

ARMY



RD&A

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INNOVATIVE ACQUISITION STRATEGIES

DEUCE Government/Industry
Partnering

PACER Acquisition Initiatives

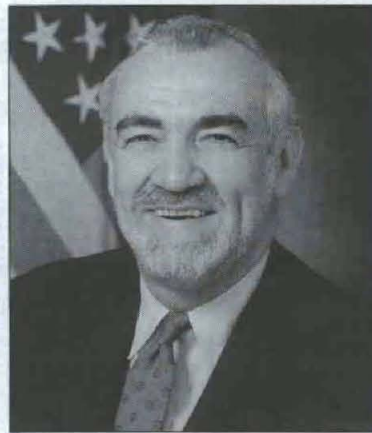
Streamlining The Source Selection
Process

Comanche Teaming Efforts

Eyesafe Laser Rangefinder

From The Army Acquisition Executive ...

ACQUISITION REFORM SUCCESSSES



The Army is well out in front in implementing and institutionalizing a number of specific acquisition reform measures, and I am happy to report that we are beginning to realize significant savings. We now have enough specific program evidence to see the results of our efforts, and conclude that if these measures continue and acquisition reform moves from a reform to continuous process improvement, we will see enormous savings and efficiencies in the future.

Let me highlight a few successes. We conducted an intense cost reduction study before entering production on the Javelin Antitank Weapon System, the revolutionary, highly lethal system to significantly enhance the survivability of our soldiers and Marines on the battlefield. We used streamlining methods such as the elimination of military specifications, allowed commercial procurement of parts and components, and allowed different approaches to production methods and quality control. We used an Integrated Process Team, which included representatives of our program management office, engineers from the U.S. Army Missile Command at Huntsville, AL, our contractors, and the end user, who was represented by the infantry school. The net result was a reduction in the overall procurement years from 14 to 11, and a savings of \$1.4 billion. We have already taken those dollars out of the future reprogram budget and applied them elsewhere.

We did a similar study on the Longbow Hellfire missile, a millimeter wave seeker missile that is very sophisticated and will significantly enhance the combat power of our Apache helicopter fleet. Similar results were obtained. The production buy was reduced from 10 to eight years at a savings of well over \$850 million. Now, these studies were done after the missiles had completed their operational testing, and the savings will yield more than 20 percent based on what we had originally budgeted. Therefore, I am confident had we employed these disciplines at the outset of development, we would have seen even bigger savings.

With the Comanche armed reconnaissance helicopter program, our goal is to retain full capabilities and to achieve several hundred million dollars of cost savings and avoidance. The program applies commercial approaches where practical, and uses simulation to the maximum. For example, the same virtual engineering approach with computer aided design/manufacturing techniques used by Boeing on the new 777 commercial airliner, were used to design the Comanche armed reconnaissance helicopter and to test very early the flight dynamics and aviation software packages. Comanche incorporated the commercial aviation technique of "test and use" prototyping, replacing the highly expensive practice of developing "throw away" models. In many applications, plastic encapsulated microcircuit (PEMs) technology can replace ceramic encapsulated microcir-

uits, defined by obsolete military specifications and standards. Our contractor estimates that using PEMs will result in a savings of at least \$150,000 per airframe.

The Comanche development program is an example of shortening the overall acquisition life cycle by melding the Demonstration/Validation phase and the Engineering and Manufacturing Development phase together due to the significant overlap of engineering activities. This *may* signal the application of such a concept to other developmental programs throughout the Department of Defense (DOD), thus saving the time, energy, and expense devoted to a separate milestone review.

Acquisition reform is critical to our modernization programs. Within the last 18 months, two significant activity-based costing studies were completed of defense contractor operations, one by Peat Marwick and another by Coopers and Lybrand. The studies identified the activity cost drivers for defense companies compared to commercial companies. The net result was that the cost premium for defense-unique procedures ranged from 20 to 40 percent of the price depending on the particular product area involved.

We have got to save some portion, if not all, of these costs by eliminating superfluous, non-value added processes. That is what acquisition reform is all about. While we probably cannot save the full 40 percent because there may be a few defense-unique procedures we cannot eliminate, we must save at least 20 percent.

A highly important and valuable benefit to acquisition reform is not just measured in dollars. By making it easy to get at commercially developed technology and products and eliminating the barriers to using them in our systems, we can acquire the latest in technology. This is critical because technology in the commercial sector, particularly in all facets of information and communication technology, far outstrips defense-unique technology.

Acquisition efforts to really succeed and create bottomline payoffs need to be a complete team effort. At the Federal level, there has to be teamwork between the Executive and Legislative branches of government. In the Department of Defense, the Office of the Secretary of Defense (OSD) and the Services must work together. Last, and far from least, an attitude of teamwork—solving problems by working together—must exist between government and industry.

Acquisition reform is a complex process that involves people and organizations inside and outside the Army. It is absolutely critical to modernization for the 21st century. We must all work together.

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**Research
Development
Acquisition**

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COVER

Numerous innovative acquisition strategies by a host of Army RD&A agencies have resulted in substantial savings in time and resources. This issue shares some of the lessons learned from these successful efforts.

REFINING THE SOURCE SELECTION PROCESS... TACOM's SOURCE SELECTION INITIATIVE

Background

Over the years, the U.S. Army Tank-automotive and Armaments Command, Warren, MI (TACOM-Warren), has typically performed about a dozen formal source selections a year and probably about twice that many informal source selections (i.e. where the contracting officer is the source selection authority). While the quality was good, we felt the time and resources that our process was consuming needed to be reduced. In 1992, along with a number of other streamlining initiatives, we formed a process action team to look at best value source selections. A survey of the work force identified about 16 issues which could be categorized into basically three:

- **Lack of Uniform Guidance and Approach.** Essentially, each new Source Selection Evaluation Board (SSEB) started over. Other than finding someone with past board experience (which may or may not have been good), there was little guidance on how or where to begin—from the administrative details through the evaluation process itself.

- **Excessive Use of Resources and Time.** A formal source selection was taking anywhere from 120 to 150 days and frequently even longer. Board size was growing, tying up 35 to 50 experienced, busy people for this extended period. Cost of salaries and facilities and equipment was growing.

- **Lack of Meaningful Training.** With little guidance and each SSEB "reinventing the wheel," the first several weeks of each board activity were literally spent working out a format and approach between the SSEB management and the evaluators. Precious little time was spent on the evaluation itself and even the time spent was not necessarily efficient.

In addition to these concerns, another

By Thomas C. Meyer

practical reality was becoming obvious. Oversight and management of formal source selections was fairly limited to a few mid and top level managers in the Acquisition Center, Legal Office, and engineering staff. Many of these people were approaching retirement. Experience and expertise beyond that group was limited.

Thus, the objective became clear: Streamline the process to make it more efficient, and institutionalize proven procedures and practices.

The Approach

The team concluded that, by standardizing on proven good practices, significant improvements were possible. Looking around at other agencies and activities, the Air Force and NASA appeared to have done quite a bit, particularly NASA with its streamlining manual and formal training program.

What these other agencies had realized, and in fact what had been evident in many of TACOM's most successful source selections, were several basic principles:

- Limit criteria to discriminators;
- Be specific regarding required content and format of proposals;
- Standardize effective procedures;

As our command began to apply these principles, even on a piecemeal basis, lead-times, board staff sizes, and costs began to shrink. In 1994, the command's Acquisition Center established a formal office to focus on this initiative and institutionalize change. The office, named the Systems Acquisition Assistance Team, is staffed by three individuals with extensive procurement and source

selection experience. The team's primary mission is to assist program offices and contract managers in the planning and execution of best value procurements.

The Method

The methods being advocated are not new to TACOM or to the Army Materiel Command (AMC). Most have been recommended and tried before. What TACOM is doing differently than it has in the past is to "package" these best practices into a coherent approach and promote its use through the Systems Acquisition Assistance Team. The team's hypothesis is proving itself: If you can shorten the time, you can get better people; if you get better people you can reduce the time and maintain or improve quality.

The up front work in any competitive, best value acquisition is critical, beginning with early involvement of all participants including the program or project office, matrix support elements, acquisition and legal staffs, and key Source Selection Board participants. Next, a quality solicitation is essential: tailored, clear, and with evaluation criteria and proposal instructions that focus on the program and evaluation objective. Finally, a disciplined board process is needed to ensure time and resources are used efficiently and effectively. Following are some specifics that are key to the TACOM program.

