed electrical systems that are fully suppressed to prevent interference to electronic equipment;
- Engines capable of operating while fully submerged in fresh or saltwater;
- Oversized air, oil, and fuel filtering capabilities;
- Oversized engine oil and cooling capacities;
- Engines which can operate on a variety of fuels and which have much higher power density than their commercial counterparts;
- Reliability over an extremely wide temperature range with improved ease of servicing and maintenance; and
- 24-volt fully waterproofed electrical systems with batteries optimized for ruggedness.

Opportunity

Given the appropriate emphasis, there are significant opportunities to reduce the performance gap between military and commercial products. The quality movement in the commercial sector contributes by making rigid specs to control quality less necessary. Changing military needs, particularly in the electronics field, make the use of off-the-shelf components the best way of achieving quick turnaround state-of-art upgrades. There are numerous options we could explore.

Options

Trade off durability for performance. The current Bradley engine is an example. We doubled the output of a 300HP commercial engine and accepted a significant decrease in durability to achieve our military performance requirement.

Oversize. You can upgrade performance and durability by use of oversized parts. Many military vehicle axles are simply oversized variants of their commercial counterparts. We chose them to

achieve reliability requirements in the more stressful military performance envelope.

Design special. Some of our components will not have a commercial counterpart. Power density in military tank engines constrained by under-armor packaging requirements is roughly 200 percent greater than their commercial counterparts. The 1,500 horsepower engine occupies less space than the 445 horsepower truck engine.

Protect commercial products. It is possible to develop special housings to protect commercial components from the environmental factors which drive a unique military design. For example, circuit boards could be shielded from humidity, shock, and vibration in a housing hardened to protect the component from the military environment. The biggest difference between milspec circuit boards and commercial stems from changes made to ensure each board has built-in ability to survive the military environment.

Upgrade commercial. Heavy duty ruggedized versions of essentially commercial design are built at the same manufacturing facility to produce the high volume less durable product and the higher cost more durable military version.

> *"Nothing is particularly hard if you divide it into small jobs"—**Henry Ford***

A Structured Approach

The problem we face is one of extraordinary complexity. We need to implement a structured approach at the component level to identify the trade-offs and strategies necessary to ensure a viable production base for military requirements. Such a process would assess each component to identify what options are available, further develop the options jointly with potential suppliers, and then evaluate potential solutions via simulation, analytical models and virtual prototyping. Final validation of the solution with hardware demonstrations will ensure non-tradable military performance requirements have not been compromised.

The job is complex with many potential trade-offs between military performance and commercial sector profitability. The whole solution will be the result of implementing thousands of "this makes sense and will work" changes to the way we currently procure Army material. Close cooperation between commercial sector and military system engineers and designers will be required.

Given the appropriate emphasis, there are significant opportunities to reduce the performance gap between military and commercial products.

Strategies

Strategies will include the following type of activities:

• *Convert unique military specifications to commercial standards.* This is not a new idea. Since the mid-80s, TARDEC has methodically winnowed some 1,300 unique specifications for repair parts down to 400. Many of the 400 are commercial standard based but have been modified to meet military performance requirements.

During this process, TARDEC negotiated with the Society of Automotive Engineers to create 38 new heavy duty commercial standards allowing 38 milspecs to be eliminated.

It will not be possible to reconcile all performance differences between military and commercial equipment. There will always be unique military equipment and a supporting industrial base. An example is military track. The commercial sector has few track laying vehicle types. Track utilized in commercial sector is generally designed for slow speed earth moving tasks as opposed to the rapid cross country mobility requirement which drives combat vehicle track design. The designs differ significantly.

• *Produce unique military components at a commercial manufacturing facility.* Some commercial facilities could be tooled at government expense for on-demand production of unique military variants of components similar in production process to those created for the commercial market.

• *Maintain unique military production facilities.* Minimizing military uniqueness is essential to an affordable industrial base. Accepting that there must exist differences, we in the military must understand the impossibility of maintaining many government subsidized production facilities. We must choose wisely and minimize our dependence on this costly approach.

• *Promote utilization of Flexible Manufacturing Systems by industry.* Properly designed Flexible Manufacturing facilities could rapidly be reconfigured to produce moderate volumes of unique military components without prohibitive economic penalties. Attention to such opportunities in the design phase of military and similar commercial components could offer additional profit opportunities and provide sources for unique military items.

> *"It is no use saying 'We are doing our best.' You have to succeed in doing what is necessary."—**Winston Churchill***

Commitment

Unlike the energy crisis, this problem shows no sign of going away. Instead of beginning the process by soliciting solutions, we should begin by defining the problem. From that investment innovative, viable solutions are certain to evolve.

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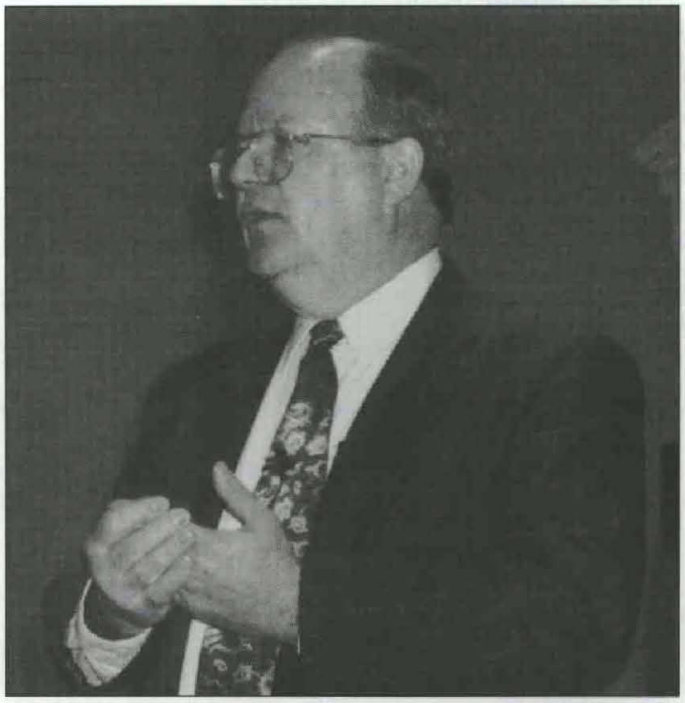
CAREER MANAGEMENT WORKSHOP STRESSES TEAMWORK, COMMUNICATION



Joseph E. Galbraith, assistant deputy chief of staff for personnel (Army civilians).

Nearly 150 of the Army's personnelists, functional chief representatives, Army Acquisition Corps (AAC) members, training and developmental specialists, and EEO representatives met in Herndon, VA, March 20-24, 1994, at the Army Acquisition Corps Civilian Career Management Workshop.

The workshop was the second training session for civilian personnelists and functional chiefs supporting the Army Acquisition Corps. This workshop was unique and innovative because it was the first time that all communities involved in implementing AAC personnel policies met to voice concerns and provide ideas and suggestions to improve current procedures and policies.

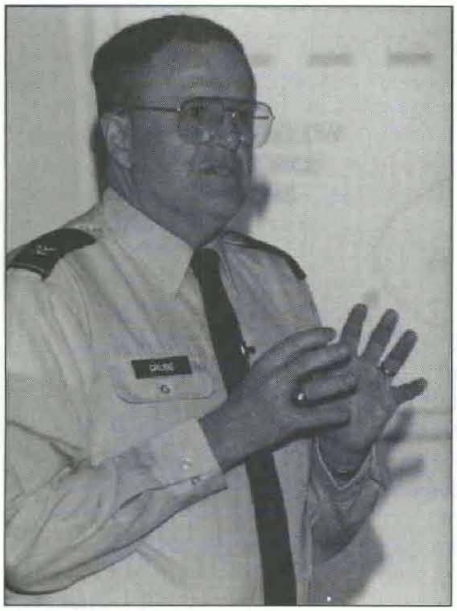
Hosted by the director, acquisition career management and the Acquisition Corps Management Office, U.S. Total Army Personnel Command (PERSCOM), the workshop was held to elicit ideas on making the process work; to adopt an advocacy role by developing multi-disciplinary teams composed of representatives from the civilian personnel, EEO, AAC, and training communities; and to develop further courses of action on issues impacting the Army Acquisition Corps.

Joseph E. Galbraith, assistant deputy chief of staff for personnel (Army civilians), opened the workshop with an evening presentation on the role and responsibilities of his position. He then discussed the Army chief of staff's initiative, *Force XXI,* which addresses potential changes that may occur between now and the year 2010. "I think we're in a tremendous period of change. Congress told us we needed an Acquisition Corps

Dr. Bennie H. Pinckley, deputy director, acquisition career management.

"I really believe that the Army does absolutely the best job of acquiring materiel for the military than any other Service."

—Dr. Bennie H. Pinckley



COL Richard A. Grube, director of AAC policy, OSARDA.

George Jones, deputy chief of staff for personnel, U.S. Army Materiel Command.

because they knew there were some shortfalls. Since Congress told us that, the world has changed totally in terms of numbers down, the focus on economy, how the armed forces will be deployed, the information era and diversity." Galbraith indicated that the future for civilians is good and that they have a great opportunity to deal with important issues, and convey to the Acquisition Corps leadership what needs to be changed.

The first full day of the conference began with a video in which Secretary of the Army Togo D. West Jr. welcomed the conferees and requested their cooperation. He said, "Our Army has led the way in the Department of Defense in instituting acquisition reform." He noted also that the Army was the first Service to establish the civilian/military Acquisition Corps with civilian professionals as key players in the process. West added that attention will continue to be focused on the development of civilian acquisition leaders, but that tough decisions are still being made regarding the size and composition of the AAC's professional force. He solicited the conferees' best efforts in making reforms work. He closed by stating, "Our prospect for success is linked to your participation."

Dan Clawson, chief of the Army Acquisition Corps Management Office, PERSCOM, and Dr. Janet L.S. Brown, chief, Civilian Acquisition Management Branch (CAMB), PERSCOM, gave opening remarks and reiterated the objectives of the workshop.

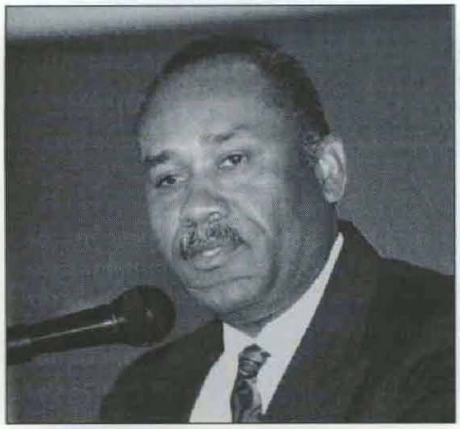
Dr. Bennie H. Pinckley, deputy director, acquisition career management, welcomed the attendees and stressed the importance of teamwork. "Collectively, we have a monumental job to do and I certainly appreciate your willingness to participate," said Pinckley. He noted the importance of the workshop and emphasized that its results would be put to good use. Continuing, Pinckley said, "I really believe that the Army does absolutely the best job of acquiring materiel for the military than any other Service." He stated that the Army has a world-class Acquisition Corps, but that improvements can always be made. One major way is by improving Corps personnel competency. Pinckley closed by stating that the AAC was, in addition to being the only game in town, the best game in town.

COL Richard A. Grube, director of AAC policy, spoke on the AAC management concept, "A new way of doing business." Grube said, "There are two major thrusts: One is clearly competency and the other is leadership and management." He reinforced the necessity for management teamwork and outlined a series of management issues scheduled for further presentation and discussion during the working groups.

Three briefings presented information on civilian acquisition training. Lutricia Jackson, acting chief, training and leader development, Civilian Personnel Management Directorate, PERSCOM, briefed the attendees on Army leader development courses and progressive and sequential schooling. LaVerne Jones, chief, Acquisition Education and Training Office, Office of the Deputy Director, Acquisition Career Management, spoke on the various education and training programs available to AAC members. Included are Army specific programs such as long-term training, executive seminars and part-time training; tuition assistance; and mandatory training. Cathy Johnston, personnel management specialist in the CAMB, PERSCOM, discussed mandatory training procedures. Johnston voiced concerns related to last minute substitutions, late or incomplete applications, no-shows and walk-ins, and failure of students to submit required financial documentation.

The luncheon speaker was George

Attendees met in various work groups to discuss issues concerning civilian acquisition training.



Jim Redmon, FCR for the Army's quality and reliability assurance career program.

Miriam Browning, FCR for the Information Mission Area.

Jones, the deputy chief of staff for personnel at the U.S. Army Materiel Command. Jones stressed the importance of the attendees' contributions to streamlining acquisition by participating in the workshops and dealing with some of the issues concerning personnel policies for the AAC. "You need to understand that what you come up with is going to help shape how we manage this acquisition workforce, how we streamline the acquisition process over the next few years, and will truly help the Army move toward a more productive force." He commended the workshop planners for including the EEO community in this workshop.

For the afternoon sessions of the workshop, six individual groups met concurrently to discuss issues concerning civilian acquisition training. These issues dealt with the importance of mandatory training for the professional development of the acquisition workforce; the interdependent relationships between key players in the training process; and the opportunities available in the Advanced Civil Schooling and Advanced Management Program. Each group reported its findings and recommendations for improvements during the evening session.

The second day of the conference began with a briefing by Dan Clawson on the size of the AAC and accession of AAC members. He presented four courses of action—sizing by requirements; no sizing restrictions or open accession to all qualified and interested; limit sizing to incumbents; and sizing by requirements with a candidate pool.

The attendees then met in concurrent workshops to discuss the pros and cons of these courses of action for sizing the corps and to provide their opinions of what the corps should look like in the year 2005.

Jim Redmon, the functional chief representative (FCR) for the Department of the Army's quality and reliability assurance career program, was the luncheon speaker on the second day of the conference. He encouraged the functionals to take responsibility for their programs and make them work. "This is not a personnel program...It is a functional program, and we, as functional personnel, have the responsibility to make this program work," he said. He called on the FCRs, collectively, to express their concerns if they disagree with something. In stressing the importance of teamwork, he said, "Coming together is a beginning; Keeping together is progress; but working together is success. We have to learn to work together. We don't all have to agree all the time, but let us work together," said Redmon.

The afternoon session included three briefings on issues concerning personnel management. Ernie Willcher, attorney advisor in the Army's Office of the General Counsel, spoke on assignment rights and responded to questions on reduction-in-force procedures and other legal issues. AAC Director of Policy COL Richard Grube addressed the group on critical acquisition positions (CAPs), succession planning, and tenure. He also presented a pilot concept to centrally manage CAPs and to implement a program for succession and tenure planning. Sheran Jackson, personnel management specialist in the CAMB, spoke on central selection. She presented a pilot program to implement central selection for civilian program managers.

The remainder of the second day was devoted to workgroup sessions on issues such as the differences between a CAP, a key position, and a Command Designated Position List position; personnel management actions; and the National Performance Review initiatives.

In the evening session, group reports were presented on the size and accession workshops, which were convened that morning.

The third day was opened with group reports on the personnel management workshops, which had taken place the previous afternoon.

Dr. James Edgar, assistant director, AAC policy, gave a briefing on position management. He provided information on position management and designation, program evaluation, and grandfathering. He cited the Defense Acquisition Workforce Improvement Act; DOD Directives 5000.52, 5000.52-M, and 5100.73; and DOD Instruction 5000.55.

Dr. Edgar was followed by Luther Santiful, director of the Army's Equal Employment Opportunity Agency, who gave brief comments on the need to establish a partnership between the personnel, functional and EEO communities in order to make the Acquisition Corps all that

"we want it to be." "From EEO perspectives, we want the Acquisition Corps to be truly reflective of our diverse population," Santiful said.

The attendees then convened into workgroups to discuss issues concerning position management. Issues affecting the efficient management of acquisition positions were identified.

Glen D. Skirvin, retired U.S. Army colonel and former chief, Functional Area Management and Development Division, Officer Personnel Management Directorate, PERSCOM, gave the luncheon address on Vision, Strategy and Planning—A Grass Roots Approach. He compared the Army Acquisition Corps to a start-up business in that it offers new ideas and concepts. The market, he said, is ill-defined and amorphous, requires new principles and doctrine, and demands empowerment and grass roots. Skirvin also stated that the AAC has similar problems as the small business owner and should solve them by using a "tool box" of six sound business principles—vision, goal, strategy, plans, execution and feedback. "Use these tools to get you into the 21st Century," said Skirvin.

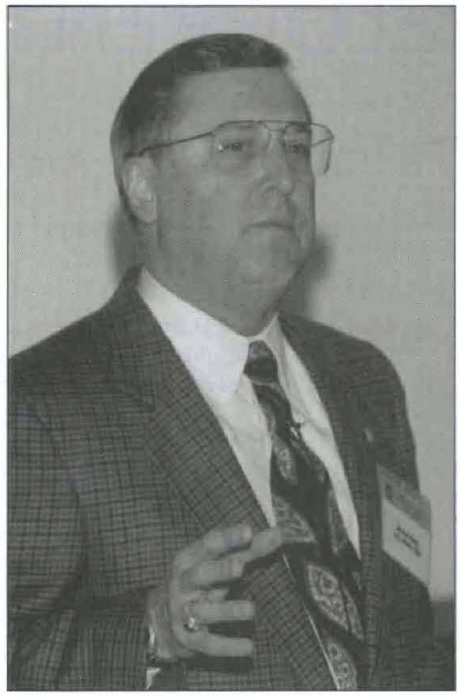
During the evening session, Dr. Edgar continued his briefing on grandfathering and also presented information on the Army Civilian Training and Education Development System (ACTEDS) and certification requirements.

The final day of the conference focused on presentations by some of the FCRs. Miriam Browning, who is the FCR for the Information Mission Area (IMA), provided career development information for IMA careerists.

Browning was followed by a continuation of the ACTEDs briefings. Neil Ginetti, assistant secretary of the Army (financial management) (ASA(FM)), is the FCR for the Comptroller Career Program. Ginetti spoke about the comptroller training program and appealed to the civilian personnel community to get the word out on opportunities available in the comptroller program.

Karen Croom, program manager in the Comptroller Proponency Office, spoke on the comptroller's mentorship program. She defined mentoring as "a process of seeking guidance from someone who has at least three advantages—experience, perspective and distance." She also presented a prototype initiative that may be implemented within the comptroller career program.

Neil Ginetti, assistant secretary of the Army (financial management), and FCR for the comptroller career program.



Bruce King, acting director, U.S. Army Contracting Support Agency, and FCR for the contracting and acquisition career program.

Bruce King, acting director, U.S. Army Contracting Support Agency, OASA(RDA)), and FCR for the contracting and acquisition career program, along with Suellen D. Jeffress, chief, Proponency Branch in the U.S. Army Contracting Support Agency, spoke on the career paths offered in the contracting and acquisition career program.

The attendees spent the majority of the afternoon sessions in their individual workgroups discussing ACTEDS.

Dr. Pinckley closed the conference by stressing the need for continued dialogue and teamwork between the various communities represented at the conference. He emphasized the importance of remembering the combined, true customer—the soldier. "If we lose sight of that, we lose sight of why we're here," he said. He also expressed his appreciation to the attendees for their participation, time and input and assured them that their comments and recommendations were heard and would be reviewed and responded to. He also cited the importance of communicating. "We need to do it more effectively...We can't survive unless we are communicating and working together," said Pinckley.

NATIONAL AUTOMOTIVE CENTER: FOCUS ON PROFESSIONAL DEVELOPMENT

By CPT Matthew J. Barr

Introduction

When Dr. Kenneth J. Oscar, former director of the Tank-Automotive Command Research, Development and Engineering Center (TARDEC), assembled the National Automotive Center (NAC) team, his guidance was simple and clear, "create an organization which amplifies the efforts of the TARDEC." (Dr. Oscar has since assumed new duties as principal deputy for acquisition, Headquarters, Army Materiel Command.) Our vision at TARDEC is to be the recognized world leader in ground vehicle development. The NAC's mission is to serve as the nation's catalyst linking government, industry and academia in all aspects of automotive technology. To fulfill our ambitions, the enabling strategic goal is to develop people to their ultimate potential. With people as TARDEC's most important resource, the NAC team has set forth as its cornerstone a program for "Professional Development."

The NAC is committed to the development of individuals within the military and federal service, as well as outreach to the community. Its purpose is to provide organized learning experiences which will increase the potential for improved performance and result in individual, organizational, and community growth. Professional development covers the entire spectrum of human resource development: that of education, training, and development. Education provides new knowledge and skills. Training entails hands-on application of skills. Development provides intrinsic learning and growth which impacts on present or future job endeavors.

The NAC is working on four different mediums to provide these learning experiences: TARDEC University, the Michigan Automotive Institute, a Technology Center, and a Discovery Center. Each of these provide the developmental skills necessary to propel us into a world-class organization.

TARDEC University

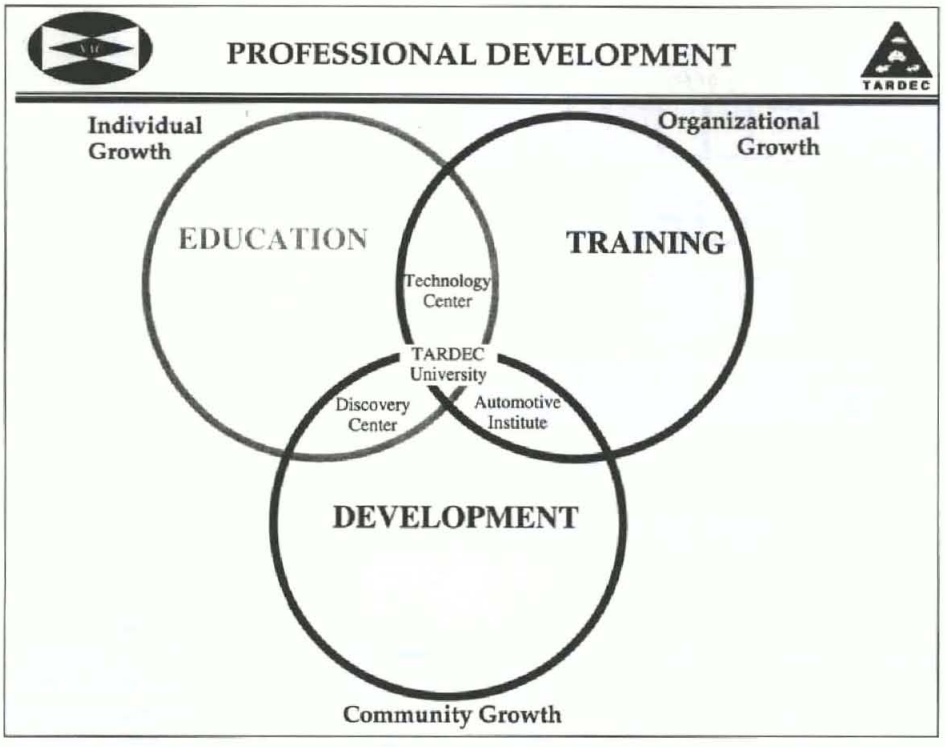
Originally established in the summer of 1992 with the School of Engineering and Science, TARDEC University has expanded and now includes the Schools of Business Administration and Industrial Technology. TARDEC University, in concert with each associate's Individual Development Plan, provides a career ladder derived from the Army Civilian Development plan for engineers, scientists, and Army Acquisition Corps requirements. A career plan is developed from intern to senior executive/scientist, including technical positions. The formal education for TARDEC University comes from accredited universities located on-site as well as from the National Technological University's video transmission.

Michigan Automotive Institute (MAI)

The MAI is a newly formed consortium of universities, industry, and TARDEC which provides educational opportunities to TARDEC associates as well as the surrounding community. The MAI also generates capstone research projects in our laboratories and in industry. The first goal of the MAI is to provide on-site learning and interaction between our associates and other industries. This results in professionals of similar backgrounds learning and working together. The hope is that the synergy of these people with their unique experiences will result in new collaborative projects and ventures in ground vehicle development. The second goal is to leverage the expertise of the best minds in the country. As professors and researchers work on projects in the lab, they provide the TARDEC team with expertise and new ideas. This allows cutting edge development of land combat vehicle technology and weapon support systems for the ultimate customer—the soldier in the field.

Technology Center

Research and development in manufacturing methods is a significant venture for TARDEC. TARDEC is a leader in virtual prototyping for advanced vehicle concept exploration, and the result is a significant reduction in vehicle life-cycle development time and cost. TARDEC, in pursuit of the virtual environment, is also experimenting with agile manufacturing methods. Virtual prototyping can not



only create a vehicle without bending any metal, but it can also test that vehicle in a simulated environment, without leaving the laboratory.

Agile manufacturing encompasses three basic principles: flexible technology, innovative management structures and business practices, and a skill base of knowledgeable workers. These principles enable machines and processes to eliminate the need for mass, and even batch production. Intelligent open architecture machines can facilitate the ultimate in dual-use production. TARDEC is educating and training its professionals in agile manufacturing methods. A current project showing excellent potential is the development of open-architecture controllers linked to personal computers driving automated machinery. A future initiative includes pilot projects in electronic data exchange, data interchange, and rapid manufacturing.

Discovery Center

What started as an idea for a museum, capturing the glorious history of the Detroit Arsenal Tank Plant, eventually grew into an idea for a state-of-art learning center. The mission of the Discovery Center is not only to provide a history of the Detroit Arsenal, but also to enhance the quality of math, science, and computer education, as well as to improve the understanding of collaborative automotive technology past, present, and future.

The center will provide unique hands-on exhibits which will demonstrate the relationship between scientific fundamentals and practical real-world applications. Here, our nation's youth (of all ages) will experience the discovery of the rich history as well as the future of tank-automotive technology. The Discovery Center is in its embryonic stage now. A not-for-profit foundation is being established which will provide planning and funding for this endeavor.

Technology Transfer and Collaborative Efforts

Technology transfer has been referred to as a "contact sport," but I believe it goes beyond this simple analogy. Technology transfer is "relationship building." If we are going to work in a world of limited resources, we must work together. The aforementioned entities coalesce the process of building relationships and create a mechanism for technology transfer and collaborative research and development. In this era of collaboration, dual-use, and technology transfer, it is imperative we develop our work force commensurate to the best standards the world has to offer. In our quest to be the recognized world leader in ground vehicle development, TARDEC is ensuring we have the necessary expertise to lead us into the 21st century.

Conclusion

The NAC has been instrumental in forging dynamic partnerships with our community. These entities allow for human resource development from a child's early years to the post-doctorate level. Emphasis on people development will result in individuals with increased skills and higher self-esteem. This in turn provides TARDEC with the necessary ingredients of a "learning organization." As the individuals learn and grow, so does the organization; allowing us to maintain a technical edge in the highly complex and rapidly changing era of information evolution. At the same time, the transfer of technology and exploration of cooperative arrangements with academia, industry, and other government agencies creates a ground vehicle test base which can be shared, expanded, and used to meet the needs of a cost-conscience military, and an ever competitive industrial base, as well as the expectations of tens of thousands of our fellow soldiers.

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REPELLENTS FOR THE SOLDIER

By MAJ Stephen B. Berté

Background

Our forces face many of the same threats to combat strength that soldiers have had to deal with throughout the history of warfare. One of the primary threats is disease and non-battle injury (DNBI) which have historically resulted in more lost combat strength than have combat casualties. A significant portion of DNBI has always been, and continues to be, due to illness caused by disease-carrying arthropods. A brief review of this threat will lead us to look at how the U.S. Army Medical Materiel Development Activity (USAMMDA) develops state-of-the-art repellents for soldiers.

The arthropod threat includes such potentially harmful creatures as insects, spiders, ticks, and mites. In addition to the direct transmission of diseases, arthropods can adversely impact combat power due to envenomization, mechanical transmission of disease agents, secondary infections, allergic responses, and negative effects on unit morale. The protection of soldiers during peacetime training, and operations other than combat, is no less important because soldiers spend the majority of their time in these activities whether they are stationed in CONUS or OCONUS.

Protecting soldiers against attacks by arthropods is both a command and individual responsibility. Commanders must ensure that soldiers are adequately informed of the threat posed by arthropods, and that soldiers are provided with the means to protect themselves. Soldiers have the personal responsibility to ensure that they employ all the personal protective measures available to them.

One of the primary means available to soldiers to protect themselves against arthropods is the DOD repellent system (Figure 1). The repellent system, developed by the USAMMDA, is comprised of a personal repellent (Figure 2) and a clothing impregnant. When these two components are used together, and correctly, the system can provide individuals with over 90 percent protection

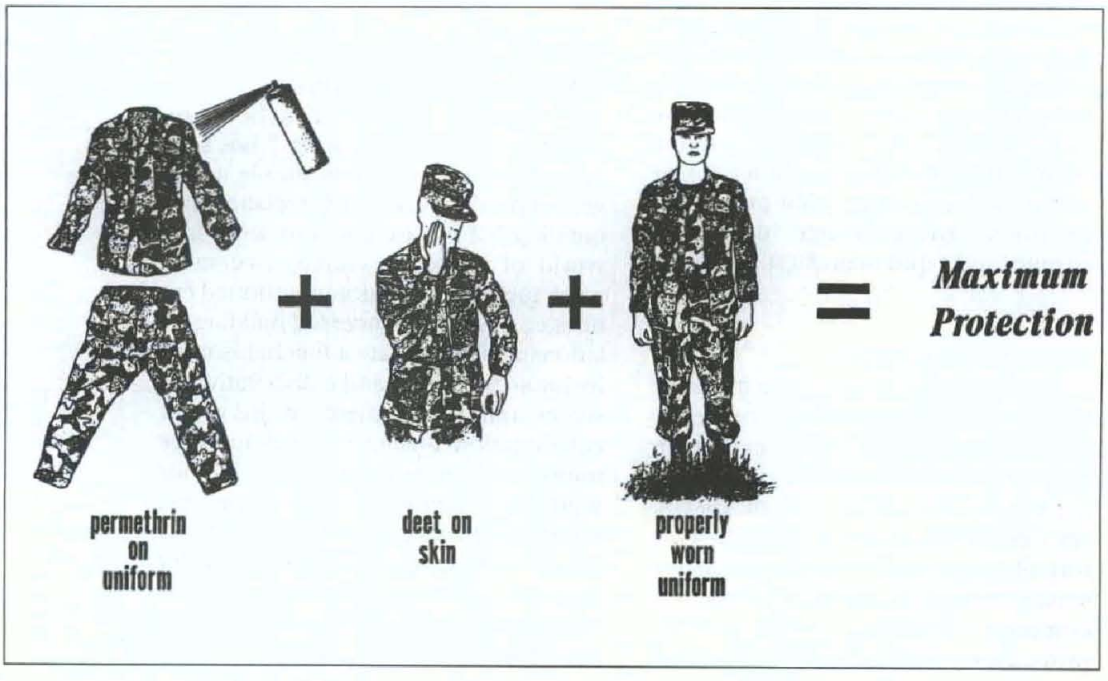

Figure 1. The DOD repellent system consists of a personal repellent creme, and a permethrin clothing impregnant. The impregnant comes in either an aerosol can, individual dynamic absorption application kit, or 151 milliliter bottle for application with a two-gallon compressed air sprayer.

from arthropod attack for up to 12 hours.

The personal repellent now in use is very effective, but it is only as good as the active ingredient it contains. Currently, the active ingredient used in DOD's personal repellent (and the majority of commercially available repellents) is Deet (N, N-diethyl-3-methylbenzamide).

Although Deet is the best repellent active ingredient currently available, there is a variety of important species of disease carrying arthropods that are unaffected by it. To address this problem, the U.S. Army Medical Research, Development, Acquisition and Logistics Command (USAMRDALC) uses the DOD acquisition process to ensure that the repellents our soldiers use meet the requirements of the combat developer. As such, two simultaneous programs are being conducted to improve our repellent arsenal.

Figure 2. The insect/arthropod repellent lotion available to soldiers (NSN 6840-01-284-3982) provides up to 12 hours of protection.

Long-Term Research

A long-term, technology base research program being conducted primarily at the Walter Reed Army Institute of Research (WRAIR) is focused on finding a new active ingredient to replace Deet, and on finding a more effective formulation to deliver the repellent to the skin. In the near term, a repellent advanced development effort, managed by the USAMMDA, seeks to improve the efficacy of the currently fielded repellent by placing an additional active ingredient in the product now used.

USAMRDALC's repellent programs are administratively governed by *DOD Directive 5000.1, Defense Acquisition, and DOD Instruction 5000.2, Defense Acquisition Management Policies and Procedures.* These documents guide an acquisition process involving a multitude of organizations both inside and outside of the DOD. Additionally, a variety of methods must be used to develop a new product for the military, including technical testing, user testing, and operational testing. Finally, efforts must be coordinated with all appropriate organizations.

Participants

Many organizations contribute to the advanced development process. For example, the surgeon general of the Army (TSG) is the AMEDD's materiel developer. Also, the commanding general, USAMRDALC is responsible for executing the TSG's materiel development program, and has designated the commander, USAMMDA as the program manager for the development of medical materiel.

USAMMDA closely manages advanced development programs by assigning products to its civilian and military product managers who create business plans that are used as tools to execute the development process, and to ensure performance, cost, and schedule objectives are met. As mentioned earlier, the USAMMDA is currently managing the AMEDD's repellent advanced development program. This development effort provides an example of how the advanced development process is managed by USAMMDA for the USAMRDALC commander.

Many organizations are players in the development of a repellent for the soldier. The first player within the AMEDD is the combat developer, which is the AMEDD Center and School (AC&S). In order to justify the development and acquisition of a new medical product for the soldier, a requirements document must be generated by the combat developer that supports the Army's mission area analysis. The AMEDD Center and School's Directorate of Combat Developments is therefore responsible for ensuring that medical deficiencies or vulnerabilities of the Army are eliminated or minimized. The combat developer produces requirements documents in coordination with the AMEDD community, and the U.S. Army Training and Doctrine Command (TRADOC). With the justification provided by a valid requirements document, USAMMDA is able to move ahead with its development effort.

The requirements document supporting the repellent improvement program is a Joint Service document, since the repellent system is used by all the Services. Joint oversight and guidance of the use of repellents are therefore provided by the Armed Forces Pest Management Board (AFPMB), established in 1956. DOD Directive 4150.7 gives the AFPMB responsibility for approving all pesticides and repellents used within the DOD. Thus, the pest management professionals of the Army, Navy, and Air Force who serve on the AFPMB provide joint input to the repellent development program.

Deet

Deet is still the most effective synthetic repellent compound available for use against biting arthropods. It was synthesized in 1957 as the result of a collaborative repellent development effort between the DOD and the U.S. Department of Agriculture (USDA) that began in 1942. USDA continues to support the DOD repellent program by synthesizing, and conducting the initial testing of new repellent compounds, and providing these chemicals to the DOD through the AFPMB for further testing. This collaboration has resulted in a promising new chemical that, when added to the current repellent formulation, may increase the protection the repellent gives to soldiers.

Entomologists at the WRAIR conduct the USAMRDALC's technology base repellent research effort. They use a variety of approaches to screen new repellents. There are laboratory in vitro and animal studies that can be done as well as field trials using human volunteers. Experience has shown that the results of many of the laboratory approaches to

repellent testing do not necessarily agree with results from field trials with humans. Thus, whenever possible, field trials using human volunteers are used to test repellents. Because of the expertise in repellent research available at the WRAIR, USAMMDA has contracted with that organization to apply its repellent expertise to the repellent advanced development program.

Toxicity Tests

Before a promising repellent can move from laboratory testing to small scale applications on human volunteers, a battery of toxicity tests must be conducted. The U.S. Environmental Protection Administration (EPA), which governs registration of repellents, outlines the appropriate toxicity tests in Code of Federal Regulations 40 (40 CFR). The AFPMB used 40 CFR in producing its Topical Hazard Evaluation Program (THEP) for repellents. The THEP is a comprehensive plan that outlines how repellents are screened, and was evaluated by the National Academy of Sciences' Committee on Toxicology under contract with the surgeon general.

This brings us to another key player in the repellent game, the U.S. Army Environmental Hygiene Agency's (USAEHA) Toxicology Division. The USAEHA follows the THEP in conducting the toxicity testing required of a new repellent before it can be applied to human volunteers. Armed with USAEHA toxicity test results, USAMMDA contracts for protocol development, and efficacy testing of candidate repellents on human volunteers. To date, these studies have been conducted primarily at the WRAIR.

Repellent studies must be conducted in a step-wise, iterative fashion that ensures safe and efficacious repellent product results. The repellent improvement program is focused on improving the current Deet formulation, so the thrust of early advanced development technical testing is to ensure that the repellent mixture being proposed is efficacious.

Other Tests

USAMMDA has programmed a wide variety of laboratory and field tests both in CONUS and at the OCONUS Army laboratories targeting mosquito, biting midge, and tick vectors that are refractory to the effects of Deet. Navy entomological assets will also be involved as the development process progresses.

Initial repellent studies test alcohol solutions of individual candidate chemicals versus Deet. After these experiments isolate the most promising candidate, the USAEHA must repeat their earlier toxicity studies (wherein the individual repellents were tested) on the combination of the candidate chemical with Deet. Once the mixture passes these tests, studies can proceed using human volunteers to determine if the repellency of the mixture provides better protection than its component repellents alone. If the new mixture proves efficacious, the toxicity and efficacy tests will be repeated using the new repellent mixture in the creme formulation (produced by the 3M Corporation) that soldiers currently apply to their skin.

In addition to efficacy tests, the USAMMDA will contract for studies to ensure the final formulation is compatible with other products already used by soldiers. This includes such items as camouflage face paint, NBC protective masks, and chemical agent decontamination kits. The effects of the repellent on soldiers' IR signature, and whether it is a plasticizer or tends to potentiate the effect of chemical agents are examples of the myriad of other tests that must be done on a candidate repellent.