- **Limiting Criteria to Discriminators.** Both the breadth and depth of the criteria tree have been substantially reduced. Top level factors (or areas) are generally limited to three to five, including technical, cost, and past performance and, as appropriate, logistics and/or production capability. We rarely include management as a separate factor, preferring to judge

management capability by past performance rather than wiring diagrams and resumes. Beyond that top level, criteria are being established no lower than two additional levels.

• **Describing Proposal Content in Specific Terms.** Far too often, we received proposals that had incomplete information or the wrong information. The next several weeks were spent identifying the problem and requesting supplemental information from the contractor. Frequently, the reason we didn't get the information correctly the first time is because we hadn't clearly identified in the RFP what we wanted in terms of precise format and content. Today's approach is to concurrently develop the scope of work, the evaluation criteria, and the specific information we need to make that evaluation. By looking at these parts together, we tend to get a clearer identification of the criteria that is really important to the selection decision, and a more precise description of the analyses, data, or documentation, and its format needed for the evaluation.

• **Standardizing Effective Procedures.** Promoting best practices is an ongoing campaign. Several specific methodologies are worth pointing out:

a. **Use of a Standard Model Operating Procedure.** A sample standard operating procedure (SOP) which was prepared for a previous SSEB is provided to new SSEB chairpersons for guidance and can be tailored as appropriate. It organizes and addresses board operations from administrative issues to discussion procedures to briefing formats. While a board may choose different approaches, they at least have a framework and example to guide them.

b. **Limiting Board Size.** SSEB's are utilizing a small core staff (e.g. 10-12 people) and supplement it as necessary with part-time and on-call personnel who can come in for a short time to perform specific evaluations and then be released.

c. **Minimize the Use of Source Selection Advisory Councils (SSAC).** SSACs are rarely used. In place of a formal SSAC, the Source Selection Authority uses informal advisors on an as-needed basis.

d. **Disciplining the Process.** In the past, many of our evaluators spent weeks in the initial proposal review and clarification or fact finding process. Requesting additional information from offerors seemed to be an end in itself. The approach now is to establish an overall evaluation schedule—90 days is now standard, and include an early milestone for requesting clarifications or additional information—typically 7 to 10 days, and a milestone for completion of initial evaluations—about three to four weeks. With a mark on the wall, evaluators concentrate on the task of evaluation and avoid academic searches for nice-to-know information.

e. **Use of Oral Discussions.** Use of oral presentations and discussions by the offerors to the SSEB has significantly improved both the timeliness and the quality of the evaluation. Oral presentations are used to quickly acquaint the SSEB members with the structure and content of complex proposals. They have been particularly effective for the cost area.

Routinely, we are using oral communication, either in person or by telephone, in the fact finding and discussion process to address clarifications, deficiencies and significant weaknesses. These oral discussions allow immediate clarification or follow-up questions, rather than another lengthy paper question/answer routine. Not only does it provide the evaluators with a more thorough understanding of the proposal, but this opportunity to explain their responses appears to significantly increase the offeror's confidence that he was treated fairly.

While we have not utilized oral presentations in place of written proposals, it is a concept worth considering for certain types of acquisitions and for certain areas in the evaluation, such as management, background and experience, staffing plans, quality program, or logistics plans. Service contracts in general are good candidates.

f. **Scoring Methodology.** The command has also standardized on a scoring methodology. A scheme using five adjectival ratings is being used across the board. This has produced several benefits. First, by standardizing on one method, each new SSEB does not have to learn a new approach. It has also eliminated the averaging problems of numerical scoring and has put more emphasis on clearer, comprehensive narrative evaluations.

g. **Model Contract/Best and Final Offer (BAFO) Procedure.** This is a significant process improvement, although not a new concept at TACOM. During the discussion process, the contracting officer prepares a draft model contract. It includes any changes resulting from discussions, any unique requirements of individual proposals (e.g. government furnished property lists), and any unique terms and conditions of a particular offeror (e.g. incorporation of unique proposal features such as meeting a desired performance level). The document is discussed with the offeror and any changes or exceptions identified and negotiated. Format and content requirements for the best and final offer are discussed in detail and agreed upon at this time. Offerors are required to submit their BAFO by inserting their final prices in the model contract, and sign the document. Once the selection decision is made, the contracting officer has an executable document in hand and can sign the contract. This approach minimizes the likelihood of an offeror taking exceptions to terms and conditions after BAFO's have

been received, or after the award decision has been made.

While exceptions or other non-cost changes to the offeror's proposal are not precluded in the BAFO, our concerted efforts to resolve all issues, including model contract content, prior to cutting off discussions makes them rare. Nearly all BAFOs received are cost/price changes only, and requirements for reopening discussions and subsequent BAFOs are virtually non-existent when using this approach.

An added benefit is that by discussing and resolving possible exceptions early, much less time is normally required for the offerors to prepare their BAFOs. A five day turnaround is not uncommon, even on large acquisitions, because the offeror has already had the model contract in hand and been discussing it with us for several weeks.

Summary

TACOM-Warren has taken a systematic approach toward improving its process. While individual improvements may solve individual problems, significant improvements require addressing every phase of the process. Notwithstanding that statement, our experience suggests that a poorly prepared RFP will present evaluation problems for even the best Source Selection Evaluation Board. Conversely, a well laid out solicitation with a scope of work that is well structured, criteria that is limited to discriminators, and proposal format and content instructions that are specific will facilitate an effective and efficient evaluation by even inexperienced boards.

Once the evaluation is underway, it must be a disciplined process. Setting aggressive milestones and standardizing best practices are key to doing it right and doing it fast.

Finally, the use of oral presentations and discussions cuts time, significantly improves communication and understanding, and should increase industry's confidence in the process.

THOMAS C. MEYER is chief of the Systems Acquisition Assistance Team at the U.S. Army Tank-automotive and Armaments Command. He holds a B.B.A. degree in marketing from the University of Toledo and an M.A. degree in procurement management from Webster University. A member of the Army Acquisition Corps, he is a certified professional contract manager and holds the "Fellow" designation from the National Contract Management Association.

PACER ACQUISITIONS: DOD VISION BECOMES A REALITY AT CECOM

By Jack Kulaga,
Lawrence Asch
and Jodi Santamaria

Introduction

On Sept. 14, 1994, Secretary of Defense Dr. William Perry put forth a challenge before each military department and Defense agency to establish performance measures that will reduce cycle time by at least 50 percent before the year 2000. Leading the charge to reach this goal, the Army's Communications-Electronics Command (CECOM) Acquisition Center at Fort Monmouth, NJ, established a cycle time goal of 120 days for competitive best value buys. This bold action represented a greater than 50 percent reduction of cycle time within two months of Dr. Perry's challenge.

This standard is the result of CECOM's Command, Control, Communication, Computers, Intelligence Electronic Warfare (C4IEW) Acquisition Center implementing a streamlining initiative, known as PACER acquisitions. Continuously striving to be the best, CECOM's C4IEW Acquisition Center, at the direction of Edward G. Elgart, director, C4IEW Acquisition Center, developed this technique to expedite the acquisition

process by employing team empowerment and electronic commerce.

Why PACER?

The C4IEW Acquisition Center realized the immediate need to find a re-engineered way of buying—a way that called for early involvement of all players, constant communications, and reduction of cycle time in order to provide our war fighters with quality products and services while saving the taxpayers' dollars. The C4IEW Acquisition Center took a fresh look and came up with a truly innovative approach, appropriately called PACER acquisitions.

Designed to cut acquisition cycle time to the bare bones, PACER demands dissection of the award process of competitive best value acquisitions. The process includes jettisoning non-value added procedures and reviews, while following all statutory and regulatory guidelines. The results were the institutionalization of PACER's efficient and effective procedures into all of CECOM's

competitive best value buys and setting the cycle time standard of 120 days.

Key Factors for Success

Several factors were instrumental to the success of PACER acquisitions: teamwork, industry's participation, and electronic commerce. Foremost, the personnel that comprised the teams were quality individuals, bringing expertise from each matrix organization and a total commitment to the designated PACER acquisition. Although multi-functional, they were not functionally-oriented. Instead, they were goal-oriented, working together to meet the customers' requirements in record time.

PACER teams were tasked to challenge the norm. They started with a clean slate, adding only the absolute minimum, essential requirements. They challenged all data items to eliminate the ones that added no value. Teams refrained from imposing military specifications and standards on contractors in accordance with the initiative set forth by the secretary of Defense.