When the repellent passes all the technical tests described so far, the USAMMDA can contract for large scale user tests involving Service members from one or more Services. However, prior to conducting any large scale tests, USAEHA will complete additional studies investigating the possibility of long term toxic effects of the repellent, and an experimental use permit will be obtained from the EPA which sanctions the testing of the repellent on large numbers of human volunteers.

Operational testing of the repellent is conducted by the AMEDD Board to determine if the candidate formulation and packaging are acceptable to users and works as intended under field conditions. The operational tests also confirm compatibility issues addressed in technical testing conducted earlier.

Of equal importance in the advanced development process are the ancillary actions needed to ensure that the logistical community can support the new product, and that no better product is available. The logistician for the repellent improvement program is the Defense General Supply Center (DGSC) in Richmond, VA, which is involved from the beginning of the advanced development effort to ensure all logistical issues are addressed.

To ensure the effectiveness and efficiency of the repellent development program, USAMMDA conducts market investigations periodically throughout the advanced development effort to determine if there is a commercially available product that meets the performance specifications set by the combat developer. If a market investigation uncovers such a product, the advanced development program could be terminated, and the commercial product purchased, thereby reducing the time and money needed to field an improved repellent.

Conclusion

Repellents are an integral part of the personal protection available to U.S. forces throughout the world. USAMRDALC, through its technology base and advanced development efforts, and working closely with many other federal and civilian organizations, is ensuring that the best repellents are provided to our Service members. USAMMDA, as the USAMRDALC's manager of medical product advanced development, is working daily to ensure it is fulfilling its pledge by *developing quality medical products for soldiers.*

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PRECISION RANGE INTEGRATED MANEUVER EXERCISES

By CPT Nick Guerra

Introduction

The sophistication of combat training has made amazing strides since the early days of static-target gunnery ranges that offered very little in the way of realistic combat scenarios.

In August 1987, the gunnery training goals for tank and Bradley units were the established crew and platoon qualification standards culminating in successful conduct of Combat Tables VIII and XII (designed to test gunnery proficiency at the intermediate and advanced levels). Time, personnel turbulence and unprogrammed operational requirements were placing competing demands on the ability of the crew, platoon, company, and battalion to meet higher level combat proficiency standards for gunnery exercises, such as the Combined Arms Live Fire Exercise, Fire Coordination Exercise, and ultimately their next rotation to the Combat Training Center or National Training Center.

It was clear that a system was required that would provide the means to present effective and realistic threat target engagement scenarios to achieve force-on-force tactical training. The system would also have to provide armor and mechanized infantry crews with realistic gunnery training in train-up for and maintenance of proficiency in combat tables.

There was a critical need in armor and mechanized infantry units for a system that would cover all necessary steps of training: train, stop, critique, make corrections, backup, and start over.

Prototype Development

A prototype platoon Precision Range Integrated Maneuver Exercise (PRIME) was developed in 1989 as a proof-of-concept system. It was designed for force-on-target exercises and was delivered to Schweinfurt, Germany for use by USAREUR units. In August 1991, a requirements document was approved for one company level set followed by three more platoon level PRIME systems in the outyears. In September 1992, a contract was awarded to LORAL Systems Company for production of the company set to be installed at III Corps, Fort Hood, TX.

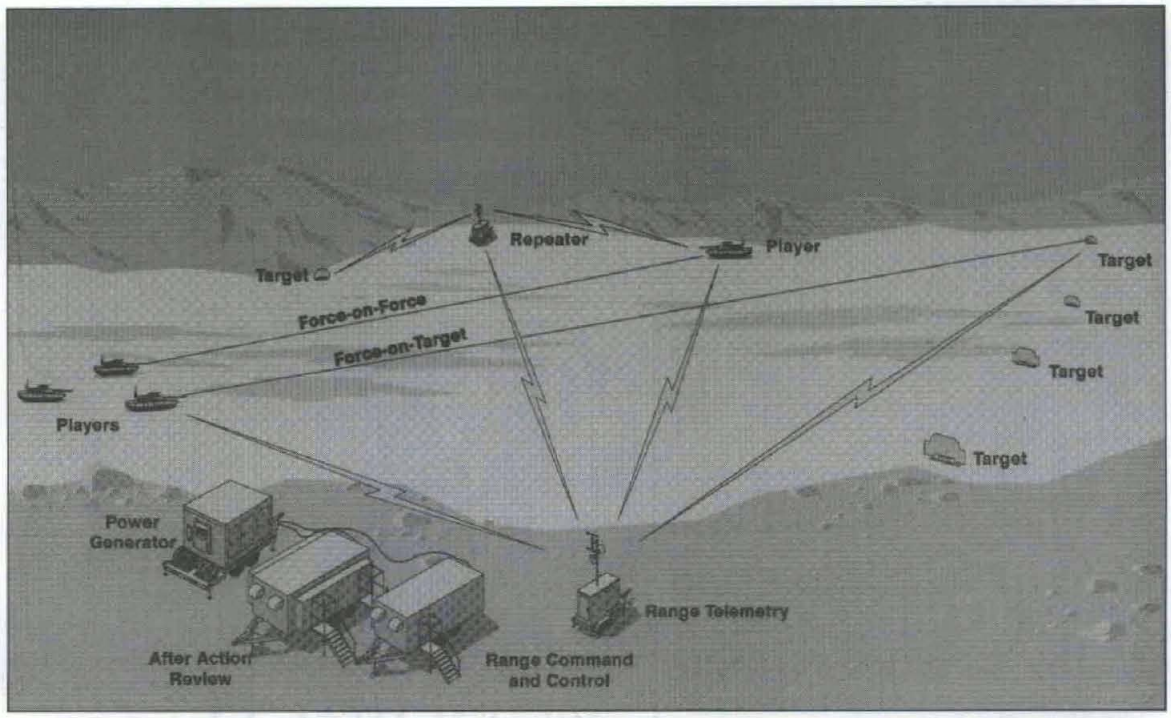
Current System

The company level PRIME set incorporates lessons learned from the platoon prototype, making it a more reliable and maintainable system while offering new capabilities. Company PRIME provides mechanized infantry and armor units with flexible force-on-force maneuver and gunnery training scenarios. It is augmented with shoot-back targets in a realistic free-play environment on an instrumented range that portrays and records crew through company level performance. PRIME specifically supports individual, crew, and unit training in: maneuver, command and control, target acquisition and identification, and fire distribution.

Five Subsystems

PRIME consists of five subsystems: the Command and Control Subsystem, the Thru-Sight Video Subsystem, the Vehicle Interface Subsystem, the Target Control Subsystem, and the After Action Review Subsystem. These systems are integrated to provide highly effective and valuable training.

- **Command and Control Subsystem (CCS).** The CCS is the heart of the PRIME system, housing the central computers and data recording centers. The CCS acts as the scenario command and control input medium, allowing for scenario development, initiation/execution, control, and review. The user can define and select scenario parameters to tailor the training to meet unit requirements. The CCS graphically displays the action of the training as it occurs and rapidly prepares objective after-action review results upon completion of the training exercise.
- **Thru-Sight Video Subsystem (TSV).** The capability to record the gunner's sight image on video and crew communications on audio recordings provides an added dimension to the training exercise reviews. By using these recordings, leaders can verify the gunner's performance, debrief the exercise, and



Typical PRIME deployment.

assess training effectiveness. The TSV video cassette recorder is housed in an environmentally enclosed unit affixed to the vehicle.

• **Vehicle Interface Subsystem (VIS).** The VIS provides the necessary CCS/Vehicle interface for PRIME system operation. One console is used for all vehicle types, allowing operator input in selecting programmable vulnerabilities.

• **Target Control Subsystem.** This realistic, automated shoot-back targetry subsystem allows units to set up combat lanes for squad or platoon battle drill training, or to mass targets in depth for company maneuver training. The target presentation is controlled either manually or automatically, based on a combination of terrain and opposing force maneuver actions.

• **After Action Review Subsystem (AAR).** The AAR's immediate effective feedback, map graphic displays, and TSV recordings will make unit strengths and weaknesses readily apparent. The facility is housed in a fully transportable, expandable trailer. It can be configured like a theater for company-level AARs, or it can facilitate four groups for squad level review. The PRIME system makes it easy for the trainer to develop meaningful reviews, based on the time-correlated graphical, statistical, and thru-sight video data that PRIME records.

PRIME can instrument team vehicles and personnel by incorporating MILES II, Global Positioning System, and radio frequency (RF) telemetry network technology. It is a technical enhancement to the capabilities provided by M1/M2 MILES, Laser Target Interface Devices, I-MILES, and pop-up targets currently used in training. Additionally, its transportability reduces chances of environmental damage and maximizes training opportunities by allowing the system to be moved to a variety of training areas.

By incorporating modern technology, PRIME makes fully instrumented force-on-force training, previously only achieved at combat training centers, affordable at home station.

Operational Concept

The transportable CCS, AAR, base station telemetry, and generator are collocated, allowing a unit to train using force-on-target or force-on-force.

By incorporating modern technology, PRIME makes fully instrumented force-on-force training, previously only achieved at combat training centers affordable at home station.

Prior to the start of a PRIME exercise, the unit commander furnishes a scenario to the PRIME operator. This information becomes the initial data that the CCS transmits by radio frequency to all unit vehicles and targets. During an exercise, the CCS polls each vehicle and target every three to five seconds to transmit its status and location.

When a vehicle enters the target presentation area (TPA), the CCS signals targets within that TPA to come up. The vehicle engages the target by sending an I-MILES laser beam at the target. This laser beam contains the weapon and vehicle identification codes. The vehicle transmits its engagement data including TIME, WEAPON, LOCATION, AND VEHICLE ID to the CCS in response to the next polling.

If a target is not killed within the time set by the scenario, the CCS will signal the vehicle to record a shoot-back event from the target. This causes the vehicle's PRIME console to enter into a random number "Monte-Carlo" routine to determine the outcome of the engagement; kill or near-miss. The vehicle's PRIME console will respond accordingly and transmit the results to the CCS at the next polling.

During an exercise, all vehicle movements, engagements, and engagement outcomes are stored in the PRIME com-

puter. When the exercise is completed, these data are downloaded and made available to the unit for use during its AAR.

Current Program Status

The current company level PRIME set is scheduled to be delivered to Fort Hood, TX, in September 1994. The system will undergo installation/final inspection during November-December 1994, and culminate with initial operational capability in December 1994. A separate M1A2 platoon PRIME set is scheduled for delivery to the Kuwait Land Forces in September 1996. Also, three additional platoon PRIME sets are authorized for outyear procurement. The locations will be determined by the major commands.

Installation Considerations

Before an installation receives a PRIME system, important training and logistical issues must be considered. Life Cycle Contractor Logistic Support (CLS) will be necessary, and this service will be managed by the Simulation, Training and Instrumentation Command.

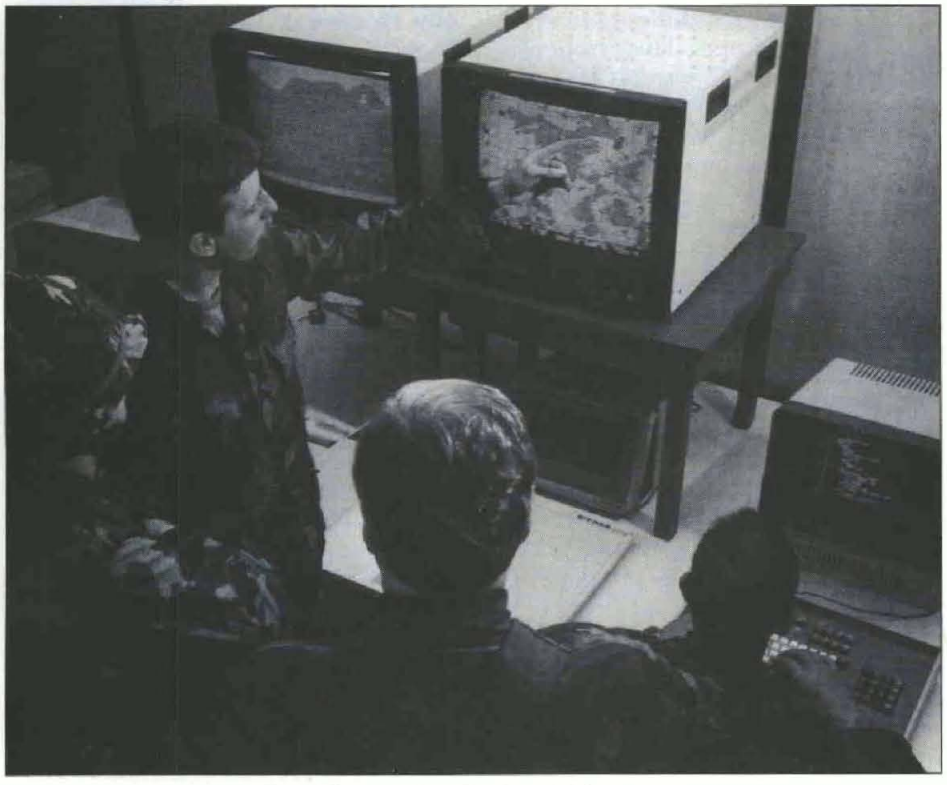
The CLS contractor will require a facility adequate for storage, office, and maintenance use. The installation will need MILES common equipment for each player as well as target lifters, silhouettes, batteries, target kill simulators, hostile fire simulators, and thermal blankets for pop-up targets. Contact the PM for Close Combat Training Systems for detailed cost estimates and briefings on the PRIME system.

An instrumented Bradley Infantry Fighting Vehicle.

Summary

The development of PRIME has been focused on providing effective and realistic threat target and force-on-force tactical training. The PRIME concept has been proven with the development of the prototype system, and has evolved into a training system that provides realistic engagement scenarios and real-time feedback. PRIME clearly plays a vital role in the U.S. Army's training vision for the future by providing armor and mechanized infantry units the training system to enhance their ability to perform their mission.

CPT NICK GUERRA is the PRIME project director at STRICOM in the Office of the PM for Training Devices. A member of the Army Acquisition Corps, he has a bachelor's degree in biology from the University of California at Santa Cruz, a master's degree in business administration from the University of Texas at Austin, and has completed the Materiel Acquisition Management Course.



The After Action Review Subsystem.

TECHNOLOGY FOR THE DIGITAL BATTLEFIELD

By Dennis K. Evans and William E. Howard III

Introduction

An integrated digital military force would utilize weapon systems with compatible internal digital networks, data buses, and data transfer systems. No country has such a force, although the U.S. Army's M1A2 tank, M109A6 howitzer, and OH-58D helicopter are intended for use in an integrated digital environment. The advantages of such a force include:

- Ability to make quicker, better decisions than the enemy;
- Automated command and control for combined Army, Air Force, and Navy units;
- Easier communication among Services and allies;
- Automatic transfer and display of the routes and locations of friendly and hostile forces;
- Use of data buses instead of hard wiring permits easier upgrading of weapons (A data bus is a component that links different digital elements together and that contains the necessary communications protocols for doing so); and
- Permits automatic identification, friend or foe.

In our efforts to field integrated digital forces, we must insure that technology interacts synergistically with the architecture of our forces so as to maximize our warfighting capabilities. Thus, we face both technological and organizational challenges. The emphasis here is on technology. Relevant technology areas include:

- Conversion of sensor data into digital format;
- Digital processing of digital data;
- Interface between digital control systems and analog outputs;
- Internal networking of digital electronic systems within a vehicle, aircraft, or ship;
- High-resolution digital displays; and
- Digital communications networking among vehicles, aircraft, ships, or satellites.

In general, existing U.S. technology is adequate to satisfy requirements in the first three areas listed above. The fourth area is a minor problem. The 1553B data bus, which is used in our most advanced fielded weapons, has a data rate (the number of bits per second of information that can be transmitted) of only 1 megabit per second (Mbs), whereas many future weapon systems (e.g., the Comanche helicopter) will need internal networks with much higher data rates. Fortunately, the necessary technology is available; we just need to get it into our systems.

The fifth subject listed above is a minor but persistent problem area. Existing tactical displays cannot display fully the information that digital computer systems can generate, and also suffer from production problems. These deficiencies impose some limitations but are not a crippling liability. Fortunately, technology in this area is advancing rapidly, due to international efforts in high-definition television (HDTV) and Advanced Research Projects Agency programs on high-definition displays.

Among the subjects listed above, external digital networking among vehicles, aircraft, and so on, is the largest problem. Consequently, we will devote the remainder of this article to examining the technology needed to satisfy possible future needs in this area.

Available Technology

Fielded Army communications and command-and-control systems include the SINCGARS radio family, the TACFIRE data system, the Enhanced Position-Location Reporting System, the Joint Tactical Information Distribution System, the Mobile Subscriber Equipment digital telephone system, the Army Tactical Command and Control System, and the TRC-170 radio system for use at Corps and Army. The accompanying table shows the data rates for these systems.

Current data rates are somewhat marginal in comparison to likely future requirements. For example, the highest rate for any of the systems in the table is 4.608 Mbs. By contrast, the JASON Global Grid Study (JRS-92-100, July 1992, MITRE Corporation) postulated that the total average communications traffic flow for a "Desert Storm-like" force in the year 2010 might be about 10,000 Mbs, with peak instantaneous rates of up to about 20,000 Mbs. (We think that this figure is probably a slight over-estimate, although it is well within the upper bounds of plausibility.) Data rates as high as this cannot be supported with the kinds of systems listed in the accompanying figure. *In general, existing wireless communications systems are adequate to support a digital battlefield, but not an optimal digital battlefield, because these systems impose some restrictions on the information that can be transmitted.* This means that Corps and Army may possibly know what's going on, but only highly filtered data will be available at the lower echelons.

Data Rates for Military Systems

The maximum data rate for a radio is limited by its band-width and the signal-to-noise ratio. A typical useful data rate for a military radio is about 20 percent

Digital Data Rates For Military Systems.

System	Maximum Data Rate (kbs)
EPLRS and TACFIRE	1.2
AN/VSC-7 tactical satellite communications link	2.4
SINCGARS	16
MSE terminal	32
JTIDS	115
Satellite-communications link on many Navy ships	176
ATCCS	256
AN/TSC-85/93 satellite communications link	1544
TRC-170 strategic radio	4608

SINCGARS is a key part of the Inter-Vehicle Information System (IVIS), which is used by the M1A2, and of the Advanced Field Artillery Tactical Data System (AFATDS), which is used by the M109A6. IVIS cannot exchange data with AFATDS unless both are fitted with the Improved Data Modem.

of the bandwidth. This sets severe limits on the data rate in systems with narrow channels. For example, SINCGARS has a bandwidth of only 25 kHz per channel.

One way to address this problem is to widen the range of operating frequencies so that the channels can be wider without being less numerous. However, ultra-wide-band radios need highly advanced integrated circuits and radical antenna designs. (The Army is funding the development of an ultra-wide-band radio called Speakeasy.) These problems, while probably not intractable, are not trivial.

An alternative solution to this problem is to fit more data into a given bandwidth. One way to do this is to use more efficient pulse coding schemes. This scheme has merit, but is unlikely to achieve really large improvements in the data rate to bandwidth ratio.

A newer approach is to compress the signal, thereby reducing the number of bits needed to transmit a given amount of information. Military use of compression is presently minimal, but interest is growing rapidly. For example, the Advanced Research Projects Agency has initiated a program in compression technology. This program involves the Massachusetts Institute of Technology, the Carnegie-Mellon Institute, and Qualcomm Corporation. Compression of more than 100:1 in real time is needed if high-volume transmissions are to be practical in narrow channels (e.g., 25 kHz).

Among current compression techniques, fractal image coding has attained the greatest compression ratios. However, fractal image coding is explicitly picture oriented and is not suitable for compressing other types of data. Compression of about 2500:1 has been attained using large computers, but not in real time. Real-time compression of almost 1000:1 has been attained by using supercomputers, but real-time compression of even 50:1 would be impressive for a compact tactical military system.

Work being done in connection with HDTV is relevant to the military problem at hand, but HDTV can function quite satisfactorily with compression on the order of 10:1 (due to the large bandwidths available to television broadcasts), so HDTV research may not lead to the level of compression needed for high-volume transmissions in narrow channels. Also, HDTV research is picture oriented, whereas the military will also need to compress other types of information (e.g., maps).

Conclusions

Data requirements for our military forces will rise dramatically over the next 15 to 20 years, with the increase being largest at the higher echelons. An increase of 10:1 or more in the overall communications traffic for a "Desert-Storm like" force is likely by the year 2010. In fact, the desired traffic flow will likely be so high at echelons above Corps that fiber-optics will be the only solution.

Existing tactical communications systems have data rates that are too low to allow high-volume image or data transmission. An integrated digital military force could function without this capability, but there would be benefits from having even limited high-data-rate wireless systems for use at Division and below and for communicating with ships or aircraft. Compression techniques are advancing rapidly, but existing technology is not adequate to allow high-volume data transmission over narrow-band radios. Hence, in the absence of basic technological advances in high-data-rate communications, Army fighters at the lower echelons are unlikely to partake fully in the information explosion.

Due to declining budgets, the military will account for an ever smaller percentage of the electronics market. Thus, the electronics market will likely become less responsive to military demands for unique standards and technology. However, a great deal of technology relevant to the digital battlefield is being developed in the commercial sector. This makes it more important than ever that the military exploit commercial technology, such as that being developed for HDTV, in an efficient and timely manner. One way to do this might be to adopt or adapt commercial standards and technology, to the extent feasible, instead of developing dedicated military technology, with the corresponding delays and costs. Of course, the military should also try to influence commercial developments, to the extent practical, in order to increase the likelihood that commercial technology meets reasonable military requirements for performance and ruggedness.

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NATICK HOSTS MIT PRACTICE SCHOOL

By Stephen M. Roll

The U.S. Army Natick Research, Development and Engineering (RDE) Center has signed a cooperative agreement with the Massachusetts Institute of Technology (MIT) as host of this summer's session of MIT's School of Chemical Engineering Practice. The Practice School Program, as it is commonly called, places graduate students at various research laboratories and industrial institutions around the country. The Practice School provides students a diverse alternative to the conventional research thesis-oriented master's degree program. This summer, eight MIT graduate students are taking part in actual Natick research programs to partially fulfill their master's degree requirements.

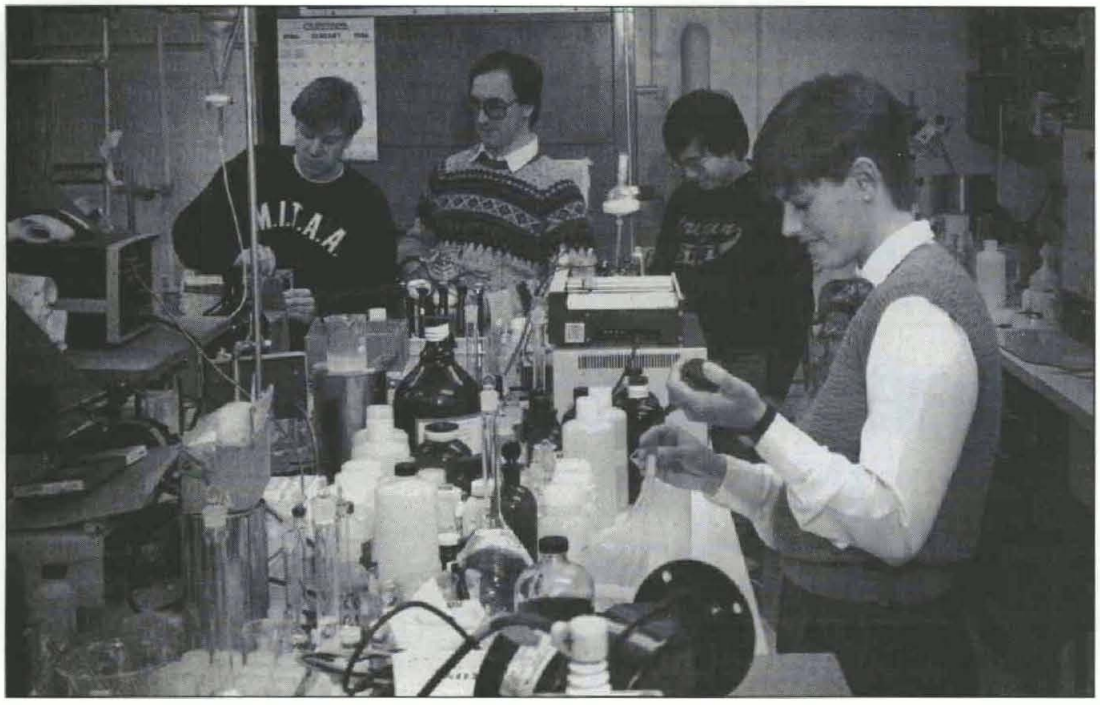
The difficulties encountered in preparing students for professional chemical engineering careers were clearly recognized by William H. Walker and Arthur D. Little when they founded the Practice School in 1916. They saw the need for early experience in applying the fundamentals learned in school, but they realized that this was beyond the capabilities of classroom teaching. While engineering schools instruct students in concepts and evaluate how quickly they assimilate these concepts, the application of this knowledge to formulate and solve problems in "real world" situations is not properly addressed in classrooms. In addition, students usually do not encounter the constraints of time and money, nor do they experience the importance of human relationships in determining whether a project fails or succeeds. Finally, exposure to process-scale equipment is needed to ensure that a proper perspective is maintained in designing or analyzing a process. And, thus, the Practice School Program was developed to remove these shortcomings from MIT's Chemical Engineering Program.

More than 2,400 students have graduated from the Practice School Program since its establishment. Many of them, who now hold distinguished positions in industry and academia, cite their Practice School experience as a key element in their successful careers. Practice School alumni include the CEO of Texaco, Inc. (Maurice Granville '39); the vice chairman of Rohm and Hass (John C. Hass '42); the deputy secretary of the Department of Energy (W. Kenneth Davis '42); the secretary of DOW Chemical (Hubert Dow); the CEO of Exxon (Edward David '50); the CEO of Gulf Oil (Jerry McAfee, '40); and the technical director of the U.S. Army Natick RDE Center (Robert W. Lewis '62). Dr. Lewis attended Practice School at American Cyanamide and Exxon in New Jersey.

The Practice School provides students a diverse alternative to the conventional research thesis-oriented master's degree program.

Practice School "stations" have been hosted by other government agencies (Brookhaven National Labs and Oakridge National Labs) and industry (DuPont, Exxon, Chevron, Dow Chemical, General Electric, Bethlehem Steel, and Merck Pharmaceutical). Natick Labs' engineers and scientists are looking forward to joining this unique program by establishing their own station.

A feature that distinguishes the Practice School from other cooperative educational programs is the presence of full-time MIT faculty at each station. Before the students arrived at Natick, the MIT resident staff worked with Natick's scientists and engineers to agree on appropriate problems for the students to resolve. Upon the students' arrival, the faculty then divided the group into teams, designated team leaders, and reviewed problems and resources with each team. The students' progress is closely monitored on a daily basis. The results of each project (final written report) are edited by the MIT staff and published under the joint imprint of the Practice School and the host company, in this case, Natick. The resident MIT staff reviews student performance with each student and documents grades for each student's permanent record at MIT.



As part of the Practice School, a group of students search for an efficient bioleaching organism. Specifically, their project was to evaluate the effectiveness of two species of Thiobacillus for removing zinc and chromium.

In the book, *The Flagship: the MIT School of Engineering Practice 1916-1991,* John Mattill quotes Professor Wei, former chairman of the Department of Chemical Engineering. The bottom line, says Wei, is that the Practice School faculty gives students "an extraordinary amount of dedication to learning and professional camaraderie that we do not have and cannot afford in Cambridge."

In addition, faculty members from Cambridge visit the stations to attend presentations and advise the students on technical matters. This will be quite convenient since Natick is only a 30-minute drive from the MIT Cambridge campus.

MIT Practice School faculty recently completed a tour of Natick's unique research facilities where protective clothing, microclimate cooling systems, and food technologies for soldiers, sailors, marines and airmen are developed. Potential Practice School projects for students were also discussed. Projects that were considered excellent Practice School problems ranged in diversity from the "Essential Characteristics of Extruded Carbohydrate/Meat Jerky Product"; the design/development of a "Falling Drop Apparatus to Evaluate Chemical Agent Permeation of Permeable Clothing Materials"; to the "Optimization of an Individual MicroClimate Cooling System." These projects will allow the students to get hands-on experience with process equipment and apply their chemical engineering backgrounds to a variety of "real" Army R&D problems.

Groups of two or three students normally are assigned to one-month projects at each Practice School station. During their field station semester, the students present about 16 oral reports and four formal written reports. This provides them an excellent opportunity to develop their communication skills while gaining "real world" experience not available in the classroom. MIT likens this experience to a medical internship at a hospital where students put in long hours and are "on-call" sometimes 24 hours a day.

Perhaps the most common criticism of the Practice School is the pressure created by ambitious projects on short deadlines. It is not uncommon for students to work 12- to 16-hour days conducting experiments, analyzing data, and writing reports.

According to Mattill in *The Flagship: The MIT School of Engineering Practice 1916-1991,* when one student left the Practice School in 1964, he saw it as "the most demanding, horrifying, demoralizing, dehumanizing experience of my life." But a year later, this same student wrote to one of his MIT professors and said that "Practice School prepared me for the real world better than I could ever have thought possible."

The U.S. Army Natick RDE Center is celebrating its 40th anniversary this summer. Next year, it hopes to celebrate its first anniversary of the MIT Practice School by establishing a permanent summer Practice School station.

In these days of Army downsizing and resource shortages, Natick's innovative cooperative agreement with MIT is a means to secure additional human resources. Not only will students benefit from their educational experience, but Natick too will benefit from the technical objectivity the students will provide by furnishing an infusion of fresh resources to attack specific engineering objectives. Finally, the U.S. Army will benefit by applying talented students to Army problems. The exposure of these students to the Army R&D arena hopefully will attract young, bright engineers and scientists to the Army.

The establishment of this summer's MIT Practice School station at the U.S. Army Natick RDE center is a trend that is necessary to merge our academic resource pool with government needs.

STEPHEN M. ROLL is chief of the Chemical Systems Branch at the Natick RDE Center. Roll holds a master's degree from MIT and is a 1987 graduate of the Practice School. He attended stations at Brookhaven National Laboratories in Brookhaven, NY, and General Electric Company in Selkirk, NY.

CLIMBING THE CAREER LADDER IN THE ACQUISITION WORKFORCE

By Bruno S. Wengrowski

The Self Challenge

Military members of the Army and their civilian counterparts differ on their perspective and approach to fulfillment of career goals. Army officers and NCOs often "lock in" by their eighth year of service to determine if they will stay and what their career path may be. Their focus, then, is to complete 20 or more years and retire. A firm template is in place for assignments, schools, training and command positions. To accomplish these goals, geographic and functional mobility is required. The civilian counterpart, on the other hand, may not focus on a career until much later in civil service. A civilian may only begin to think in career terms after achieving a certain grade.

Employment and Development

Early in employment, an individual's focus is to have a job, or to work in a series of jobs. As an employee in a professional series, an individual may be required to take certain courses for progression or promotion. Professional enhancement or job satisfaction are often secondary to a paycheck. As one matures in the workforce and competes for higher grades, job demands become more complex. The 1990 Defense Acquisition Workforce Improvement Act (DAWIA) created new requirements for entry and continuation in the acquisition workforce and mandated additional experience, academic and career training and education standards. This legislation also generated a basis for the establishment of an Acquisition Corps. The Acquisition Corps provides an incentive for military and civilians to think in terms of a career and a profession.

Transition to a Career

Three years of satisfactory performance to achieve career status in civil service does not automatically convert an employee to a careerist, nor does it require an employee to think in terms of career. The challenge to think in terms of a career, rather than a job, is based on experience, education and training. Has the employee performed the same tasks for 10 years, or developed a variety of skills and knowledges by performing more diverse assignments? If an affirmative answer is given to the latter part of the question, one is thinking in terms of career, rather than job. Has the person met or exceeded the academic requirements of DAWIA and completed training required by DOD 5000.52M? If so, the individual is well on the way to transitioning from a job to a career.

A careerist often accepts more challenges, takes tougher assignments, is willing to become a supervisor, or a contracting officer, and is recognized through promotions. The employee who thinks in terms of career also comprehends that promotions are not entitlements, and occur only after one has displayed competence, ethics, judgement, teamwork and leadership.

The careerist also understands that mistakes are made and one can learn from them. This type of worker is not intimidated by mandatory training and actively seeks it out. Often, this individual coaches junior employees. That careerist also gains an appreciation of related disciplines and can apply the interrelationships. Knowledge of these linkings can be obtained by successfully completing the Army Management Staff College. This person is also proud of their accomplishments and seeks to enhance current competencies. Recognizing the need for enhancements, the careerist seeks active participation and membership in organizations such as the National Contract Management Association, the Armed Forces Communications and Electronics Association and the Association of the U.S. Army. The careerist also realizes that a balanced workforce contributes to an organization's effectiveness. Lastly, the civilian careerist

fully appreciates the congruence of his or her path with the military counterpart.

Careerist to Professional

All careerists are not destined or seek to become professionals. Four benchmarks must normally be met to achieve this next recognition level: leadership; developmental assignments; long-term senior-level academic training; and mobility. Generally, careerists at the GS-14 or higher grade are recognized as professionals.

Acceptance into the Army Acquisition Corps is also a major indication that someone has the required experience, attributes, character, education, and training. The quality of leadership reflects that a person is more than a supervisor, manager, or coach; this individual does not shirk from the most complex, difficult assignments. Often, this person is dynamic, an effective oral and written communicator, a visionary thinker, and a mentor for subordinates. He or she has universal acceptance among peers and can relate to military concepts, methodology and philosophy.

Leadership is often recognized when one is selected for a critical acquisition position. When leadership skills are shown, the professional continues to pursue developmental opportunities through additional training or assignments. Developmental training and assignments can be achieved at work or through formal training programs, such as the Logistics and Management Career Development Program (LOGAMP).

Developmental assignments should be interdisciplinary. For example, a contracting careerist would participate in a process action team with resource managers, logisticians, automation managers, and engineers to improve efficiency and enhance the quality of the end product.

The professional seeks employment rotation and enrichment to obtain a more broad-based background of eclectic skills and knowledges. Armed with these enhancements, the professional seeks a long-term, academic assignment. Completion of the Army War College, the Industrial College of the Armed Forces, or the Program Management Course postures this individual to cross over into other areas. The individual can also pursue a post-graduate degree. Finally, another indicator for professionalism is mobility.

Mobility is of two major types, functional and geographic. With functional mobility, the professional accepts difficult challenges to assume a new position within the command or commuting area. The assumption of a different position forces the person to look inward and use the reservoir of experiences and training to master the new position. The professional promulgates his or her philosophy, values, attitudes, and vision within the new organization. Often, geographic mobility is more of a sacrifice and creates new demands. Professionals must adjust to a new location, while accommodations are made with family, climate and culture. The sale and purchase of a home also has a severe financial impact. With the new 1994 tax laws, some disincentives may dampen the positive aspects of the geographic change. Geographic mobility every two or three years is commonplace for military personnel, but is more demanding and traumatic for many civilians. Nevertheless, relocation does enrich one's insight, and enhances an individual's flexibility. A fresh outlook is infused in the new organization and old paradigms are challenged and changed. The rejuvenation process benefits incumbents and new managers. Once one becomes a professional, what's next?

The senior professional is a member of the Senior Executive Service, who is the paragon of acumen, the zenith of integrity, and the role model for subordinates in the functional career field.

Senior Professional

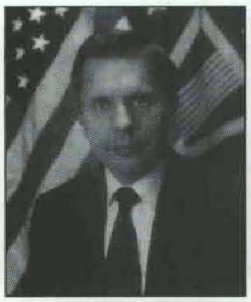
The senior civilian professional is a general officer's counterpart. The senior professional is a member of the Senior Executive Service, who is the paragon of acumen, the zenith of integrity, and the role model for subordinates in the functional career field. The extensive knowledge, wisdom and personal presence of this individual inspires the workforce. Through tireless efforts, devotion to duty, and concern for peers and subordinates, this person earns the recognition for unparalleled competence. The preparation, performance, sacrifice and vision auspiciously demonstrated by the SES member results in accession to the highest civilian level in the federal government.

Conclusion

In summary, these concepts and ideas can be applied to one's self. Where are you now? What do you aspire to become—a careerist, a professional, or a senior professional? You are your own career manager! Do you dare to challenge yourself?

BRUNO S. WENGROWSKI is the chief of the Contracting Office at the U.S. Army Information Systems Command, formerly Seventh Signal Command, at Fort Ritchie, MD. He holds a B.A. in economics from the University of Detroit, MI, and a cognate M.A. in economics and education from Wayne State University in Detroit, MI. A former faculty member and course director at the Army Logistics Management College, he is a member of the Army Acquisition Corps.

In View of the Current Environment of Constrained Economics, What Recommendations Do You Have for Maintaining a Healthy DOD and Defense Industry Relationship?



Dr. Kenneth J. Oscar
Army Non-Developmental Item Advocate and Principal Deputy for Acquisition
Headquarters,
U.S. Army Materiel Command
Alexandria, VA

In good times or bad, the key to a healthy and productive DOD-industry relationship is trust. The fundamentals of trust are frequent and open communications; sharing of information; working together toward common goals; understanding of each other's position; clear, fair, written rules of engagement; and a willingness to change and improve. The Army Materiel Command (AMC) has several initiatives which are strengthening the DOD-Industry relationship by concentrating on these fundamentals of trust. One exciting new program is called partnering.

Partnering is a program where industry and government work more as a team with common objectives, rather than as an arms length, after-the-fact inspector. A written agreement, outside the contract, is developed which details the relationship including how problems will be solved, information shared, and disputes settled. Early results have shown a significant improvement in contract performance and a reduction in litigation.