Industry became an essential, participating member of the PACER teams through various forums that were made available. The PACER teams promoted open communication with industry through Advanced Planning Briefings for Industry (APBI), pre-proposal conferences, and one-on-one sessions. Together, the government and industry worked to develop, improve, and streamline the Statement of Work (SOW), specification, and Request for Proposal (RFP).

Equally important was the Electronic Bulletin Board (EBB) established by CECOM to facilitate real-time communications. Both the C4IEW Acquisition Center and industry extensively used the EBB as a vehicle for real-time communication. Early and frequent communications with industry facilitated the development and maintenance of close ties throughout all phases of the acquisition cycle. For instance, when a schedule was developed by the PACER team, industry in turn was instantly made aware via the EBB. Throughout the process, industry reviewed documents in draft and final form by utilizing the EBB.

PACER Success

To date, there have been three PACER acquisitions processed by the C4IEW Acquisition Center. One of these acquisitions was for the AN/TSC-143, Super High Frequency (SHF) Tri-Band Tactical Satellite Terminal (Tri-Band).

On Oct. 23, 1993, the Department of the Army directed the project manager (PM) for SATCOM to urgently procure six Tri-Band Satellite Terminals to be awarded no later than March 31, 1994. From the 75 participating firms, 10 proposals were received. An award within 72 days was a great accomplishment, especially considering that 270 days were typically expected

for a procurement of Tri-Band's estimated dollar value.

The Tri-Band team was encouraged to become involved from the beginning, approving the documents during their generation rather than making recommendations after the fact. The team limited the requirements to only those deemed absolutely essential, imposed page limitations of 100 pages for the entire proposal, and gathered performance risk assessment information subsequent to proposal receipt to cut time. Consequently, process time was drastically reduced. This is best exemplified by the Acquisition Center's insurance of the RFP one day after receipt of the completed Acquisition Requirements Package.

The Tri-Band team also challenged the source selection process: they worked simultaneously, not serially. The Tri-Band PACER team included experienced Source Selection Evaluation Board (SSEB) personnel with program familiarity. They gained technical insight from the ultimate user regarding specification development. This interaction also fostered trust and confidence between the PM and the C4IEW Acquisition Center. Together, they made sound ethical business decisions based on consistency with program intent and willingness to take risk. As a team, the Tri-Band SSEB evaluated the critical discriminators only. The items for negotiations were limited to the essential points, and were clearly and comprehensively written. Model contracts were developed and negotiated with each offeror subsequent to best and final (BAFOs). The quality of the resultant contract was improved and the award was made ahead of schedule.

Tri-Band's success was unquestionably attributed to extensive use of the Electronic Bulletin Board and industry participation. The Electronic Bulletin Board was responsible for quick turn-around in processing time, while industry's contribution was achieved through engaging in early briefings regarding the draft RFP. Comments were solicited and discussed during one-on-one sessions, and industry was constantly offered, and took advantage of, opportunities to ask questions and provide comments. As a result, no time extensions were required in order to meet the aggressive schedule, and no protests were filed.

In addition to Tri-Band, two other PACER acquisitions were equally successful. Awarded in just 96 days, the Tactical Endurance Synthetic Aperture Radar (TESAR) acquisition boasted streamlining processes of its own. An astounding 60 percent reduction in processing time was accomplished by waiving several non-value added documents and reviews: Data Review Board, Operational Requirements Document (ORD), Test and Evaluation Master Plan and the Senior Solicitation Board. As with Tri-Band, early identification

and selection of key SSEB personnel and extensive use of the EBB were also essential to the TESAR PACER acquisition.

The third PACER acquisition, Applique, incorporated lessons learned from the two previous acquisitions. Generated by the Army Digitization Office, the computer-based Applique requirement encompassed computers, software development and systems integration. All of the PACER streamlining initiatives were put to the test in the expeditious awarding of this complex acquisition. The Applique proved undeniably that PACER initiatives work equally well on research and development acquisitions.

Success to Build on

Due to the overwhelming success of PACER acquisitions, the C4IEW Acquisition Center applied lessons learned and even bolder initiative to more recent acquisitions. Referred to as, "Teaming for Success," the C4IEW Acquisition Center has basically taken PACER acquisition principles and applied them to a higher degree. Built upon PACER, Teaming for Success is also a proactive strategy that re-engineers the acquisition process.

A significant difference from PACER is that "teaming" programs are Acquisition Category (ACAT) Level 1, and involve the Army Materiel Command and DA's input and review. Under the auspices of a "Perry Initiative Buy," Army Acquisition Executive Gilbert Decker approved the SCAMP (Single Channel Anti-Jam Man Portable) Terminal as a Teaming for Success acquisition. Forecasted for award in FY96, this acquisition for a satellite communication terminal utilized an "integrated product team (IPT)" philosophy.

IPT allowed for the elimination of sequential review practices with the development of a concurrent process. The SCAMP IPT was empowered to act and be directly accountable for the acquisition requirements package (including specifications and standards) and the solicitation. As part of this process, the team will conduct reviews in areas of Functional Requirement Authentication, ORD/RFP Crosswalk, and Board of Solicitation Reviews. In addition, a working level Source Selection Advisory Council (SSAC) was used early in the program. The efforts of the SSAC were threefold. First, the SSAC was empowered to review all phases of the total package. Second, they acted as a highly knowledgeable mentor for the team. And third, they become "agents of change" from all lessons learned.

Win-Win Situation

Besides the marked reduction in cycle time, the benefits of using the PACER process for the government and industry are profound. Most importantly, the cus-

tomers' requirements are met expeditiously and are the "best value." The quality of our contracts improves, while the integrity of the acquisition system is maintained. Waste is eliminated, and communication between government and industry is enhanced. Both sides benefit from cost savings as government costs for operations and support lessen and industry bid and proposal costs are reduced. As well, the risk of protest is mitigated as industry is a team player from the beginning and experiences and contributes to the professionalism of the product and the process.

CECOM's Acquisition Center remains available to industry and other government offices, and welcomes any discussions on PACER acquisitions. Readers having questions, comments or concerns regarding PACER acquisitions are encouraged to write to the Communications and Electronics Command, C4IEW Acquisition Center, Fort Monmouth, NJ 07703, ATTN:AMSEL-AC-SP-BP.

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Comanche Prototype Number 1.

Industry/Army Teaming...

A MODEL FOR PROCUREMENT SUCCESS: THE COMANCHE PROGRAM

Introduction

The Boeing Sikorsky RAH-66 Comanche program has established a well-earned reputation as a "model procurement program" since the Army awarded the Boeing Sikorsky First Team the RAH-66 demonstration/validation contract in April 1991. The Comanche program earned this accolade from a former assistant secretary for research, development and acquisition (RDA) because of consistent success in meeting cost, schedule and performance goals, despite major unanticipated program restructurings in 1992, 1993 and 1995.

Comanche's ability to remain on track despite significant administrative challenges is especially instructive for other procurement efforts because of the program's unique approach. On the administrative front, RAH-66 development involves a new joint venture structure, rarely utilized in past government procurement programs. From a technical standpoint, the program established an ambitious list of

By Jim Morris
and Rick Matson

technological system improvements to reach within a relatively tight time frame. Financially, the program aimed for these objectives within the tightest defense budget environment in recent history.

Today, thanks to its team approach to procurement, nearly all the principal constituencies in the Comanche RDA cycle—the Army operational community, DA, DOD, and the Congressional oversight committees—have developed consensus that Comanche should be the U.S. Army's 21st century combat helicopter. And the program has proven that sophisticated technical development can be accomplished on cost and on schedule within the operational specifications stipulated by the customer. The Comanche will give Army

aviation new standards of operational safety, field supportability, survivability and military effectiveness at an affordable unit cost and with dramatic savings of operating and support costs.

In fact, comparison with historical program data shows that RAH-66 development has been at least six times more timely and efficient in cost performance than the average defense acquisition program, success reflected in a consistent record of 100 percent incentive awards to Boeing Sikorsky from the Army for every evaluation period since the program's 1991 inception.

Teaming

While excellence of design and utilization of advanced manufacturing and system integration processes are responsible to a great extent for the Comanche's success, teaming forms the basis for the program's strong performance record.

Following the competitive phase, Boeing Sikorsky and the Army launched the Comanche program as a genuine teaming effort. In prior programs, the Army, DOD and the contractors had accepted adversarial relationships as a routine aspect of program management. But the RAH-66 effort changed the rules. Program leadership began the process with a strong commitment to effective communication as a successful administration and technical development. Establishing alignment and trust among the disparate elements of the program development has been a hallmark of Comanche management.

But creating the cooperation necessary to establish an effective management team is a significant leadership challenge. Teaming requires an enormous amount of up-front communication and learning. Specialists must take the time to teach generalists, and generalists must make the effort to learn new disciplines in order for each to participate in decisions that ultimately affect all aspects of development and production. Furthermore, respect and trust are necessary among all elements of the team in order to drive toward challenging program goals.

The RAH-66 program has become a case study in teaming implementation. With more than four years of program experience under its belt, "Team Comanche" is more than just a catch phrase. It is ingrained as a business management approach with measurable payoffs that add significant value to meet changing program needs.

For example, the product development team (PDT) has become a centerpiece of the Comanche developmental program. PDTs bring experts from all program disciplines, from designers to manufacturers to the field customer, into a collaborative group to examine all facets of aircraft design, development and production. When combined with computer-based design technologies that eliminated several major intermediate steps in the RAH-66 development, the multi-disciplinary PDTs quickly proved that a "concurrent" approach to aircraft creation can pay large dividends through implementation of cost-saving ideas and elimination of errors that often require costly rework.

Comanche prototype number one is a clear cut example of PDT success. Assembly of the prototype composite airframe, fabricated on Invar steel production tooling, and trimmed and drilled to machine tolerances, required fewer than 40 percent of the man-hours allocated in the production plan. Furthermore, computer-based production parameters allowed the team to capitalize on members' unique strengths at multiple manufacturing sites. Sikorsky's composite assembly plant in Connecticut took responsibility for completion of the forward assembly structure, while Boeing built the Comanche's aft fuselage, including the shrouded tail rotor, in Philadelphia. When the two sections came together at Sikorsky's final assembly facility, they fit together perfectly by any measure.

Thanks to other PDTs, the Comanche's

mission equipment package (MEP), involving complex integration of several sophisticated electronic systems, has also come together with astonishing speed and ease. Many MEP components required just hours, rather than the usual days or weeks, for testing and validation in the Comanche System Integration Laboratory.

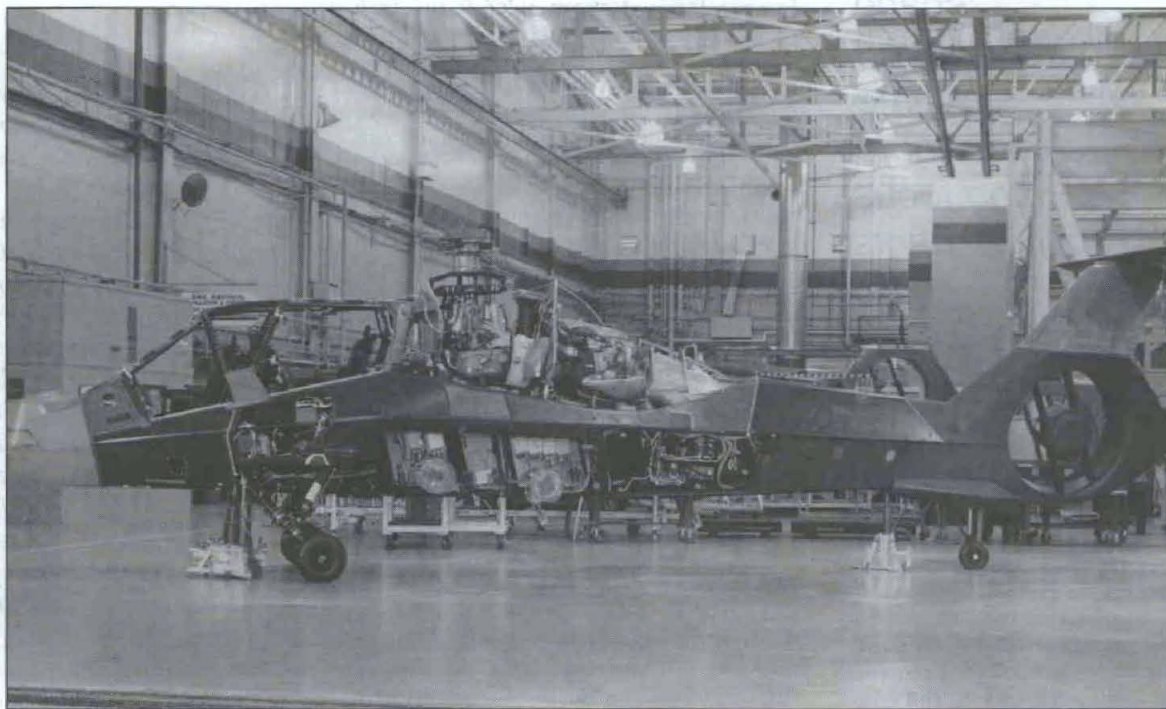
But the teaming approach goes well beyond engineering and scientific tasks.

Army Participation

The U.S. Army has actively participated in every phase of the RAH-66 teaming approach since program down-select. The Army's role, advocating the interests of maintenance and operational specialists as well as the requirements of the combined arms team, has contributed an invaluable perspective to the program.

A group of Army operators and maintenance specialists representing the Army's TRADOC systems manager is stationed permanently at the Joint Program Office to represent customer interests and ensure continuity and consistency of program management. They are an integral part of the team. Combat systems developers are also involved in the program's combined test team, the next step for PDTs as Comanche and its systems move into the validation phase of the demonstration/validation program.

Throughout the Defense establishment, procurement officials have also contributed to teaming by encouraging and adopting



Comanche Prototype Number 1 in assembly at Stratford, CT.

**Warriors
in the
infantry,
artillery,
armor
and air defense
will realize
as many
benefits
from
the RAH-66
as will
Army
aviators
because
they
will receive
higher
quality
of battle
space
information
at a time
to coordinate
and focus
all elements
of fire
and maneuver,
both Army
and joint.**

acquisition reform measures that have benefited the Comanche program. One such step is the "Design Flexibility Clause," a streamlining measure that enables the Comanche Team to vary selected requirement changes that contribute to the optimum system design without changing contract specifications. This innovative approach defines groups of requirements

and allows the contractor team to implement system improvements within reasonable parameters for those groups without time-consuming and expensive contract changes. For example, the Army may, without contract modification, permit contractors to implement design-to-cost improvements even if those improvements add to design weight as long as the benefits of cost saving can be shown to justify the change.

Program communication at every management level has relied on an open and honest approach. Teaming provides the framework through which conflicts can be resolved with minimal time and trouble while balancing the various interests of all disciplines that inevitably compete for specific problem outcomes.

Team Comanche's consensus-building approach has even reached outside the program's bounds. The executive steering group has provided a mechanism for senior corporate and military executives, normally not involved in the program's day-to-day operations, to agree about broad principles of management and keep consistent support for the RAH-66 at the highest levels of the interested companies and government.

Additional Benefits

This commitment to synergy has also generated several additional benefits not foreseen at the beginning of the Comanche program. For example, Pratt & Whitney, a division of United Technologies, imparted its knowledge of infrared signature reduction in jet aircraft engines to Comanche engineers at sister division Sikorsky. And, Boeing Military Aircraft Division shared lessons learned about aircraft fuselage radar cross-section with the Helicopters Division. These and several other examples of technological cross-fertilization have contributed to improvements in the Comanche's design, capabilities and cost-effectiveness many times.

All of the Comanche Team's partners—Lockheed Martin; Westinghouse Electronic Systems Group; Boeing Defense & Space Group, Electronics Systems Division; Moog; Sundstrand; Lear Astronautics; Hughes Training; Hamilton Standard Division of United Technologies; Harris Corporation; Kaiser Electronics; Litton; TRW Military Electronics & Avionics Division; Williams International; and LHTEC, a consortium of Allied Signal's Garrett Division and Rolls Royce Allison Engines—create an integrated whole that is demonstrably greater than the sum of its tremendously capable parts.

Through combinations of PDT and disciplined systems engineering, the Comanche program has virtually ensured success for future phases by validating nearly all flight and mission systems in the laboratory through robust simulation and systems integration long before these components perform in actual flight. For a program of such technical complexity, Comanche has already

anticipated and addressed a large number of issues that would remain unresolved in a conventionally managed program.

The outcome of Comanche's teaming approach is fully integrated system development and management that will generate an equally integrated weapon system platform. Comanche will certainly improve the Army's aviation war fighting capacity, but this aircraft will most importantly increase the capabilities of every other element of the combined arms team. Warriors in the infantry, artillery, armor and air defense will realize as many benefits from the RAH-66 as will Army aviators because they will receive higher quality of battle space information at a time to coordinate and focus all elements of fire and maneuver, both Army and joint.