To improve communications, AMC has quarterly CEO/government executive meetings; level 1, 2 and 3 Advance Planning for Industry meetings by commodity; yearly Atlanta executive conferences; this *Army RD&A Bulletin;* sponsored industry lead sector studies to identify problem areas to help shape industrial policy; and government/industry roadshows. These roadshows are lead by Army acquisition leaders to change the culture and train both industry and government people in the acquisition business. The roadshows use real RFPs as examples. Templets were created as guides to help streamline Army RFPs.

Trust is built on performance over time. The Army has been a leader in acquisition streamlining and has a steady stream of accomplishments such as the newly approved specifications and standards reform, and best value contracting. The Army leadership is committed to continued progress in improving our acquisition system and in ever strengthening our industry relationship.

MG Dennis L. Benchoff
Commanding General
U.S. Army Industrial Operations Command (Provisional)
Rock Island, IL

A careful balance of public and private resources will ensure that an adequate, flexible and competitive industrial base is always available for power projection contingencies.

Because of the size and complexity of the industrial base, we must not attempt to reconfigure it as a whole. Rather, it must be separated into manageable segments, or sectors. A sector is a cross-section of public/private capabilities within a given commodity, such as tracked vehicles or aviation.

Within a given sector, we must identify core capabilities. These are applicable to both public and private resources and, when properly developed, describe the value that a particular entity contributes to its sector within the industrial base.

Core capability cannot be determined using a generic, high-level algorithm. It must be developed using a bottom-up, skill-by-skill analysis at each activity and must relate to the role of that activity under a logistics power projection scenario.

The idea that organic depots exist only to perform depot-level maintenance is archaic. Depot personnel provide support in modifications, upgrades, technical assistance and troubleshooting. In the Gulf War, they not only deployed with the troops in the desert, but supported the pre-deployment effort at installations around the country. The capability of depots to provide such a wide range of logistics power projection support is the reason we exist.

Depot-level maintenance is simply the mechanism that allows us to retain the skills necessary to respond to the requirements in such a conflict.

Thus, depots need not perform depot-level maintenance on all the Army's weapon systems, only the number that will provide enough of the right mix of work to keep intact the core capability skill base. I call this the minimum sustainment cadre. Preliminary indications are that significant percentages of current depot capacity may be divested while maintaining this core capability should funded workload continue to decline.

The cornerstone to making this idea viable lies in our having an ability to excess large amounts of infrastructure. We cannot afford to maintain our current infrastructure with the continued decline in workload which is every businessman's dilemma in the current economic environment. We must consolidate the organic capability into as few facilities at each depot as possible. The excess land, facilities and equipment must then be removed from government ownership or laid away in the most economical manner.

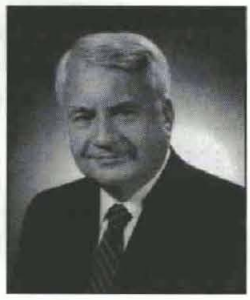
By thus reducing the organic capacity, we concurrently strengthen the private sector, decrease the prices we charge our customers and maintain our Army's internal industrial readiness. Using this new rubric we can develop a partnership with the industries in each sector to provide balanced and full service to our customers—the men and women of our Armed Forces.

LTG Lawrence F. Skibbie, USA (Ret.)
President, American Defense Preparedness Association
Arlington, VA

The question assumes that there is already a healthy relationship between DOD and Defense industry. However, I disagree with this assumption. Unfortunately, I think the relationship is basically unhealthy; at the very best it seems to be a testy adversarial relationship. Why is this so? On the government's part, I think it comes from a lack of understanding of industry and its motivations. As pointed out in my article [See January-February 1994 issue of *Army RD&A Bulletin*], profit is not a four letter word and it is the fundamental motivator in our free-market economy. Further, I think many government people have allowed their experience with a few unscrupulous contractors to discredit the vast majority of ethical, responsible Defense industry suppliers. However, the responsibility for this unhealthy relationship must also be shared by Defense industry where it is very easy to make promises to the government which either cannot be or are not kept; also, it seems that there are some contractors who attempt to get the last nickel out of the government relationship, and this leaves a bad taste. Finally, it behooves industry to better educate government on the free-market economy and its advantages as well as its limitations.

But I don't want to beg the question. How do we fix this problem relationship? For industry's part, it needs to police its own ranks. This could be done with the help of the Defense associations by mandating ethics programs to which all must subscribe. Further, by encouraging the Defense associations to develop membership programs for TQM providers—with all that implies—the industry can continue to raise its level of performance across its spectrum, not just in select companies. Equally important is an education program which explains industry, its activities and motivations to the Service acquisition community. (Remember most government acquisition people have only worked for the government and don't understand business development, cash flow, investment, etc.) Together, these activities will go a long way to improving the DOD Defense industry relationship.

For the government's part, it needs to be more sensitive to the fact that Defense industry is essentially a fifth Service. The other four uniformed Services are only able to accomplish their missions when properly equipped by Defense industry (the fifth Service). Accordingly, mutual respect is important. Also, while our government acquisition professionals have a responsibility to protect the government's interest, they must realize that in protecting against the one percent (or less) of unscrupulous Defense contractors, they often end up causing the government to pay much more than any potential government losses. For example, it is currently accepted that the government pays a cost penalty of 30-50 percent in all of their procurements—this due to overly complex regulations with excessive checks and balances. If we are to save some of the 30-50 percent cost penalty, we must accept the fact that a few unscrupulous Defense suppliers will slip in with the other 99 percent of scrupulous, responsible manufacturers. Will the nation be money ahead for relaxing some of these checks and balances? You bet!



Peter F. McCloskey
President, The Electronics Industries Association
Washington, DC

Defense companies create and maintain some of the most important technologies and employee skills available to this nation. Due to national security and budget trends beyond their control, they find their potential markets shrinking fast, with no obvious solutions in sight.

Although the Defense conversion goals of the Clinton Administration are laudable, current programs in technology reinvestment are neither adequately funded nor properly designed to address the massive needs of our industrial base. The marketplace alone determines the ultimate commercial success or failure of new products and technologies. Perhaps the major challenge facing Defense companies is to develop commercial-style market understanding, access and related marketing capabilities. Government programs simply do not address this tremendous obstacle to their success.

Despite these problems for current conversion approaches, there are significant steps the government can take to improve the prospects of the electronics industrial base. The Administration can reform procurement policies that add significant overhead costs and burdens not required in the commercial sector. These costs are imposed on companies as the price of doing business with the government, and they severely complicate our industry's ability to compete for commercial business opportunities which can be identified. To address this problem, numerous industries have forged a coalition to promote legislation which would finally bring commercial-style acquisition practices to the government marketplace. We are now working with Capitol Hill and the Administration on procurement reform legislation and are pleased that they have identified a need to reform the current systems. These bills represent a starting point, but unfortunately do not go far enough to permit commercial suppliers to do business with the government.

The government should emphasize use of Defense firms to meet major, non-Defense program needs. From information superhighways and national telecommunications systems, from upgraded air traffic control systems to intelligent vehicle systems and crime prevention initiatives, the list of national needs in which the federal government has a major stake is long and growing. As we address these needs that enhance our national competitiveness, government can emphasize use of Defense firms to meet the resulting challenges in systems integration, program development, and forging cooperative government-industry business relationships. Although they face a host of competitive barriers in commercial markets, Defense firms today possess these key skills in abundance. Putting the talents of their workers to use in such projects is among the best ways of maintaining critical skills needed to sustain the Defense needs of the future.

The government also must support the sale of Defense products overseas, with programs and practices similar to those long used by our allies and competitors. The idea that unilateral refusal to sell our products will somehow cause international markets to dry up is naive and unrealistic. If we simply opt out of international markets, we will lose more than the jobs and earnings that industry needs to promote diversification efforts over the longer term. We also will lose political and logistics leverage over potential aggressors around the globe.

Finally, government must enact changes in trade and fiscal policies to enhance the economic health and competitiveness of all U.S. businesses, including Defense. Deficit reduction, export control reforms, and a tax policy that recognized the global nature of the com-

petition industry now faces, all of these areas must be addressed. The essential challenge for government is to develop policies to strengthen our international competitiveness by encouraging improved productivity and investment throughout our economy, and ensuring access to markets abroad. If these issues are not resolved effectively, our competitiveness, and by extension, our national security itself, will be weakened in the course of the 1990s.

COL George J. Savitske
Director, Acquisition and Industrial Policy
OASARDA
Pentagon

Historically, production is the engine that has driven the industrial base. The challenge that confronts us today is the continued sustainment of that base, in light of the significant down-turn in Defense procurement.

The Army is answering this formidable challenge in a variety of ways. Three that immediately come to mind are in the areas of *Acquisition Reform, Industry Sector Studies* and *Workloading*.

Under the leadership of Dr. Perry and Mrs. Preston, the military departments have embarked upon a comprehensive program to streamline their complicated acquisition systems. Increased reliance on commercial specifications and standards, use of recognized civilian accounting practices and principles and adaptation of "off-the-shelf" non-developmental items to satisfy military needs are but a few of the many initiatives currently under consideration within the Army. By implementing these and other good ideas, we will reduce cost to both the contractor and the government, while expanding both competition and the potential vendor base.

In 1992, the Army Materiel Command, with industry input, performed a comprehensive analysis of 13 industrial sectors comprising Army hardware acquisition activities. The results of that analysis showed a number of sectors in jeopardy due to their Defense unique output, coupled with reductions in the overall number of systems procured. We have used these results to take specific steps to identify and protect, where possible, the critical components of those Defense unique sectors. One example is the program to modernize M1 tanks to the M1A2 configuration. This program will upgrade system operational characteristics while preserving essential industrial capabilities of the armored vehicle base.

The division of labor between public depots and private industry has been and will continue to be an issue of some controversy. There is no question that the Service depots are an essential component of the industrial base. A recently completed report by the Defense Science Board's Depot Maintenance Task Force validated the need to maintain a core capability within the depots which can respond quickly in a crisis situation. At the same time, the report recommends that workload above core requirements be made available to private industry, particularly major modifications and weapon systems upgrades which provide key engineering and production capabilities. The report further recommends repeal of the current public law which mandates a minimum 60 percent workload allocation to depots. The Office, Secretary of Defense (OSD) staff has forwarded this report to Congress. In a separate but related action, OSD asked the military departments to look for ways to fully utilize the 40 percent workshare split to industry allowed under existing public law.

Don Fuqua
President
Aerospace Industries Association
Washington, DC

This is the ninth straight year of decline in the Defense budget, with additional reductions yet to come. The aerospace and Defense industry has lost 471,000 jobs since 1989—32 percent of its total workforce. Given these factors, it is imperative that government (Department of Defense and Congress) and industry work together to drive down cost, improve quality, and replace excessive oversight and burdensome regulations with greater trust in the judgment of the professional workforce and reliance on the mechanics of the marketplace.

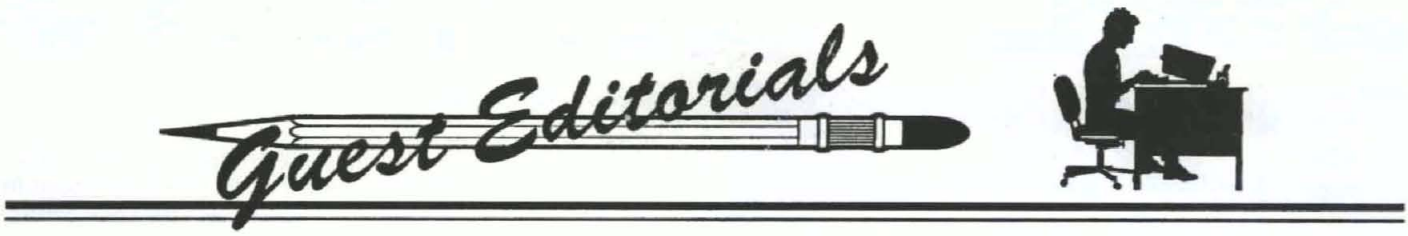
The depot maintenance issue is an excellent example of the need for more cooperation between industry and government. There is excess maintenance and repair capacity in both industry and government, with both parties vying for a greater share of the diminishing workload. The surplus capacity is costly and harmful to our force structure and Defense industrial base. We simply can no longer afford it.

Some solutions to this contentious problem have been proposed. The Defense Science Board task force on depot maintenance completed a Congressionally-mandated report in April of this year. The task force, composed of a team of 42 experts from DOD and industry, recommended that the Services retain core workload and that industry perform all non-core work, as well as major modification and upgrade work. The task force also recommended eliminating the 60/40 legislative allocation. This artifical allocation is clearly inconsistent with the concept of reducing depot workloads to a minimum core requirement.

These recommendations provide a rational framework to eliminate the excess and costly infrastructure that currently exists. We need to move forward now with implementing them.

Another area where greater cooperation and trust between the government and industry is needed is in how the government buys goods and services. The legions of auditors and redundant oversight processes that were established in the early 1980s at the peak of the procurement budget are still in place today, even though the budget has been declining since 1986. We can no longer afford to continue business as usual if DOD is to ensure military readiness in the lean years ahead. Now is the time for a major overhaul of the entire acquisition system—a cultural change encompassing statutes, regulations, policies, procedures, detailed "how-to" specifications, and attitudes which contribute to a costly inefficient system. Defense Secretary Perry is committed to this effort, and Congress must do its part as well.

When I joined AIA in 1987, the industry was in the midst of a difficult time. Allegations of fraud, waste and abuse were rampant and contributed to the current micromanaged system. We have come a long way since then. We are working much closer with DOD. We have been able to prevent several serious problems and misunderstandings through better and more timely communication and a recognition of our mutual interests. That is a significant change from just a few years ago, and is a model for the future.



CHANGING THE WAY WE DO BUSINESS

By Gilbert F. Decker
Assistant Secretary of the Army (Research, Development and Acquisition) and Army Acquisition Executive

I have read the *Army RD&A Bulletin* for several years. It is the outstanding publication within the Defense RDA community, and I compliment all of you who contribute the excellent articles and particularly the staff who puts it together.

The world today is one of turbulence, seething and unrest. It's almost impossible to predict where the next outburst will occur, but occur it will. The U.S. may well be drawn into one or more of the frays at any time and U.S. military activities may range from humanitarian missions through stability operations to outright regional war or wars.

To provide the basis for planning and readiness in this environment, the Department of Defense leaders conducted a study in 1993, the Bottom Up Review, affectionately (or not so affectionately) known as the BUR. It spells out in fairly specific terms the scenarios for war and operations other than war that we must be prepared for.

Army military and civilian leadership is attempting to convince our bosses that farther reductions to Army RD&A should not be made. Meanwhile, we are being asked to do more with less. In turn, we are asking all of you, the outstanding people in the RDA community, to do the same. It seems that many people think that as we do more and more for less and less, we will soon be able to do absolutely everything with nothing. We're certainly trying to.

Now, these conditions make it absolutely vital that we in the RDA community and others in the "Table of Distribution and Allowance" (TDA) elements of the Army *must* change our way of doing business. We *must* throw away old organizations, philosophies, policies and procedures (oftentimes referred to as infrastructure) and replace them with a new, streamlined, smaller and highly efficient infrastructure. This will require a tough, painful, and rapid process.

Within the RDA community, the centerpiece of this process is acquisition reform. I consider acquisition reform my main, evangelical mission as the Assistant Secretary of the Army (Research, Development and Acquisition) and the Army Acquisition Executive. I will say more about specifics of acquisition reform in future articles. For now, I will leave you with two thoughts. First, there are many outstanding people in Army RDA who are self starters, who hate waste and inefficiency, and who are out in front in acquisition reform. I commend you sincerely. Second, my personal efforts to lead you in this pursuit will not only be directed to the Army, but upwards, laterally, and toward industry as well.

I am happy to be on board; I am excited about the challenge, and I am warmed by the reception I have received.

From The AAC Career Manager...

Q&As

If you have an Acquisition Corps subject you would like addressed in this column or a question you would like answered, send your requests to: Deputy Director, Acquisition Career Management, SARD-AC, Room 3E360, 103 Army Pentagon, Washington, DC 20310-0103. Questions may also be datafaxed to DSN 224-3690 or (703)614-3690. Please include your name address and phone number in case additional clarification is required. This information will not be published.

Q: Does civilian attendance at the Materiel Acquisition Management (MAM) Course satisfy any AAC education requirements? If so, which ones? I understand military officers are currently receiving credit for both the Defense Systems Management College (DSMC) Fundamentals of Systems Acquisition Course (PMT 101) and the Intermediate Systems Acquisition Course (PMT 201).

A: The Army Logistics Management College (ALMC) has been working with the Defense Acquisition University (DAU) to achieve equivalency for the MAM Course. As of this publication, the DAU has approved equivalency for PMT 101. ALMC is still working with the DAU to achieve equivalency for PMT 201. Once approved, civilian and military attendees at the MAM Course will be granted equivalency credit.

Q: How many fulfillments for DSMC credit due to experience have been given? How many requests? How long does the process take?

A: Seven individuals have received fulfillment credit for the Program Management Course (PMC) based on the competencies in the Mandatory Course Fulfillment Program and Competency Standards Guide. Most of the requests for fulfillment have been received from serving deputy project/product managers and seven have been approved. Once the fulfillment request is received by the deputy director, acquisition career management, approval/disapproval will be granted within 30-45 days. Individuals who feel they meet all the competencies for PMC are encouraged to submit requests for fulfillment credit in accordance with DoD 5000.52M and AOS-93-01-6D, January 1993, *Mandatory Course Fulfillment Program and Competency Standards.*

Q: If civilian PMs are limited to five years in a job, what do they do after this five years?

A: The five-year rotation policy is for incumbents of all critical acquisition positions, not just PMs. The rotation policy was enacted to ensure career broadening assignments and to infuse new ideas into critical acquisition positions. The Acquisition Career Program Board is chartered to conduct these reviews and will determine, on a case-by-case basis, if an individual should be reassigned after five years. Tour lengths of civilian PMs will be the same as a military PM tour length—three years for Acquisition Category (ACAT) II, III, and IV PMs and four years for ACAT I PMs. If a determination is made to rotate civilian PMs, there are many career broadening opportunities for individuals with PM experience. Examples of follow-on assignments are selection for another PM position, assignment to a PEO or headquarters staff, and instructors at the Defense Systems Management College or Naval Postgraduate School.

Q: How can GS-13 level employees get the application disk (AUTOAPP) in order to prepare in advance for the Acquisition Corps when it is opened to them?

A: Each Army acquisition organization has a copy of the AUTOAPP program diskette or can get one from the local Civilian Personnel Office (CPO), along with a brief instruction sheet for installing the program on the hard disk of a personal computer (PC). (Any Army CPO that needs a copy of AUTOAPP may download it from the Personnel Systems Manager Bulletin Board System or request it by mail from the AAC Management Office at the U.S. Total Army Personnel Command.) A single program diskette may be used many times to install the AUTOAPP program on multiple PCs. It also may be duplicated onto other diskettes. Copies should be immediately write-protected to ensure the integrity of the program files. Once you have installed AUTOAPP on your hard disk, you may run the program, read the additional instructions it contains, and begin filling out your application. When the announcement for GS-13s (and GS-14/15s not in critical acquisition positions) is released, be sure to read it carefully for additional information. When you have completed your application, save your data onto a new diskette and submit it to your CPO as specified in the announcement. Do NOT submit your data diskette before the announcement is released and you have read it.