Conclusion

Team Comanche, including the Army's RDA community, can be proud of its accomplishments to date. The team has performed beyond every expectation and has consistently achieved well-documented technical and managerial excellence throughout the Comanche program's history. And, with the continuing support of Army RDA, the RAH-66 can look forward to a strong future that will ensure completion of Comanche's timely development, acquisition and fielding—on cost and within specification—in time to meet the growing future demands of Army aviation and the combined arms team as we move forward to the challenges of the 21st century.

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Dozing A Path Through Acquisition Reform...

THE DEPLOYABLE UNIVERSAL COMBAT EARTHMOVER

By CPT John Koetz
and Paul Pemberton

Background

The Deployable Universal Combat Earthmover (DEUCE) provides the light and airborne engineers with a new generation mobility-counter-mobility-survivability asset. Consistent with the light infantry and airborne division's flexibility to rapidly accomplish missions on a global basis, DEUCE is rapidly deployable on all aircraft and its ground speed provides maneuverability consistent with the division's combat systems, including the Armored Gun System. DEUCE's on-road speed of 30 mph, roll on/off C130 capability, and airdrop capability ensure that deploying forces have the right engineer machine operating on the ground, without waiting for trucks, trailers, and the 5 mph steel track dozer. DEUCE is truly a new bulldozer and the program execution is a new way of doing business in acquisition for America's Army (Figure 1).

Consistent with its new capability, DEUCE is also on the front lines of acquisition reform. The DEUCE program team has labored to apply the tenets of acquisition streamlining and reform in line with the Federal Acquisition Streamlining Act of 1994 (FASA 94), Non-Developmental Item (NDD) Acquisition (DOD 5000-37.H), and the National Performance Review. We have demonstrated substantial success in shortening fielding schedules, reducing acquisition costs, minimizing military specifications, sharing government/contractor testing programs, and applying of commercial processes and practices throughout the program.

Our successes are the result of open and honest communications, a willingness to jointly discuss and accept risk, make trade-

offs, and common sense business practices. But the success is due most of all to the people of the DEUCE program team who were willing to open their eyes, discuss issues, and look beyond "business as usual," ask "Why?," and cooperate with a common focus on communication and the mission.

This article briefly examines the program's history, details the techniques applied to the DEUCE acquisition, outlines the successes and summarizes the lessons learned in the process. The successes to date are merely mile-markers along our route to a successful materiel release and accomplishment of our mission to field a capable, reliable, supportable DEUCE to the engineers of Force XXI.

Program Origins

The DEUCE concept dates to the mid-

80s when Caterpillar Inc. developed its Mobil Trac System (MTS). This innovative, steel reinforced rubber belted track was introduced commercially in 1987 on the Caterpillar Challenger 65 Agriculture Tractor. These rugged belts, in contrast to steel tracks, allow high-speed travel without damaging paved surfaces (similar to tires) plus they retain the off-road traction (for drawbar) of standard steel tracks. Caterpillar surveyed Army engineers to determine what characteristics they would like in future dozers. Their primary comments addressed increasing mobility, but still maintaining mission dozing capability. Based on those results, an internally-funded Caterpillar program was initiated in early 1987 to design and build a new type of dozer. This machine, the Model 30/30 Engineer Support Tractor, was completed 11 months later in November 1987. The

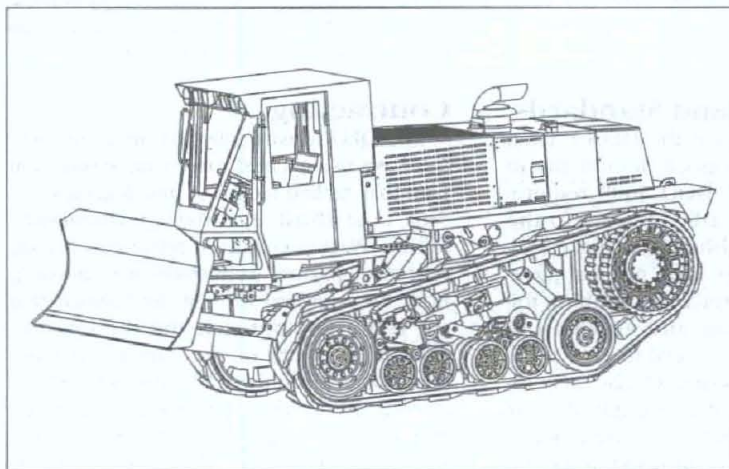


Figure 1.
Deployable
Universal
Combat
Earthmover
(DEUCE).



Figure 2.
Caterpillar Model 30/30 Engineer Support Tractor.

Caterpillar DEUCE will be based on the existing high mobility tractor, and integrates commercially proven Caterpillar components. (See Figure 2.)

DEUCE officially began as an Army program with the U.S. Army Engineer School's (USAES) approved "Mission Need Statement for a Light Engineer Earthmoving Capability" in 1993. USAES began working with the Tank-automotive and Armaments Command (TACOM) and the U.S. Army Materiel Command (AMC) product manager for Construction Equipment and Materials Handling Equipment (PM CE/MHE) to plan a program strategy that would acquire and field DEUCE machines quickly. In the market investigation and survey, several manufacturers expressed interest and identified modified commercial or military machines meeting up to 80 percent of the Army DEUCE requirements. From this, we determined that an NDI acquisition strategy would meet the Army's needs within reasonable cost and an accelerated schedule.

Specifications and Standards

MAJ Tim Goddette led the DEUCE team in preparation of program documents in accordance with the DOD 5000 requirements. He took the DEUCE team to the AMC templating Roadshow and successfully applied the process. The original package included 54 contract deliverables; following the tailoring and templating process that number reduced to 22.

The final DEUCE contract also benefited from the use of a coordinated draft with industry. Two draft purchase descriptions were released to industry for com-

ment. British Aerospace, Caterpillar, Hagglands, United Defense L.P., and Uniwolf all provided comments. Also a draft request for proposal (RFP) was released and substantial comments were garnered on the proposed solicitation. The draft process supported reduction of military specifications, as well as improvements in the quality and specificity of the requirements. The industry participants suggested commercial standards and practices common to construction and off-road equipment. MAJ Goddette was fervent in his quest to reduce the military specifications and, rely instead, on commercial practices. The initial 64 MILSPECS considered for DEUCE application were reduced to 10 military-unique specifications waived for use by the Milestone Decision Authority: C130 air transport and air drop, military sling and tiedowns, JP8 fuel, military lubricant, and Chemical Agent Resistant Coating paint. The remainder of the specifications were converted to commercial specifications (SAE, ANSI, ISO 9001) or rewritten as performance-based requirements.

Contracting

The DEUCE was solicited on a competitive basis using a best value source selection plan that ranked technical first, logistics second, cost third, and past performance fourth. Placing cost third represented a significant departure from traditional thinking! Both the user and the PM determined that the technical approach and the logistics support network of the contractor were paramount, given the NDI approach and the current Army thrust towards increased reliance on commercial parts systems. During Roadshow IV, DEUCE source selec-

tion board people participated as a team, learning and practicing best value prior to initiating the DEUCE source selection. The competitive RFP produced only one actual proposal from Caterpillar Inc. with the focus shifted to evaluating and understanding their proposal.

The Army began discussions with Caterpillar within a week after bid closing. The first meeting focused on establishing a common understanding of their proposal and the Army program. The intent was to provide a basis for making reasonable program decisions and trade-offs. It was readily apparent that both sides were focused on finalizing a program which, at its very core, was right, made sense, and was aimed directly at the common goal of fielding quality DEUCEs. Although this sounds obvious and easy, it was by no means the last hurdle the combined DEUCE team had to breach to attain this goal.

Test Planning

We made substantial gains throughout the negotiation process. For example, many duplicate test efforts were uncovered as joint discussions proceeded. Caterpillar's commercial process for introducing new machines to the marketplace required many of the same checks and balances, and associated testing, that the DOD 5000 and AR 70 series required. The common goal in reviewing test plans was "to avoid repeated testing to match the traditional manner and standard...acquire a thorough understanding of how and to what standards commercial product developers tested their systems" (DOD 5000.37-H).

The resultant DEUCE test plan conducts the majority of the performance testing and the commercial product development endurance testing at Caterpillar's Peoria, IL, and Tucson, AZ, proving grounds. The military-centered performance tests, operational tests, and RAM tests are at Aberdeen Test Center (ATC). This eliminated duplicate tests by leveraging the best commercial practices and facilities of Caterpillar and the unique military facilities and expertise of ATC. Additionally, the test plan addresses Caterpillar's greatest area of perceived risk—delivery of a machine shortly after assembly with very limited contractor reliability growth testing. The final test plan is a classic trade-off: by increasing the test work by Caterpillar, contract costs rose but the overall program costs actually dropped due to reduced risk.

Integrated Logistics Support

Within the broad Integrated Logistics Support (ILS) umbrella, DEUCE made substantial strides in adopting commercial practices, and reaped solid cost avoidance and savings. The DEUCE RFP requested bids for both Department of the Army technical manuals (DATMS) and MIL-M-7298

commercial off-the-shelf manuals. Caterpillar offered DATMS and suggested, in negotiations, the idea of using commercial format (non-MIL-M-7298) manuals. The user and the publications proponents reviewed Caterpillar's bid samples and held discussions on the concept.

The Engineer School established a position that the commercial formatted manuals met their needs, but that a Maintenance Allocation Chart, National Stock Number (NSN) to part number cross reference and preventive maintenance checks and services (PMCS) were also needed. Together, TACOM and Caterpillar people wrote a performance specification encompassing only nine pages to define these requirements and Caterpillar's process. The resultant cost avoidance from using commercial format instead of DATMS was over \$1.4 million. This approach was approved, via waiver, by AMC. Perhaps it has also been the most difficult tailored approach to sell within the government due to the multitude of duplicative requirement, oversight, and assessment agencies.

DEUCE also pursues a tailored provisioning approach. After carefully analyzing the demand histories on existing Army bulldozers, the DEUCE RFP requested bids for full and tailored provisioning. The tailored provisioning requirement requires Army support for safety, legal, PMCS, long lead time (greater than eight months), and DEUCE-unique items. The remaining items are contractor supported which leverages commercial logistics systems and Army commercial parts programs such as Prime Vendor, Direct Vendor, Contractor Operated Parts Stores, and Contractor Operated Parts Depot. This tailored approach is linked directly to the importance of logistics in the source selection plan.

Caterpillar offered the Army a commercially recognized world-class parts supply and support system. Their support capability, as proven in commercial marketplaces and in military support during Desert Storm and Somalia, fit perfectly with the tailored provisioning approach. This approach requires close coordination between TACOM provisioning managers and Caterpillar logisticians early in the logistics development process to identify the essential parts and ensure that the logistics development concurrent with the machine.

The benefits of tailored logistics support lie in reduced acquisition cost (\$225K saved) and substantial life cycle support cost reduction by not carrying relatively inactive inventory and NSNs in the Army system. On a low-fleet density system like DEUCE, the prime vendor and commercial parts purchasing systems can easily support unit demands for non-essential items at home installation, or during worldwide deployments.

Reinvestment

The final DEUCE contract includes purchase of a second pilot machine for production qualification testing to manage the inherent risks of an NDI integration of components system. This second machine purchase was possible only due to the savings we reaped through the efficiencies outlined above. We avoided or saved nearly \$2 million by applying the tenets of streamlining and reform to this relatively small NDI program. The efforts of Caterpillar and TACOM enabled us to actually lower overall program risk.

Partnering

The DEUCE contract, like many new contracts, included a standard partnering clause in the contract. In all honesty, it was almost overlooked. We had established a solid partnering spirit early on, as evidenced during the contract discussion sessions. We had a common commitment to the success of the DEUCE. The actual partnering agreement became less significant than it would be in a program with strained relations. We took the partnering charter as a challenge to integrate the standard government partnering charter with the ideas of commercial teaming agreements, and do something a little different! We began with the idea that the charter became a means to publicly evidence joint commitment to the program, the DEUCE mission, and mutual success. Caterpillar provided ideas from commercial teaming agreements—defining each partner's strengths, outlining communication mechanisms, and including those responsible for success as cosignatories. We drafted an agreement that met both parties' needs.

The final signature session occurred in November 1995.

Lessons Learned

The lessons learned in the program could fill several articles! Some lessons lean towards the humorous side, but in the very expensive acquisition process, even in humor there is truth. (See accompanying sidebar on this page.) There are several key ideas we have distilled from the many lessons learned that are believed to be nearly universally applicable.

- **People are the key to success in reforming the acquisition process.** Every success in the DEUCE program is linked to people who were able to view the problem in a different manner, ask themselves and others "Why?" and, most importantly, recognize that the risk in trying something new was worth the gamble. Too often, the people managing a program at the lowest level are not empowered to try a new approach, or they see that only when they say no—and do it the usual way—do they succeed. We reaped many benefits from innovators in technical

You Aren't Really Part of Acquisition Reform If . . .

- You last met a real soldier in 1972. (All those statistics about education and quality are just PR.)

- Your statement about a tailored requirement begins by citing the number of years you've worked in the government or your company. "We've always done it in the past and it works."

- Your idea of a template involves spray paint.

- You find yourself citing the FAR, MILSPECS, United States Code, or company policy in everyday conversation.

- Your idea of "streamlining" involves use of a wind tunnel, clay, and lots of computers.

- You smile and agree with the phrase "all contractors are scum" or "government employees don't work and you can't fire them" or you have a desk sign with that printed on it.

- Your measures of success include page count, word count, or number of protests.

- You'd rather die than sit down for dinner with the guy across the table.

- Your favorite response is—"We can't do that. I'm not sure why, but there must be a good reason."

- You really believe that "common sense has no place in Army acquisition."

requirements, ILS management, test people, procurement specialties, and cost evaluation as they demonstrated their willingness to take a risk and embrace the spirit of reform.

- **Communication is the second key to success.** Frank, open, and personal discussions are required to succeed. Once the right people are together, effective communication processes (including the principles of brainstorming) are required to communicate ideas, emotion, risk, and criticality. When we rely solely on letter writing campaigns that typically communicate accusation and bureaucracy, we fail! We must grasp enabling technologies that aid in communicating beyond the written word. Telephones, e-mail, and video teleconferencing are a few examples. At critical junctures in the DEUCE program, we held video conferences weekly, teleconferences and e-mail daily, and biweekly trips to ensure that we reached timely understandings.

- **Finally, recognize that streamlining and reforming the acquisition process takes a much higher level of effort than business as usual.** It takes little effort to cite the same old requirement. Resistance to change is inevitable; that same old requirement may be 20, 30, or 40 years old and be the entire foundation for the nation's largest rice-bowl cottage industry, and you are attempting to break it in one fell swoop! Trying something new also requires effort to define and put the concept into words, time and effort to sell it up every level of management. This often occurs in multiple organizations and involves time to make it work once approved. In short, it becomes a passion, a religious experience, that at times is all encompassing.

When time is short, one must focus on solving the problem locally, that is resolving a program-unique solution rather than solving the global problem. As most engineers know, sufficient local solutions often produce a global solution. Reform and streamlining are also difficult because they are continual processes. We are forced to review problems continually, rather than sit back.

Innovative solutions rarely are identified correctly at the first shot. We are still tinkering with issues in shared testing, publications reform, and conflicts between MIL-SPECS and SAE specifications. Problems are inevitable in new approaches but, with the right people, the right communications, and dedication to resolving them, reform is possible.

Improving the Process

In identifying the lessons learned, we also recognized recommendations for improvements. One suggestion is to institute personal verbal communication between government and industry early in the acquisition cycle to better communicate understanding of the procurement

strategy. Even after two draft purchase descriptions and contractor comments, neither Caterpillar nor the Army fully understood the other's intent and position. Written communications simply can't convey enough of the message. The government should expand use of site visits during a proposal evaluation process. A carefully controlled visit and agenda can yield a much better understanding of a bidder's capability and corporate/commercial approach than simply relying on written proposals and their inherent limitations. Perhaps even increased reliance on bidder presentations and discussions between the government and prospective bidders (after an open bidders conference) can help by giving bidders an opportunity to more freely ask questions and speak out.

The materiel developer and industry can only go so far in applying reform; lacking is top-level revision of federal laws and regulations. One prime example is cost and pricing. The Federal Acquisition Regulation currently does not fully recognize the competition sensitive nature of commercial item cost data. We must formalize approaches to assess commercial pricing data, rather than always count on innovators as we did in DEUCE.

If we really want to break the paradigm instead of just bend it, why not look at the entire RFP package as a performance-based document? Currently, government and industry are very comfortable with using performance specifications that allow suppliers to offer innovative technical solutions such as 30/30s, M113s with blades or Small Unit Support Vehicles with blades. The next step may be to expand the concept and open up publications, testing, provisioning, etc. to performance requirements. Industry should not be prevented from presenting an innovative idea simply because it is ILS-related instead of technical. After all, that is essentially what we did with DEUCE when we established the goals for testing, manuals, etc.