Army Acquisition Corps Senior Service College Selections

Congratulations to the following Army Acquisition Corps officers on their selection to attend Senior Service College:

Industrial College of the Armed Forces

Name	Functional Area
CERVANTES, Mario A.	51
DAVENPORT, Brian W.	97
FRYE, Jan R.	97
HASTIE, William A.	51

KEE, Stephen G.	51
WALSH, John C. Jr.	97
WEIR, William A.	51
YOUNG, James E.	51

Army War College

BERRY, Corlis S. III	51
CAMBRON, James D.	51
CARR, Herbert M.	51
COGAN, Kevin J.	51
DEETER, Louis P.	51
DOTON, Lawrence C.	53
DRESEN, Thomas E.	51
FLOHR, Steven W.	51
GORRELL, John D.	51
HENDERSON, Jerry M.	53
HOFFMAN, John W.	51
KAFKALAS, Peter N.	97
MASSUCCHI, Michael R.	51
NICHOLSON, David N.	51
PADDOCK, Joseph P.	97
URIAS, John M.	51
ZEGLEY, Raymond D.	51

University of Texas Fellowship Program

CARTER, Roger L.	51
DEKANTER, Scipio Jr.	51
NEWLIN, Donald D.	51

Officer Awarded for Scholastic Achievement

The 1994 Army Acquisition Corps Award for Scholastic Achievement in Systems Acquisition Management at the Naval Postgraduate School (NPS) has been awarded to MAJ Perry J. Delahoussaye. MAJ Delahoussaye was a member of the March 1994 graduating class and is currently assigned to the Program Executive Officer, Missile Defense.

On The Horizon. . .

• **DOD 5000.52-M:** A DOD-led review of the mandatory certification requirements for each career field is in progress, with a goal of completing a revised 5000.52-M by first quarter FY95. One key item is whether to make the Program Management Course mandatory for Level III certification in the program management career field.

• **FUNCTIONAL AREAS 51/53/97:** The Deputy Director for Acquisition Career Management Office is in the process of reviewing the education, training and positions required to support well-defined and well-supported career paths for Army Acquisition Corps (AAC) officers. This review will take into account the possibility of combining 51/53/97 into one functional area, the need for better career guidance to the field until an updated DA PAM 600-3 is published, and the Military Acquisition Position List Council of Colonels scheduled for first quarter FY95.

• **DCSPER PERSONNEL FUNCTIONAL ASSESSMENT (PFA):** The DCSPER PFA of the AAC is scheduled for August 1994. This PFA will evaluate the health and status of the AAC for military and civilian personnel. As part of the overall assessment, any major issues requiring a decision by the DCSPER and other concerns will be presented.

For additional information on any of the above subjects, please contact MAJ Mark Jones, chief, Army Acquisition Corps Proponency Office, DSN 225-7264 or commercial (703) 695-7264.

New Civilian AAC Members Accessed

Congratulations to the following newly accessed civilian members of the Army Acquisition Corps.

Abel, Charles	Franklin, Robert	Reed, Arthur Jr.
Acosta, Jose	Gainor, Charles	Ritondo, Michael
Alloway, Jan	Garcia, David	Rodgers, Richard
Altgilbers, Larry	Gordon, Claire	Schmidt, Dr. Harry
Batelka, Frank	Graft, Ronald	Schueler, Gerald
Baylor, Dennis	Greenfield, James	Seegar, Janis
Beard, James	Hays, Richard	Steeves, Earl
Bender, Gary	Hodges, Phillip	Stevenson, Todd
Bensel, Carolyn	Hooker, William	Talley, Rex
Binney, Barbara	Jeanblanc, Donald	Tatum, George
Bosco, Charles	Kaplan, David	Thompson, Larry Joe
Britton, Harold Jr.	Klimek, Walter	Timochko, Michael
Bryant, Bobby	Lee, Calvin	Tiwari, Subhash R.
Carlon, Hugh	Lemon, Shirley	Valenti, Michael
Cerny, Otto	Magee, William Jr.	Van de Wal, Anthony
Chesney, John	Martin, Patricia	Wagner, Dean
Chronister, Ronald	Matts, Donald	Watts, Dr. George
Cohen, Herbert	Maxey, George	West, Larry
Combs, Craig	Meadows, James Jr.	Winegar, Dennis
Cook, Thomas	Mercer, Robert	Woodbury, Donald
Crawford, John	Narayan, K. Anath	Wong, Alexander
Crawford, Robert	Newlon, Roger	Wyatt, Mack
Daniel, Calvin	Nook, Herold	Wymer, Debra
Drinkwater, Thomas	Pedoto, Eugene	Yankolonis, Alan
Drucker, Melvin	Penski, Elwin	Yeoman, Walter
Early, Michael	Phelps, Kirkman	
Eaton, Frank	Pickard, Donald	
Embury, Janon	Price, George	
Fahl, John	Prichard, David	

PERSCOM Notes...

Advanced Civil Schooling

Many Acquisition Corps officers have questions about their enhanced opportunity to attend graduate school under the Army's fully funded Advanced Civil Schooling (ACS) Program. This voluntary program is not required for a successful acquisition career, however, all officers are encouraged to pursue a graduate degree, either through an Army program or on their own. Other Army graduate programs are outlined in AR 621-1, *Training of Military Personnel at Civilian Institutions.* These include the Degree Completion Program (DCP) and the Co-op Program.

Selection for fully funded ACS is based on three major factors: promotion potential, academic background, and acquisition timeline considerations. The AAC will not send an officer to fully funded ACS if he or she is considered a promotion risk. The respective assignment officers in the Military Acquisition Management Branch (MAMB) provide this assessment.

An officer's undergraduate major and grades often limit graduate options. Additionally, performance on standardized graduate level tests (GRE or GMAT) is a key for acceptance into a quality program. Officers with low GPAs or test scores are not viable candidates for fully funded ACS. A solution in this case is to take several graduate level courses (normally 12-14 credit hours) on your own time at a local college. Many schools will look at this graduate experience favorably, increasing your likelihood of fully funded attendance.

We evaluate each ACS applicant's Acquisition Corps timeline when considering graduate school options. The goal is to ensure the officer can meet the "best-case" DAWIA experience requirement: 72 months at the 17-year mark. Typically, only officers accessed into the Corps at their 11-year mark or later have concerns in this area. If necessary, the officer will be encouraged to attend a one-year program, or in some cases, pursue a degree on their off-duty time.

Not all officers will attend fully funded ACS immediately upon accession into the AAC. Your military and academic performance, and the assignment needs of the Corps, will require some officers to move into an acquisition assignment first. This will not preclude future attendance at fully funded ACS! Take the opportunity in this initial assignment to learn your trade, bolster your academic record if necessary, and apply for ACS at the end of your tour.

Our goal is to send officers with demonstrated potential for academic and professional success to fully funded ACS. Your goal should be to match that profile. A future issue of *Army RD&A Bulletin* will address specific academic requirements, desired curriculums and recommended schools.

Military Acquisition Branch Points of Contact

POC	Commercial	DSN
Advanced Civil Schooling	(703)325-2763	221-2763
Separations	(703)325-3095	221-3095
Chief, Military Acq Mgt	(703)325-3131	221-3131
FA51 LTC Assignments	(703)325-3129	221-3129
FA51 MAJ Assignments	(703)325-3128	221-3128
FA51 CPT Assignments	(703)325-2800	221-2800
Mil Pers Spec (DSMC/MAM/PM)	(703)325-3127	221-3127
FA53 LTC/MAJ Assignments	(703)325-3114	221-3114
FA53 CPT Assignments	(703)325-2759	221-2759
FA97 LTC/MAJ Assignments	(703)325-3124	221-3124
FA97 CPT Assignments	(703)325-2801	221-2801
AAC Computer Engineer	(703)325-3130	221-3130
AAC Strength Management	(703)325-2760	221-2760

DDN E-Mail Addresses

Functional Area 51: TAPCOP51@HOFFMAN-EMH1.ARMY.MIL
Functional Area 53: TAPCOP53@HOFFMAN-EMH1.ARMY.MIL
Functional Area 97: TAPCOP97@HOFFMAN-EMH1.ARMY.MIL

Visit the Military Acquisition Management Branch

If you are in the Washington, DC area, we encourage you to stop by PERSCOM and review your records, especially if you will be going before a board in the near future; but, we ask one thing of you. Let us know you are coming. The assignment officers are very busy and if you just walk in, you do yourself a disservice because the assignment officer must then go to an interview without reviewing your record and being properly prepared. As a result, neither you nor the assignment officer walk away feeling you received a quality interview.

Components of a Board Packet

In the interest of the Corps and the individual officer, we would like to explain what composes a board packet. We cannot overemphasize the importance of knowing what a DA board will look at to decide your future, and more importantly, what you can do to ensure you look your best.

There are three simple items that go before a board: The Officer Record Brief (ORB), performance microfiche (Restricted Microfiche, if there is one, will be seen by a RIF or SERB board), and an official DA photograph. Microfiches and ORBs can be ordered at any time and if you have an extra photo you will have a "board file." This is why it is important to have these items current!

Photographs

Look over your photo very carefully prior to sending it to MAMB. Take the time to have the photo retaken if you are not pleased with the results. Keep the photo updated. Update your photo at least every three years and upon promotion. It is also a good idea to update your photo for each board. This ensures your most current data goes before the board.

Color or black and white? Get a color photo! Color photos have been used by DA boards since February 1992. This goes along with keeping your photo updated. If you have a new photo taken when promoted or for an upcoming board, you will have a color photo.

When you take your photo, remember that the Acquisition Corps is not a branch. DO NOT PUT AC AS YOUR BRANCH! You retain your basic branch affiliation, and your basic branch goes on the footboard.

Tips on taking photos:

- Take a color photo for the board!
- Insure your trousers and sleeves are the correct length.
- Check for creases along the crotch and shoulders.
- Put your basic branch, NOT AC on the footboard.
- Wear only official awards and decorations.
- Use edge dressing on the shoes to include the toe bottom.
- Have a proper hair cut.
- We recommend no moustaches.
- Take a friend with you to double check the photo.

ORBs

A correct and easy to read ORB is important for a board. Check your ORB now, even if you have just gone through a birth month

audit. Ensure corrections you submitted are present and, if not, try again. Problem areas tend to be assignment history and updated home addresses. Remember, any mail we send to you, including *Army RD&A Bulletin,* is sent to the address on the ORB. Wrong address, no mail!

If you cannot resolve a problem with your ORB, send us a hand-marked corrected copy of your ORB.

Acquisition certification data will not be printed on board ORBs.

Microfiche

Your performance microfiche is the final item in your board file. Each officer should order a fiche if you have not done so in the last year. Check to ensure only your OERs and AERs are on the fiche. Alert us if you note problems. Remember that only the awards certificate goes in the fiche and be sure to have your PSC type the award orders number and your SSN on the certificate. To order your fiche, write to:

Commander, Total Army Personnel Command
ATTN: TAPC-MSR-S
200 Stovall St.
Alexandria, VA 22332-0444

Be sure to include your SSN and return address on the letter. Although there is no extra process required to receive a restricted fiche, we advise you to specifically include it in your request. Every officer has a restricted fiche, unfortunately, some officers have something in theirs.

Corps Membership Versus Acquisition Workforce

For officers who have recently come under the control of the Army Acquisition Corps (AAC) and for those officers already controlled by the AAC, it is important to understand the difference between being a member of the AAC and being a member of the federal acquisition workforce.

When an officer is selected by the acquisition accession board, that officer becomes an Acquisition Corps candidate. Once accessed as an Acquisition Corps candidate, the officer will have their control branch changed from their basic branch to AC. As an AAC candidate, the officer will receive the training and assignments needed to meet the requirements to become a member of the Army Acquisition Corps.

The following are definitions from DOD Instruction Number 5000.58, Subject: Defense Acquisition Workforce:

Acquisition Workforce - The personnel component of the acquisition system. The acquisition workforce includes permanent civilian employees and military members who occupy acquisition positions, who are members of an Acquisition Corps, or who are in acquisition development programs.

Acquisition Corps - A subset of the acquisition workforce, composed of selected military and civilian personnel (meeting qualification requirements) in grades of Major, GS- and/or GM-13 and above, who are acquisition professionals. There is one Acquisition Corps for each military department and one for all the other DOD components.

Just because you are control branch AC does not mean you are a member of the Acquisition Corps. You still have to meet the requirements established by law to become an Acquisition Corps member. IF you have been accessed and are control branch AC, you will, in all likelihood, become a member of the Acquisition Corps.

Everyone who works in an acquisition assignment is a member of the acquisition workforce. The acquisition workforce is determined by the position you hold, not experience or training. Corps membership is determined by experience and training, not position. The Defense Acquisition Workforce Improvement Act prescribes the following requirements for Acquisition Corps membership.

1. The officer must be a Major or above.
2. The officer must have a baccalaureate degree.
3. The officer must have at least 24 semester credit hours (or the equivalent) from among the following disciplines:
   - Accounting
   - Business Finance
   - Law
   - Contracts
   - Purchasing
   - Economics
   - Industrial Management
   - Marketing
   - Quantitative Methods
   - Organization and Management
4. The business hour requirement stated above is also satisfied if the officer has 24 semester credit hours in his acquisition career field and 12 semester credit hours from among the disciplines listed above. For example, a functional area 51 officer with an engineering degree would only need 12 credit hours from the above disciplines to meet this requirement.
5. The officer must have at least four years of experience in an acquisition position.
6. The requirement of 2 and 3 above are also satisfied if the officer had at least 10 years of acquisition experience as of Oct. 1, 1991.
7. DOD Instruction 5000.58 imposes the further requirement that after Oct. 1, 1993, an individual must have completed the training required for level 2 certification in their career field.

Once an officer meets the above requirements, PERSCOM will verify all requirements have been met and then submit the officer's name to the director, acquisition career management (currently LTG Forster) for Corps certification.

The Military Acquisition Management Branch at PERSCOM is currently working to have a change made to the Officers Record Brief to show if the officer is a certified Acquisition Corps member.

Questions on Acquisition Corps membership versus being a member of the Acquisition Workforce may be addressed to Commander, Total Army Personnel Command, TAPC-OPB-E (ATTN: MAJ John Womack), 200 Stovall Street, Alexandria, VA 22332-0411. The phone number is (703)325-2801 or DSN 221-2801.

Comptroller Career Developmental Job Swap Program

The Army's Comptroller Civilian Career Program (CP-11) community is developing an innovative and intriguing Comptroller Career Developmental Job Swap Program designed to offer CP-11 careerists a unique opportunity to develop, update and enhance their skills in spite of the present downsizing environment.

The financial management leadership is sponsoring a one-year test of the program, which is voluntary and non-competitive. Interested careerists may register through an electronic bulletin board during the initial registration period of July, August and September 1994. Job swaps will be arranged during Fiscal Year 1995, beginning Oct. 1, 1994. Twenty-five swaps (50 careerists), to be chosen by a random lottery, will be centrally funded. Any number of other swaps can be arranged through the program at the expense of individual activities.

For the purposes of the test, registration is limited to CP-11 careerists in grades 11 through 13 and in the following general schedule series: 343, 501, 505, 510, 511, 560 and 1515 (cost analyst). All swaps will be at the same grade level; will not involve vacancies; and will not be made to positions with known promotion potential (unless both positions possess the same promotion potential). Job swaps are also an exception to the DOD Program for Stability of

Civilian Employment (Priority Placement Program.) Swaps may be permanent or temporary.

CP-11 careerists who wish to register in the Comptroller Career Developmental Job Swap Program need to register with their installation registration point of contact. Registration does not commit the careerist to accept a job swap if offered.

An important feature of the program is that the careerist's supervisor must first acknowledge that he/she is aware of the registration and, if a job swap is later arranged, both supervisors must agree to the arrangement.

At the time of publication, the Comptroller Developmental Job Swap Program is being reviewed and refined. If you are a CP-11 careerist interested in learning more about the program, get in touch with your activity career program manager or, if there is none, your MACOM activity career program manager. More information may also be obtained from the Comptroller Proponency Office, where Tom Eagling is the job swap program manager. He can be reached at DSN 227-2976 or commercial (703) 697-2976; or fax DSN 223-7162 or commercial (703) 693-7162. Mailing address is Department of the Army, SAFM-PO, Assistant Secretary of the Army (Financial Management), 109 Army Pentagon, Washington, D.C. 20310-0109.

The financial management community views this program as a "win-win" situation. From the careerists point of view, it is an opportunity to acquire new perspectives and ideas and to expand retention posture by diversifying skills. For the supervisor who supports professional development, it serves to improve morale, reduce stagnation and enhances the professional caliber of the staff.

Army Acquisition Corps Reserve Components

With the advent of the Defense Acquisition Workforce Improvement Act, a definitive role for reserve forces in the acquisition arena has been deliberated at various levels within the Department of Defense.

In June 1992, the U.S. Army Reserve Personnel Center (ARPERCEN) distributed a questionnaire to a select group of U.S. Army Reserve (USAR) officers possessing the "right stuff" to become members of the Army Acquisition Corps (AAC). The initial survey was sent to more than 700 USAR officers; approximately 380 responded and 253 met the minimum criteria for membership. Recently, another 43 USAR officers were identified by ARPERCEN for potential AAC-Reserve Component (AAC-RC) membership. For further information regarding the preliminary AAC questionnaire, contact MAJ Neils Zussblatt, DSN 892-2139, commercial (314) 538-2139, or toll free (800) 325-4958 (ARPERCEN).

The U.S. Army Force Integration Support Agency is now assessing the requirements for AAC-RC officers within the Army Reserve force structure. The purpose of the assessment is to ascertain the numbers of required and authorized personnel needed during both wartime and peacetime scenarios, by grade, unit identification code, and area of concentration, i.e. 51, 53, and 97. Early indications are that the total AAC-RC requirement is approximately 1100.

Current planning is to convene a Department of the Army board during the fourth quarter FY94 to officially certify USAR officer nominees for entry into the AAC. Although education, training and experience requirements for AAC membership are identical for both active and reserve officers, specially designed training programs for RC-unique situations are being explored. Specifically, the issue of available time for RC officers to attend resident courses in the AAC arena is under review.

Under the direction of MG Robert L. Menist, assistant military deputy to the assistant secretary of the Army (research, development and acquisition), COL William Hanna, director for reserve affairs, OASA(RDA), has been assigned responsibility for building the AAC-RC. For further information on AAC-RC issues, contact COL Hanna at DSN 227-4440 or commercial (703) 697-4440.

Dual Roles Seen For Vehicle Collision-Avoidance System

The U.S. Army Tank-Automotive Research, Development and Engineering Center (TARDEC), Warren, MI, is teaming up with General Motors subsidiary Delco Electronics to explore the potential military and commercial uses of a vehicle collision-avoidance system under development at Delco.

Similar to a system now in use on all Greyhound buses, it will use millimeter wave radar sensors on the front, sides and rear of a vehicle to alert drivers of situations that could lead to a collision.

Two front-mounted sensors will measure the distance between the vehicle and the vehicle ahead and feed the information into a computer. The computer will then use this measurement and the vehicle's speed to calculate the distance separating them.

If the distance drops below a predetermined number of meters, the computer will warn the driver to slow down by illuminating a display panel and activating an audible alarm. If desired, it will also be possible to set up the system to control a vehicle's brakes, steering and throttle to maintain proper distance and avert collisions.

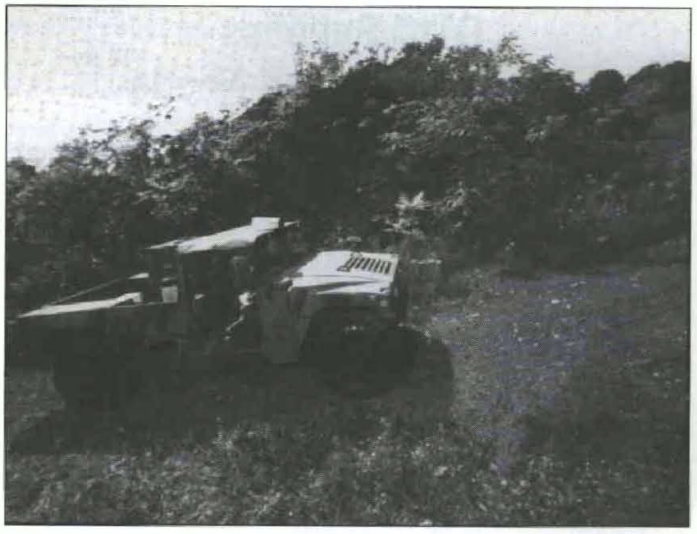
Two sensors on the back and one on each side of the vehicle will aid drivers in those instances where blind spots make it hard to see objects in time to avoid collisions.

For instance, it could warn a truck driver backing his vehicle up to a loading dock to stop in time to prevent a collision with the dock and possible damage to the truck. It could alert a driver attempting to change lanes if a vehicle should be traveling in his blind spot. It could also warn a driver backing out of a driveway if a child were to wander into the path of his vehicle. At TARDEC, engineers are involved in several research projects aimed at investigating the feasibility of using a collision-avoidance system in manned and umanned tactical trucks.

In one of these, Delco is integrating the first prototype of its system in a manned HMMWV (High Mobility Multipurpose Wheeled Vehicle) under terms of a contract awarded in September 1993. According to TARDEC project engineer Shaaban Abdalla, TARDEC engineers will use it for demonstration purposes and to evaluate the system's performance in collision-avoidance tests.

"A major reason why we are interested in a collision-avoidance system for manned vehicles is to cut down on the frequent number of front collisions that occur because of bad weather such as snow, rain and dust, and when backing up to loading docks—particularly at night," said Abdalla.

In the second project, scheduled to begin next December, the Pittsburg-based RedZone Robotics Company will install



A robotic HMMWV equipped with the collision-avoidance system.

the Delco system in an unmanned HMMWV. Then, using a manned HMMWV as a lead vehicle, RedZone will test the system's ability to follow the lead vehicle and maintain a safe distance in a robotic convoy. Abdalla said if the tests are successful, it is hoped that it will someday be possible to use one manned vehicle to lead up to 10 robots.

"There would be a logistical advantage in being able to do this," Abdalla explained. "If you needed to transport large numbers of vehicles and supplies to some remote location, you could do it with fewer operators."

Abdalla said that in an upcoming research project planned for next year, TARDEC will be looking into a potential commercial application of collision-avoidance systems for the U.S. Department of Transportation. Known as the vehicle headway control, it would involve programming collision-avoidance systems to maintain a close spacing—perhaps as little as one to three meters—between moving vehicles to increase traffic flow and improve safety. The TARDEC goal in this effort will be to achieve a headway distance between vehicles of 10 meters or less.

The preceding article was written by George Taylor, a technical writer in the Marketing Office of the U.S. Army Tank-Automotive Research, Development and Engineering Center.

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—*Independent Research and Development (IR&D) Database* contains descriptions of technical program data, proprietary to federal government contractors that furnish it. Access is limited to DOD personnel and to other federal agencies with the approval of DOD. Online access to this proprietary data can only be accommodated through the use of a classified (either STU III or dedicated) terminal.

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TARDEC and MWBL Seek Under-Armor Auxiliary Power for M1

Army engineers are investigating the feasibility of an under-armor auxiliary power unit (UAAPU) for M1A1 and M1A2 tanks that could provide electric power for on-board equipment without running the main engine.

A UAAPU would eliminate the possibility of an enemy discovering a tank on a battlefield silent watch. The UAAPU is expected to be quieter and generate less heat than the 1500-horsepower main engine.

M1-series tanks, which were introduced during the early 1980s, use six 12-volt lead-acid batteries. The battery pack was sized to start the engine at temperature extremes and operate the vehicle on-board systems for 60 minutes at a time without a charge—the minimum silent watch time requirement for an M1. But this equipment has grown more sophisticated over the years with the arrival of the M1A1 and M1A2. As a result, its power requirements have escalated dramatically, making more frequent and attentive maintenance necessary to prevent the batteries from discharging below the level needed to start the main engine.

The Army is now buying 1,500 two-kilowatt, diesel-driven external auxiliary power units for installation in M1A1 tanks that will offer some relief to the power generation system. The unit is designed to support itself, having its own battery, electric starter, fuel tank and electronic control system. It also includes a cold-starting system that will start the engine at temperatures as low as 20 degrees below zero F. The unit will be mounted in the turret bustle, the area where M1 crew members stow their gear.

Though this APU will extend the silent watch capability somewhat, it does not include a bleed-air capability that is required to operate the M1's NBC (nuclear, biological and chemical) protection system. This system includes blowers and filters that continuously supply dry, filtered air to the crew members' masks and protective suits. It also pumps clean air to the vehicle crew compartment at a pressure slightly greater than that of the atmosphere to prevent contaminated air from entering through cracks around doors and ports.

Searching for an alternative electric-power source, the U.S. Army Tank-Automotive Research, Development and Engineering Center (TARDEC), Warren, MI, and Fort Knox, KY, will soon begin evaluation of four UAAPUs at their Mounted Warfighting Battlespace Laboratory (MWBL). The units each consist of an engine-driven 10-kilowatt generator.

Three of the UAAPUs are powered by gas turbine engines. They were developed by Allied Signal Aerospace Systems and Equipment of Torrance, CA; the San Diego-based Sundstrand Aerospace in a joint venture with MAK, a German company; and Tiernay Turbines of Phoenix. The other system uses a single-rotor (Wankel) engine and is made by AAI Corporation of Hunt Valley, MD.

According to TARDEC project engineers Theodore E. Vician and Milad H. Mekari, and PM, Abram's Karen A. Milanov, a prototype UAAPU from each company was installed in an M1A1 tank at Fort Knox and took part in a technology demonstration there. The demonstration will involve troops from the 16th Cavalry Regiment, who used the vehicles in normal training exercises and kept records on all maintenance, repairs and fuel consumption throughout the period.

"We weren't trying to run any full-blown scientific tests with these systems," said Vician. "We were just tinkering with the idea to see if there are any integration problems. Hopefully, this will allow us to learn enough to get a better feel for what we really want and eventually lead to development of a UAAPU for the M1."

The Allied Signal, Tiernay Turbines and AAI UAAPUs will be located in the area currently occupied by five of the six lead-acid batteries used in the standard M1. The remaining battery will be replaced by a compact nickel-cadmium battery that will provide power to start the APU engine, as well as the main engine.

The Sundstrand-MAK unit, whose dimensions would not permit installation in the battery compartment, will be located in the space currently occupied by the left sponson fuel cell. Like the other three units, it will also use a nickel-cadmium battery. Fuel for all four UAAPU engines will come from the vehicle's main fuel supply.

As this issue of *Army RD&A Bulletin* was sent to press, engineers were evaluating the results of the technology demonstration. Milanov said that if a UAAPU proves to be feasible in the upcoming demonstration, the next step will be for Fort Knox to get a firm requirement established so that funding can be identified for PM, Abrams to initiate a full-scale development effort.

Mekari talked about other important benefits a UAAPU would offer in addition to making the enemy detection of a tank on silent watch more difficult. He said among these would be a vastly extended silent watch capability that would be limited only by the M1's fuel supply. Moreover, he said it would result in significantly lower operating costs.

The preceding article was written by George Taylor, a technical writer for the U.S. Army Tank-Automotive Command.

Army Research Laboratory Breaks Ground For New Facility

The Army Research Laboratory broke ground earlier this year for a new $80 million materials laboratory at Aberdeen Proving Ground.

The state-of-the-art facility will contain 290,644 square feet and will include research and technology laboratories, special purpose space, and office space.

The building will house approximately 200 positions, primarily scientists and engineers, now at ARL's Materials Directorate in Watertown, MA, and Fort Belvoir, VA. The Watertown facility is being closed under the 1988 Base Realignment and Closure Act.

The Materials Directorate is the lead Army organization for materials research and development. Included in this category of materials are metals, polymers, specialty organic materials, composite materials and high performance ceramics.

The Army Corps of Engineers, Baltimore District, will oversee the construction. The new facility is scheduled for completion in May 1997.

Improved Battery Technology May Ease Army Maintenance Burden

An advanced battery technology may someday lead to a lead-acid battery for combat and medium and heavy tactical vehicles that needs no water and requires no maintenance.

That is the opinion of researchers at the U.S. Army Tank-Automotive Research, Development and Engineering Center (TARDEC), Warren, MI, who will soon evaluate promising battery concepts stemming from this technology.

The Army now uses a low-maintenance battery known as the 6TL. Introduced to troops during the late 1980s, the 6TL incorporates similar design features used in commercial maintenance-free batteries that have been in use in many vehicles since the mid-1970s.

The key feature of maintenance-free batteries and the military 6TL battery is their capability to minimize gassing when being charged. In the commercial design, this is done by using plates made with an alloy of lead and calcium instead of the lead-antimony combination previously in use, whereas the 6TL uses lead plates containing a much lower percentage of antimony than older battery designs.

These alloys enable the batteries to tolerate elevated ambient temperatures and overcharging that is often the result of a faulty voltage regulator. Overcharging can lead to premature failure by causing a battery's internal temperature to become excessively high. Prolonged high temperatures cause depletion of water through evaporation and eventually result in plate damage due to sulfation.

The capability to tolerate overcharging results in a lower internal battery temperature. Thus, the loss of water from evaporation that is characteristic of earlier battery designs is reduced sharply, along with the need to add water periodically.

Although the current 6TL battery represents a significant improvement over its predecessor, the 6TN, most of the Army's battery problems continue to be the result of battery sulfation due to several factors. According to TARDEC's Applied Engineering Division Chief John Bush, one of these is inadequate field maintenance. He said that even with low-maintenance batteries, the harsh conditions of a military environment still make it necessary for crews to ensure that the water levels are sufficient to preclude plate damage. "This is especially true in high temperatures like those we experienced in Desert Storm. But equipment maintenance procedures do not require the crews to do this enough, and we are getting a lot of premature battery failures," Bush added.

In hopes of solving the problem, TARDEC engineers plan to look at alternative lead-acid batteries that need no operator maintenance and do not use the traditional liquid electrolyte. One such battery is manufactured by Sonnenschein Batteries Inc., in Germany, in accordance with the NATO standard for the 6TL. It uses lead-calcium plates and a gel electrolyte that is permanently sealed in the battery and requires no maintenance.

This battery has been used in military vehicles overseas for several years, and users there have reported that it lasts longer than conventional batteries. But the Army has not adopted it for use here. One reason for this is that it costs about twice as much as its standard counterpart.

Also, like most conventional commercial lead-acid batteries, the gel battery has a limited shelf life, because the electrolyte is installed at the time of manufacture, which activates the battery. Each day that an activated lead-acid storage battery is idle, it loses a small percentage of its charge. And, if not charged by a generator or battery charger, it eventually loses most of its power. (Because its electrolyte is in a gel state, the shelf life of the gel battery is better than "flooded" commercial lead-acid batteries.)

The Army's low-maintenance battery is dry-charged. This means it is charged without electrolyte and hermetically sealed dry and is therefore capable of indefinite storage.

The battery and electrolyte are shipped in separate containers. To activate the battery, the field soldier removes a plug from each cell, breaks the seal, pours in the electrolyte and gives the battery an initial charge.

"We use dry-charged batteries because the Army has to keep large quantities on hand to maintain a state of readiness," Bush explained. "If we stored sealed, active batteries, their distribution would have to be intensively managed to see that those in storage the longest would be the first to go in vehicles."

Bush asserted that despite their high cost and limited shelf life, the Army may now be ready to adopt non-liquid electrolyte batteries because of significant advantages they would offer over current batteries. He said the most important of these is that they would require no maintenance, which should extend battery life. "Unlike the so-called maintenance-free batteries, which in reality do sometimes need water added, especially if they are operating in a hot environment, a sealed battery with a non-liquid electrolyte is expected to have better performance," Bush said.

He added that a non-liquid electrolyte battery would also have logistical benefits. For one thing, he said that shipping batteries and electrolyte in a single container would always ensure that both arrive at their destination together instead of days or weeks apart, as sometimes happens with 6TL batteries. Also, he said elimination of one container per battery would mean a reduction in the cost of stocking batteries as well as the amount of floor space needed to store them.

According to Bush, TARDEC is now conducting a market survey of battery manufacturers to determine those having expertise in non-liquid electrolyte technology and if they would be interested in supplying batteries for the Army.

When producers are located, Bush said TARDEC will buy and test representative samples of each company's batteries. He added that if any are found to meet or exceed the military battery standards, it will then be up to the Army to decide whether to adopt them.

The preceding article was written by George Taylor, a technical writer in the Marketing Office of the U.S. Army Tank-Automotive Research, Development and Engineering Center.

Network Monitoring, Management and Simulation

Local Area Network (LANs) have grown in size and complexity faster than our ability to understand them. An overloaded network, an intermittently operating network and/or an improperly specified network is no longer a nuisance—it is a critically threatening loss of time and resources. Automated tools to aid the network management process abound, but are often very expensive and many organizations cannot afford them.

The Texas A&M Computer Simulation Research group has profiled several low-cost or no-cost network management tools that are currently available at various locations on the Internet. We collected and ran tools developed by different U.S., Dutch, Canadian and Australian universities. While not as polished and full-featured as the commercial products, some freeware/shareware programs are viable alternatives for resource-strapped organizations. For an electronic format catalog detailing the performance and capabilities of the tools listed in this article send e-mail to drew@cs.tamu.edu; regrettably, hard copies of this document are currently unavailable.

Network management by trial and error, damage control or other ad hoc methods are risky. Using ad hoc methods, it is almost impossible to determine the actual performance of contemplated network extensions, upgrades, or other network modifications prior to purchase. There are three methods for obtaining predictive data about networks: analytical modeling, monitoring/measurement and simulation. In practice, for non-trivial networks, simulation is often the only forecasting method available.

Monitoring/Measurement

Intuitively, the best way to check the operation and performance of a network is to connect it, run it and measure the results. There are three major drawbacks to this approach:

- This is not predictive, this is trying out changes/new products after the fact.
- Experimenting on an operational network is very risky.
- Meaningful measurement efforts must be made over time and will produce very large amounts of data to be interpreted.

Network monitoring provides the measurements that ultimately validate the performance of a network. However, the monitoring process is neither easy nor inexpensive and requires the desired configuration to be already installed and operational.

Network Simulation

Many of the networks that managers want to study are already constructed and in use. Through the use of network simulation, changes and modifications to existing networks can be tested for performance and cost effectiveness before they are implemented. This can save money by reducing unnecessary modifications and limiting down time.

In order to create an accurate network model, the performance of the existing network must be understood. Thus network monitoring may be used for determining the inputs for the network simulation. Besides cost, an additional limitation of commercial tools is that commercial vendors are unlikely to provide their source code so users can do a detailed validation of their simulation.

Simulation Validation

Network simulation is a tool to eliminate much of the uncertainty involved in LAN planning and management. However, unvalidated simulations may produce subtly erroneous data. Since simulation is the only tool that is readily scaled to handle large networks, validating a large network simulation is not easy. We recommend individually monitoring manageable parts of the network and using that data as input to validate your simulator. If the "did hit" and the "should hit" data check out, then the simulator can be used to forecast topology/equipment changes and upgrades with some confidence.

Analytical Modeling

Obtaining operationally useful information requires a detailed mathematical analysis. For all but the very simplest network configurations, it is usually safe to assume there is no solvable, analytical model which will provide useful predictive data. A great deal of analytical modeling work has been done in the research community and this work is ongoing. However, the state of the art is not at a point where it is usable in most industrial organizations. From a pragmatic point of view, most system administrators will take little solace in telling their superiors that the network is "down" even though it can be mathematically proven that the failure shouldn't have happened.

Summary

Our preferred methodology is to first measure small parts of a network and then use the resulting data to validate a basic simulation. The basic simulation is then scaled up to a full-size high-fidelity simulation of the entire network.

The Army no longer has the resources to discard old LANs. Rather, it is more likely that existing LANs will be extended and upgraded. Existing homogeneous LANs will become heterogeneous LANs. Taking a disciplined approach to LAN management through monitoring and simulation will enhance the understanding of the LAN. Most importantly, thorough study can minimize the considerable risks involved in purchasing new networks and upgrading/modifying existing networks.

For Further Information

The objective of the Texas A&M Computer Simulation Research Group is to develop an integrated set of tools that will support data collection, network topology building, network simulation, network traffic simulation, reliability analysis, and analytical modeling. The group members are MAJ Drew Hamilton, Gary Ratterree, CPT Paul Brutch, Anish S. Karmarkar, Shridhar R. Muppidi, Chris K. Cunningham, Eric Fisch, and Dr. Udo W. Pooch.

If you are interested in further information on this project, send e-mail to: drew@cs.tamu.edu or call MAJ Drew Hamilton at (409)845-9383.

New Software Provides Clearer View of Battlefield

Tactical Army commanders will now have an unprecedented ability to display and exploit knowledge of the digitized battlefield environment. A recently completed demonstration of a new software system called AirLand Battlefield Environment (ALBE) allowed soldiers in Germany to evaluate the impact of terrain and weather on various military functions—such as planning, command and control, and logistics.

When combined with digital maps or reconnaissance imagery, the new software allows visualization of the battlefield in 3-D perspective, plan avenues of approach, identify limitations to mobility, find likely minefield sites and perform many other functions critical to combat operations.

ALBE is the result of an Army R&D program managed by the U.S. Army Corps of Engineers. Three Corps labs and an Army Materiel Command lab combined their resources to develop, test and evaluate the software system. According to Walt Boge, director of the Corps' Topographic Engineering Center (TEC), "the ALBE program is a major breakthrough in the ability to quickly visualize and understand the complex battlefield environment, and generate rapid and accurate analyses to support tactical planning and maneuver operations."