Conclusion

The DEUCE program has been challenging. We were successful in reducing military specifications and standards, reducing and tailoring data requirements, leveraging and embracing commercial processes and practices in logistics, testing, and engineering, and in partnering. These successes required diligent labor from Caterpillar, TACOM, the U.S. Army Test and Evaluation Command, and the Engineer School but reaped substantial savings in acquisition costs and time.

Although our successes are encouraging, we also learned that some ideas were still too radical or risky. In every instance, we attempted to apply the tenets of reform and to do the right thing for the soldier and the taxpayer. We've established and stuck to our acquisition program schedule

and are on track to deliver DEUCEs to the 10th Mountain Division in FY98. Fielding a capable, reliable, supportable DEUCE to the Engineers of Force XXI will be our ultimate measure of success.

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COMMERCIAL SPECIFICATIONS: AN INDUSTRY VIEW

*By LTG Donald Pihl (USA, Ret.)
Vice President, Government Relations
and Legislative Affairs
General Dynamics Land Systems*

In 1920, the American novelist Willa Cather published an essay on writing fiction in which she argued that "very nearly the whole of the higher artistic process" consisted of "finding what conventions of form and what detail one can do without and yet preserve the spirit of the whole." The Clinton administration seems to have followed a similar approach in reforming the Defense acquisition system. Rather than adding new ornaments to an already baroque regulatory process, the administration has launched a campaign to drastically simplify the way in which the nation buys its weapons. This effort is long overdue, and represents a creative application of principles learned by private companies as they struggle to survive in an increasingly competitive marketplace.

It is not hard to see why change was necessary. The real (after inflation) value

of the Defense procurement budget has declined by two-thirds since the mid-1980s, and the military Services are hard pressed to find adequate funds for the modernization of their aging arsenals. Yet, despite such pressures, studies have repeatedly found that 25-30 percent of weapon costs are attributable to regulatory features of the acquisition system. By alleviating much of the regulatory burden, managers can free up money for modernization without seeking increases in the Defense budget.

Perhaps the most far-reaching facet of the acquisition reform program is the plan to eliminate many of the 31,000 military specifications and standards that currently confine weapon designers and builders in a bureaucratic straitjacket. These specifications and standards often stifle innovation and efficiency by forcing contractors to comply with costly

In the acquisition system of the future, program managers will specify performance goals and then encourage contractors to use commercial standards and practices in developing the best solutions for meeting those goals.

Despite the many complex implementation problems that must be addressed, the shift to reliance on commercial specifications and standards is a bold recognition of economic and technological realities.

product and process requirements that sometimes seem to serve no useful purpose. In the acquisition system of the future, program managers will specify performance goals and then encourage contractors to use commercial standards and practices in developing the best solutions for meeting those goals. The new approach is expected to reduce costs, encourage creativity, and accelerate the integration of military industrial activity with the commercial sectors of the economy.

Of course, there will always be exceptions to the new way of doing business to accommodate unique military missions or performance requirements. But even when Defense-unique specifications and standards are retained, the new approach to acquisition will tend to use them as guidelines rather than as inflexible rules. The intention is that wherever possible, the Defense Department will try to foster the kind of agility, innovation and vision that is rapidly transforming America's industrial economy into the most productive in the world.

Some members of industry are apprehensive about the radical reengineering of the acquisition process, just as many companies are worried about the integration of our domestic commerce into an increasingly dynamic global economy. But neither process is avoidable over the long term unless Americans are prepared to give up their status as the world's leading military and economic power. It is important to understand why a transformation of the Defense acquisition system is necessary, and how it is linked to broader economic and technological trends.

The end of the Cold War occurred at a time when revolutionary forces were sweeping through the global economic system, digital technologies were proliferating, markets were becoming more open, and vertically-integrated organizations were being deconstructed in a process that Alvin and Heidi Toffler have referred to as the *Third Wave*. The collapse of the Soviet Union was in large part traceable to its inability to compete in this rapidly changing environment. Centrally-directed, highly bureaucratized organizations had little hope of thriving in the brave new world of market-driven, information-intensive enterprises.

Unfortunately, the Defense Department that emerged from the Cold War shared some of the same organizational weaknesses that destroyed the USSR. It was centrally managed, heavily regulated, highly bureaucratized and out of touch with key features of its environment. Senior managers recognized that the department had to undergo fundamental change in order to keep pace with trends in the

commercial economy, and acquisition reform was seen as an essential part of the change. Viewed against this backdrop, it is clear that the administration's plan to rely on commercial specifications and standards is much more than the substitution of one set of rules with another. It is an attempt to foster cultural change, change that brings the behavior of the Defense Department and its contractors into closer alignment with ideas shaping the new industrial revolution.

But like any revolution, the shift to commercial specifications and standards will occur unevenly, and with occasional setbacks. Defense managers cannot avoid these problems entirely, but they can minimize them by taking some basic steps:

- Program managers and other acquisition officials must be trained to accommodate a more open and flexible approach to system design, development and production.
- At the same time, acquisition personnel must be given the authority and incentives to deviate from traditional ways of doing business when a better approach is available from the commercial world.
- Contractors must be encouraged to develop innovative solutions to technical challenges based on commercial specifications and standards, and (within reason) rewarded for taking risks.
- Contractors with good performance records must be trusted to apply commercial standards and practices in a manner that will yield best value for the customer, rather than constantly being monitored for signs of trouble.
- Finally, DOD senior management must commit to the cultural change necessary to permit the above to happen. This includes concepts such as risk taking, layering of approved authorities, delegation of decision-making authority and accountability for performance.

There are some ways in which Defense production may never fully resemble the competitive dimension of the commercial world. This is particularly true when Defense-unique items are procured from sole-source providers. But the increasing utilization of dual-use technologies available from multiple sources in modern weapons underscores the need to dismantle the traditional, regulation-based approach to Defense acquisition.

Despite the many complex implementation problems that must be addressed, the shift to reliance on commercial specifications and standards is a bold recognition of economic and technological realities. Acquisition managers and contractors should embrace the new way of doing business, accepting the insight of Henry David Thoreau's advice in *Walden*: "Our life is frittered away by detail. . .simplify, simplify."

EYESAFE LASER RANGEFINDER

An Acquisition Streamlining Success Story

By Sharon Woods

Introduction

Acquisition streamlining and reforms employed in the Abrams Tank System Phase II Upgrade Eyesafe Laser Rangefinder (ELRF) Program have resulted in a best value contract award, saving the program millions of dollars. The program's success has been reported to the Army chief of staff.

The success of the ELRF program entailed incorporation of innovative strategies such as: use of performance specification and interface control drawings which allowed for competition; horizontal technology integration; eyesafe technology improvements; a templated scope of work; best value contracting; streamlined source selection criteria and evaluation procedures; hardware "demonstration sample" submissions; flexible range pricing; parts competition plans; and use of new debriefing procedures.

These program initiatives introduced new eyesafe technology and reduced the cost of the average laser rangefinder unit price by 54.5 percent (compared to non-eyesafe sole source contracts). As a result, the program will save approximately \$9.4 million.

The ELRF acquisition was a multi-agency team effort from its conception

to the point of award. The ELRF team was composed of representatives from the Program Executive Office, Armored Systems Modernization (PEO ASM); project manager, Abrams Tank Systems (PM Abrams), with assistance from PEO ASM Project Manager Offices, including Armored System Integration (PM ASI), Armored Gun Systems (PM AGS) and from the Bradley Fighting Vehicle Systems (BFVS); the Armament Chemical Acquisition and Logistics Activity (TACOM-ACALA), the Armament Research, Development and Engineering Center; Night Vision Laboratories; and the Tank-automotive and Armaments Command's Systems Acquisition Assistance Team. The gathering of expertise from the various activities saved valuable time and the team benefitted greatly from the lessons learned brought to the table.

Background

The Abrams Tank ELRF is an eyesafe replacement for the current Abrams Laser Rangefinder. The current laser rangefinder can be hazardous to the unprotected eyes of soldiers during operation and maintenance. The user

Acquisition streamlining and reforms employed in the Abrams Tank System Phase II Upgrade Eyesafe Laser Rangefinder Program have resulted in a best value contract award, saving the program millions of dollars.

requirement to provide the eyesafe capability came to the forefront in 1994 (it had been a "desired" feature for many years).