The ALBE program uses state-of-the-art technology to determine the interactions of soil, slope, vegetation and weather to supply virtually all terrain-related data a commander needs. The program began in 1986 to demonstrate prototype software developed by several R&D laboratories. The software was converted to a common computer platform and subsequently troop tested. Early versions of ALBE were evaluated at the High-Technology Test Bed at Fort Lewis, WA, and tested during exercises in Germany and Korea.

A combination of mapping data from the Defense Mapping Agency, current information from imagery and prototype decision aid software was run on commercial, ruggedized computer work stations. The result was invaluable to the command being supported. The concept proved even more beneficial when advance versions were provided to U.S. forces during Operations Desert Shield and Desert Storm. There are more than 70 ALBE decision aids, grouped into 13 categories. These categories include ground mobility, maneuver control, terrain factors, weapon system performance, visibility and weather effects.

As a result of its latest successful test in Germany, the ALBE software was approved to be issued to troop units by the U.S. Army Engineer School. Ten terrain teams in Germany recently received ALBE software for their computers, and were trained by personnel from TEC. Additionally, the final version of ALBE software has been delivered to elements in Korea and the United States.

When the field deployable Digital Topographic Support System (DTSS), developed by TEC, is fielded later this year, it will include many ALBE software functions. Additional ALBE functions will be added by way of the DTSS pre-planned product improvement (P3I) program. In the interim, ALBE software, resident on commercial personal computers, will be available to Army terrain teams.

In the near future, some key ALBE evaluation capabilities will be available to users of the Army Tactical Command and Control System with the Terrain Evaluation Module. Also, several government civil agencies already are using ALBE software in support of a wide range of terrain analysis programs.

The ALBE software was developed by the Army Research Laboratory, Battlefield Environment Directorate, White Sands Missile Range, NM; U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH; U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS; and TEC, Alexandria, VA, which also provided all the program management.

According to Boge, "This software will provide our terrain units with a tremendous increase in their ability to support the tactical commander." He also emphasized that the ALBE program was, "a truly successful team effort."

Quantum Well Infrared Photodetectors

Someday soon, medical doctors may be able to more accurately diagnose healing of injuries and monitor progress of badly burned patients by taking a high resolution thermograph of the injured body.

This medical procedure may become a common practice due to the breakthrough research in quantum well infrared photodetectors conducted by Dr. K.K. Choi, an electronics engineer at the Army Research Laboratory's Electronics and Power Sources Directorate (EPSD), Fort Monmouth, NJ.

Current infrared sensor technology uses a chemical compound containing mercury cadmium and tellurium (HgCdTe). However, it is expensive and is difficult to achieve high resolution thermal imagery. Choi recognized the need for the technology to be improved; to be sensitive at extreme distances to fast moving objects, such as missiles and other air-to-air combat weapons; and to be radiation hard.

Since 1987, Choi has been researching and optimizing the technology for an improved infrared detector design. He brought the project with him to the Electronics Technology and Devices Laboratory (now EPSD), and has been refining his research there.

Choi has optimized the material so that the technology is radiation hard and can detect more than one wavelength, simultaneously allowing the users to customize the color spectrum to their needs. His basic theory and detector designs have been demonstrated in high resolution infrared imagery in the 10 micron range by defense industries.

"This technology is just at the beginning stage. We see a lot of promising future possibilities," Choi said. "The Improved technology will benefit military and civilian applications such as the FAA (Federal Aviation Administration)/Air Safety, Search and Rescue and the earth observing system that monitors (via satellite) the earth's resources, global warming and pollution."

He recently has been working cooperatively with AT&T Bell Labs, NJ; NASA Headquarters, Washington, DC; and the NASA Jet Propulsion Laboratory, Pasadena, CA, to design and demonstrate a better detector for military weapon systems and

satellite applications for NASA and others.

The new technology can also be developed for other purposes. For example, according to Choi, the oil industry can monitor oil pipe lines to check for cracks and leaks using the same technology and process of temperature gauging used by medical doctors.

Choi presented a paper on the improved technology recently at the 1994 Army Science Conference in Orlando, FL.

Radiological Assistance Team Ready to Help Commanders

The Cold War may be over, but for U.S. military commanders, there is a new and equally challenging problem—how to cut America's massive war machine in an environmentally safe and responsible manner.

The good news for military commanders is that they do not have to face this awesome challenge alone. Seneca Army Depot Activity in upstate New York has a trained and experienced Radiological Assistance Team, or RAT, that will deploy quickly to assess sites for contamination and clean the sites, if necessary.

Seneca developed its in-house capability over three decades beginning in the early 1960s. During that period, Seneca had a requirement to be nuclear capable. Consequently, the installation developed an extensive in-house program to respond to nuclear accidents and incidents. Moving into the 1990s with the military "downsizing" initiative, the Army had an increased need to assess and decontaminate equipment, machinery, and facilities. Specifically, the U.S. Army Materiel Command, Alexandria, VA, and the U.S. Army Armament, Munitions and Chemical Command, Rock Island, IL, had a requirement to provide on-site assistance and audits at subordinate installations. Today, Seneca offers this expertise to those military commanders facing this task.

Seneca's RAT has more than 40 trained members and is well-equipped with the essential protective gear and highly specialized and technical instruments designed to detect and clean radiological contamination. Team members continuously participate in on-going training to ensure their competency in responding to the military's needs.

One of the key features of the Seneca RAT program is the ability to respond quickly to the customers' needs at a set fee. The team has blanket travel orders, enabling rapid deployment. Seneca can also quote a firm price that will not change because of contract modifications—typical when work such as this is not done in-house.

Although Seneca has had this capability for many years, it only recently began offering the on-site service to other customers.

Multi-Faith Meals And Humanitarian Aid

From the long famous military cuisine, the meal-ready-to-eat (MRE), comes two new spin-offs: the multi-faith meal (MFM) and the humanitarian daily ration (HDR).

Every effort is made to ensure that the foods found in the MRE reflect the preferences and tastes of the members of the Armed Forces. A tasty meal encourages consumption which can contribute to proper nutrition. Changes and improvements are made on a yearly basis through field testing and incorporating new foods which replace less popular items.

In an effort to increase the acceptability of the MRE, the military is addressing some of the religious dietary restrictions of those serving in the armed forces. For example, the newly-developed MFM follows kosher and hallal restrictions and is compatible with existing MRE components.

Six new MFMs, some of which are vegetarian, were field tested during September and October of 1993. Although the data is still being analyzed, initial information indicates that the new rations were well-received. Pending Department of Defense approval, one or two MFMs will be included in each case of MRE rations.

HDRs are another necessary outgrowth of the MRE. During the last three years the MRE has served as a humanitarian aid ration in various crisis situations around the world. Although the MRE has performed well, it is not designed to be universally acceptable, culturally correct or intended for malnourished populations. In addition, the MRE contains non-food items essential to maintain the quality of life for members of the armed service, but not essential to prevent starvation (i.e. flameless ration heaters, toilet paper, etc).

The secretary of Defense for humanitarian and refugee affairs requested that the Defense Logistics Agency (DLA) develop a more cost effective, universally acceptable humanitarian ration now known as the HDR. In terms of the menu itself, 44 percent of the original MRE food products are still used. Because of the use of some MRE components in this ration, Natick-developed specifications were followed as part of the design effort. Right Away Foods Corporation of McAllen, TX, is the primary contractor. The HDRs require no special preparation before eating and can be delivered by airdrop.

There are currently six HDR menus available containing an average of 1,138 calories. All of the meals are vegetarian and will sustain a person for one day. HDRs are specifically designed for malnourished people since the foods contained in the MRE are too "rich" for these populations. Often, after an individual has been malnourished for a substantial period of time their digestive system is unable handle a more substantial meal, thus the MRE might cause adverse reactions. The HDR costs $3.95 and meets World Health Organization nutritional standards.

Awareness of cultural diversity has lead to the development of the MFM and concern for global humanitarian efforts has lead to the development of a more cost effective, universally acceptable humanitarian ration, the HDR.

RD&A NEWS BRIEFS

Army Harnessing the Power Of the Information Age

Secretary of the Army Togo D. West Jr. and GEN Gordon R. Sullivan, chief of staff of the Army, have announced the formation of the Digitization Special Task Force designed to harness the power of the information age.

"As we reshape America's Army to fight and win our nation's wars today, tomorrow, and the day after tomorrow, we must stay at the cutting edge of our profession. In the defense of America, second place is second best. The Digitization Special Task Force will keep us the best army in the world. It's that important to the future of America's Army," said Sullivan.

The Digitization Special Task Force will be headed by BG Joseph E. Oder, director of the Requirements Horizontal Technology Integration Office. It will be composed of doctrinal experts from the Army's Battle Labs, and procurement experts from the Army Materiel Command.

Creation of the Digitization Special Task Force is the first step towards harnessing the "information power" America's Army will need to win decisive victories in the 21st century. Another Army project, the Louisiana Maneuvers, uses interactive simulations, state-of-the-art computers and high speed data links to test new ideas and methods, like digitization. Battle Labs, a third resource, are Army research laboratories that focus less of theory and more on practical applications. Battle Labs tests so far indicate that digitization can enhance every aspect of fighting and sustaining Army forces in the 21st century.

Digitization will bring together "cutting edge" expertise and technology in simulation, communications and analysis. It will combine the technologies to develop systems to automate tactical reporting and improve the Army's acquisition and surveillance capabilities. For example, future tanks may be equipped with a display that shows all of the friendly and enemy vehicles in their area on the battlefield.

The Army is studying technologies currently in use in American businesses, industry, local government, and educational institutions, and applying those technologies to the Army's unique requirements.

Conversely, America as a whole benefits from Army research in this area. The entertainment industry uses motion-based, computer-driven theme rides, and city planners and law enforcement personnel rely on simulation training programs which grew out of military research into computer image generation and high fidelity cockpit representations. The educational community is also experimenting with concepts developed through Army distributed interactive simulation technology to create interactive electronic classrooms where geographically dispersed teachers and students can share knowledge.

CONFERENCES

Army Holds Operations Research Symposium

The 33rd Annual U.S. Army Operations Research Symposium (AORS XXXIII) will be will be held Nov. 7-9, 1994, at Fort Lee, VA. Registration will be held the evening of Nov. 7. Approximately 250 government, academic and industrial leaders are expected to participate.

This year's theme is "Analytical Relevance through Change." The symposium will provide a forum for the exchange of information and experiences on significant analyses recently completed or on-going. This year, AORS will provide the stage on which Army analysts may share what they are doing to meet the new challenges surrounding streamlining of government, continued downsizing and shrinkage of the defense budget, the ever-changing world situation, and the impact of information technology.

Attendance will be limited to invited observers and participants. Papers are being solicited which address the theme of the symposium. Selected papers and presentations will be published in the proceedings.

The U.S. Army TRADOC Analysis Center, White Sands Missile Range (TRAC-WSMR), directed by Roy F. Reynolds, is responsible for the overall planning and conduct of AORS XXXIII. For the 21st consecutive year, the U.S. Army Combined Arms Support Command and Fort Lee, commanded by LTG Samuel N. Wakefield, and the U.S. Army Logistics Management College, commanded by COL Richard E. Cadorette, will serve as co-hosts.

Inquiries pertaining to the symposium should be addressed to: Director, U.S. Army TRADOC Analysis Center, White Sands Missile Range, ATTN: ATRC-WSM, White Sands Missile Range, NM, 88002-5502. Inquires can also be made by phone to Debra Sawyer, DSN 258-3493 or commercial (505) 678-3493.

CCM to Hold 20th Anniversary Research Symposium

The University of Delaware's Center for Composite Materials will hold its Twentieth Anniversary Research Symposium Sept. 20-22, 1994, in conjunction with the American Society for Composites Ninth Technical Conference. The theme of this joint conference is "Composites Science and Technology for the 21st Century." For more information, call the center at (302) 831-8149.

Reengineering the Corporation: A Manifesto for Business Revolution

By Michael Hammer and James Champy
First Edition, Harper Collins Publishers Inc., New York, NY

Reviewed by CPT (P) Thomas B. Gilbert, an Army Acquisition Corps officer assigned to the Directorate of Combat Developments, U.S. Army Signal Center, Fort Gordon, GA. He is a frequent contributor to *Army RD&A Bulletin*.

At the strategic level, the rush for "reengineering" business and government has attained a following concomitant with the early days of Total Quality Management. This book provides a clear and concise perspective of the reengineering process and has justifiably been on the best seller list for a long time. It provides an articulate depiction of the processes and parameters involved in reengineering through definition and example. It will help the government manager to better understand and follow Vice President Gore's ongoing crusade to reengineer the government. Some of the reengineering principles will be outlined below.

The essence of reengineering keys on starting over. As the authors elaborate:

> *"It [reengineering] doesn't mean tinkering with what already exists or making incremental changes that leave basic structures intact. It isn't about making patchwork fixes - jury-rigging existing systems so that they work better. It does mean abandoning long-established procedures and looking afresh at the work required to create a company's product or service and deliver value to the customer. It means asking this question: 'If I were recreating this company today, given what I know and given the current technology, what would it look like?' Reengineering a company means tossing aside old systems and starting over. It involves going back to the beginning and inventing a better way of doing work."*

As you can see, reengineering requires a complete paradigm shift throughout the entire organization culture and especially among higher levels of management. Reengineering, an inherently dichotomous term, was defined by the authors as "...the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, cost, quality, service, and speed." The key words in this definition of reengineering are fundamental, radical, dramatic, and processes.

- **Fundamental.** The organization must identify the true nature of its existence. Questions need to be asked to determine why the organization is in business, definition of the product and customers, and why organizational processes exist.
- **Radical.** In this context, radical redesign entails determining the business root of the organization, discarding former structures and procedures, and basically starting over.
- **Dramatic.** The authors emphasize that reengineering an organization is not needed for minor adjustments. It is needed only when an order-of-magnitude change is warranted. However, when reengineering is warranted, it must be of significantly dramatic scope to achieve the most success.
- **Processes.** Management science has long advocated the systematic fragmentation of processes into manageable tasks, reduced to the most basic component, and assigned to specialized employees. Those of us working for the government or large companies have experience with this type of organization. Unfortunately, over-specialization has built-in inefficiencies. Reengineering suggests that a generalist working across functional boundaries may, in fact, be dramatically more efficient, motivated, and customer oriented. As an example, think about the success you may have had when you "hand carried" a document or action item *through* the process, *across* functional boundaries, and *accomplished the objective* in rapid fashion. Why can't the process be structured to achieve that level of success in the first place?

This book is a welcome contribution in the ongoing effort to understand the "reengineering" craze. As a parting shot, the authors provide the following warning that applies just as easily to government. (See accompanying figure.)

WHY COMPANIES FAIL AT REENGINEERING

1. Try to fix a process instead of changing it.
2. Don't focus on business processes.
3. Ignore everything except process redesign.
4. Neglect people's values and beliefs.
5. Be willing to settle for minor results.
6. Quit too early.
7. Place minor constraints on the definition of the problem and the scope of the engineering effort.
8. Allow existing corporate cultures and management attitudes to prevent reengineering from getting started.
9. Try to make reengineering happen from the bottom up.
10. Assign someone else who doesn't understand reengineering to lead the effort.
11. Skimp on the resources devoted to reengineering.
12. Bury reengineering in the middle of the corporate agenda.
13. Dissipate energy across a great many reengineering projects.
14. Attempt to reengineer when the CEO [Chief Executive Officer] is two years from retirement.
15. Fail to distinguish reengineering from other business improvement programs.
16. Concentrate exclusively on design.
17. Try to make reengineering happen without making anybody unhappy.
18. Pull back when people resist making reengineering changes.
19. Drag the effort out.

Decker Assumes Duties As Assistant Secretary for RDA

Gilbert F. Decker has assumed duties as the assistant secretary of the Army (research, development and acquisition) and Army acquisition executive.

From 1966 to 1982, Decker was employed by ESL Incorporated, rising to the presidency of that firm in 1977. Since then, he has headed the New Ventures Department of TRW, served as president and chief executive officer (CEO) of Penn Central Federal Systems Company, was president and CEO of Acurex Corporation, and served as president and CEO of Xeruca Holdings. He was also chairman of the Army Science Board from 1987 to 1989.

Decker graduated from Johns Hopkins University in 1958, with a degree in electrical engineering and a commission in the Army as an Armor lieutenant. Subsequently, he attended flight school and served on active duty as an Army aviator until 1964. Upon leaving the service, Decker attended Stanford University, earning a Master of Science degree in operations research in 1966. He retained his commission and remained active in the Army Reserve until 1988, when he retired as a colonel.

Oscar Becomes Army Acquisition Advocate

Dr. Kenneth J. Oscar has assumed new duties as the Army non-developmental item advocate and Army Materiel Command (AMC) principal deputy for acquisition, succeeding Darold Griffin, who retired. Oscar comes to AMC from the U.S. Army Tank-Automotive Command (TACOM), where he served as deputy commander for research, development and engineering, and director of the Tank-Automotive Research, Development and Engineering Center.

Oscar's earlier assignments also include assistant deputy chief of staff for development, engineering and acquisition at HQ AMC; associate technical director for research and development at the U.S. Army Troop Support Command; and director of the Combat Engineering Laboratory at the Belvoir Research and Development Center.

Oscar holds a B.S. in physics from Clarkson University, and M.S. and Ph.D. degrees in physics from American University. He is a member of numerous professional societies, including the New York and Virginia Academies of Sciences. He has published more than 30 papers, many in international scientific journals.

His awards include the Presidential Rank Award, the Meritorious Civilian Service Award, two Commander's Awards for Civilian Service, the Superior Civilian Service Award, the Achievement Medal for Civilian Service, and Sigma Xi's Scientific Achievement Award.

Zajtchuk Takes Over As USAMRDALC Commander

BG Russ Zajtchuk, MC, has assumed command of the U.S. Army Medical Research, Development, Acquisition and Logistics Command, Fort Detrick, MD. Zajtchuk comes to USAMRDALC from the Office of the Surgeon General, where he has served as chief of professional services and director of Task Force Aesculapius. He will retain those two titles in addition to his new position.

Backed by 24 years of service, Zajtchuk has also served as commander of Brooke Army Medical Center and deputy commander of the Walter Reed Army Medical Center.

A cardio-thoracic surgeon, Zajtchuk completed his medical degree, internship, and general surgery and cardiothoracic residencies at the University of Chicago. He is also a graduate of the Army Medical Department Officer Basic and Advanced Courses, the Army-Baylor University Program in Health Care Administration, the Army Command and General Staff College, and the Industrial College of the Armed Forces.

Zajtchuk's military awards and decorations include the Department of Defense (DOD) Superior Service Medal, the Legion of Merit with four Oak Leaf Clusters, the Bronze Star, the DOD Meritorious Service Medal, the DOD Commendation Medal, the Army Commendation Medal, the Army Achievement Medal, the Humanitarian Assistance Medal, and the "A" Proficiency Designator for Outstanding Performance in Cardiothoracic Surgery.

Zajtchuk is a member of the American College of Surgeons, the American College of Cardiology, the Society of Thoracic Surgeons, the American Association for Thoracic Surgery, and the Association of Military Surgeons of the United States.

ARMY

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RD&A BULLETIN

WRITER'S GUIDELINES

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