MG John E. Longhouser, PEO ASM, challenged the ELRF team to develop one contractual instrument in which all the PEO vehicle systems (Abrams, Bradley, and AGS) would have a means to procure ELRFs—in other words, a horizontal contracting integration instrument.

The PEO goal is to acquire one ELRF configuration. Not only will this effort cut down the multiple spare parts in the field, but it would also reduce the administrative cost that arises in tracking multiple configurations in the supply system.

Acquisition Strategy

Early planning aided in the success of the program. The Abrams Procurement Office conducted a conference with the contracting officers involved in the upgrade program. The purpose of this meeting was to discuss acquisition strategies and best value contracting for all upcoming acquisitions under the Abrams Phase II Upgrade Program.

The concept behind the Abrams Upgrade Production Program is to reclaim and upgrade as many of the tank's current LRFs. In the case of the ELRF production units, the contractor would receive M1 laser rangefinders and upgrade them to the ELRF configuration. The ELRF team became aware during the acquisition strategy meetings that there were components that could be potentially procured "new" at a lower unit price than an "upgrade." This was primarily due to new technology and the use of more commercial parts. Under the ELRF program, the team wanted to take advantage of the same opportunity. It was imperative to obtain new technologies, stay within budget and obtain the "best value" ELRF possible. The "best value" contracting approach was preferred by PM Abrams and discussed at the Contracting Officer's Conference.

To obtain the "best value" ELRF, the offerors were given the option to bid on (1) upgrade production and new spares; (2) all new; or (3) bid on both option one and two.

Guidance from the TACOM Systems Acquisition Assistance Team on Best Value Contracting and Source Selection Evaluation Criteria provided valuable information in the planning and execution of the source selection evaluation. The team's support in providing current guidelines and lessons learned from past SSEBs helped avoid problems and saved a great amount of time in the evaluation

process. Due to the uncertainty of the ELRF and tank requirement quantities per year, a flexible range quantity contract citing minimum and maximum quantities for a five year contract was established for both the ELRF upgrade production contract line item numbers (CLINs) and the new production CLINs established to procure spare parts. An option was also included to procure new production ELRFs for the Armored Gun System beginning in year two of the contract. The contract type was an indefinite quantity with firm-fixed prices for all five production years. The maximum order quantity was 866 (600 upgrade and 266 new). The minimum order quantity was 125 each year (100 upgrade and 25 new).

Performance Specification

The use of a performance specification made competition of a historically sole source component possible. This course of action was possible due to the 15 years of laser experience in supporting Abrams procurements. The performance specification allowed the offerors to choose their own design approach in developing the ELRF.

Initially, developing the performance specification incorporating horizontal technology integration was a real challenge. The objective was to acquire an ELRF that was compatible with the Abrams Tank, the Bradley Fighting Vehicle System, and the Armored Gun Systems vehicle and to ensure that the performance requirements for all three systems would be incorporated into the performance specification issued under the request for proposal. The AGS vehicle uses the same laser rangefinder as the tank, and the initial requirements and size envelope of the component are the same. The Bradley eyesafe laser was different. It was developed in three separate modules located in various locations around the Integrated Sight Unit (ISU), a different size envelope than Abrams and AGS.

It soon became apparent that requiring commonality with the Bradley was not practical without significant design effort. The Bradley ELRF was (and still is) under development as part of the Operation Desert Storm Product Improvement Program. Due to the continual redesign of Bradley ELRF, there was no existing baseline to use in the performance specification. The BFVS' commonality requirement was removed from the performance specification and the requirements portion of the RFP. The PEO still desired an avenue to explore the ELRF

commonality issues with the BFVS. The approach chosen was a "commonality option."

Commonality Option

The commonality option is an engineering provision which provides 10,000 level-of-effort hours of engineering effort to maximize the commonality of the ELRF across vehicle platforms. If the option was exercised, the contractor would conduct a study outlining possible commonality approaches with the BFVS. The contract type for this option is cost-plus-fixed fee.

Hardware Demonstration Sample

Another challenge was determining the best method for an offeror to demonstrate the ability to build an ELRF that met the requirements of the performance specification. This was critical, since the performance specification allowed the contractor to choose their own design approach.

Two methods were chosen and included in the RFP. The first method was the use of a validated model which the offeror would run under a series of scenarios. The second method required the offeror to submit a demonstration unit that would be tested against 13 discriminators from the performance specification requirements.

Unfortunately, the offerors were experiencing problems running the model. The output they were receiving did not match the output received under their own testing. The technical team reviewed the offerors input/output and acknowledged that there was a problem. The lesson learned: be sure that the model is validated for the specificity of the application in which you choose to use it. Once it was determined that the model was not accurate for this application, this requirement was removed from the RFP.

The purpose of the demonstration was to test the sample against 13 discriminators from the performance specification which is based on more than 15 years of ELRF production testing experience. This testing would also give an understanding of the offeror's capability of building an ELRF. The offerors sent their demonstration sample to the U.S. Army Yuma Proving Ground, AZ, where the Combat Systems Engineering Branch, Tank Automotive Division conducted the test. The test allowed the government evaluation team to delineate observed characteristics of each sample and identify any test deficiencies

that could be used as feedback to the contractors. The contractors were given the chance to view the testing of their own sample and in the case of a failure, repair it on the spot or submit a corrective action plan.

Templating

The ELRF team applied streamlining initiatives in writing the scope of work and other contract requirements using the Army Materiel Command functional template concept. The templating removed all the restrictive military standards and specifications allowing the use of commercial equivalents. All data item descriptions are cited for reference only. All deliverables will be submitted in contractor format. The qualification inspection plan/procedure will be provided by the contractor. The scope of work was narrated in plain English.

Competition Plan

As part of the evaluation criterion, a parts competition plan was required. The competition plan had to clearly define stand-alone form, fit, function, and include acceptance test requirements for each item that will be prepared and/or spared, based on an approved maintenance concept. A technical data package (TDP) or other alternative to the TDP could be offered. The evaluation criteria considered the degree of competition available with each offeror's approach. Interestingly, the offerors' responses to this requirement provided data, computer software, and the rights to these which will allow for substantial levels of competition.

Pre-proposal Conference

A Pre-proposal Conference was held at the contracting agency, TACOM-ACALA, using the concept of oral discussions. The purpose of the conference was to explain to potential offerors the Abrams Upgrade Program, and the best value approach. This was very beneficial to the contractors, many of whom had not been through best value contracting and/or were not familiar with acquisition streamlining and the reforms.

Source Selection Evaluation Procedures

The SSEB board was very streamlined, consisting of 13 people. The board was composed of the chairman, deputy chairman, technical team of five, price analyst, logistic team of three, past performance

evaluator and administrative officer. Evaluation criteria were limited to real discriminators with no subfactors below the third level. The board employed streamlined source-selection procedures which included: oral discussions; reliance on price competition, and price analysis instead of full cost and pricing data; and the use of the new debriefing procedures. The ELRF contract award was made 79 days after receipt of proposals. There were no complaints or protest.

Lessons Learned

An important element in the success of this acquisition is that the team knew the performance desired. The ELRF was procured by performance specification due to the fact that we had 15-plus years experience and testing knowledge behind the laser rangefinder. Because of the maturity of the laser, there was far less risk in obtaining the product desired through a performance specification.

The following is a list of the lessons learned provided by the ELRF SSEB:

- Five narrative evaluation ratings were used from excellent to poor. However, a sixth rating of unacceptable may have been beneficial. This rating would show unequivocally the deficiency and, if not corrected, the ineligibility for award.
- Having the offerors brief their responses to the information for discussion (IFD) request and confirm their response in writing proved very effective and efficient. In addition to the time saved, this afforded the offeror more understanding and insight into the government's requirements and issues. It also provided the government with a more thorough understanding of what was being offered.
- The debriefings followed the "new" AMC format. The unsuccessful offeror reacted favorably to the new format. It was the board's impression that the additional insight into the winner's ratings and evaluated cost was welcomed and may have helped in avoiding a protest. A debriefing presentation was also given to the successful offeror. The successful offeror felt this was very helpful in evaluating their bid process and highlighting those risk areas they need to analyze in further depth or intensively manage.

Conclusion

As funding diminishes, requirements are reduced, the industrial base shrinks, and it is imperative that acquisition streamlining and reforms be incorporated into the acquisition planning process.

As funding diminishes, requirements are reduced, the industrial base shrinks, and it is imperative that acquisition streamlining and reforms be incorporated into the acquisition planning process.

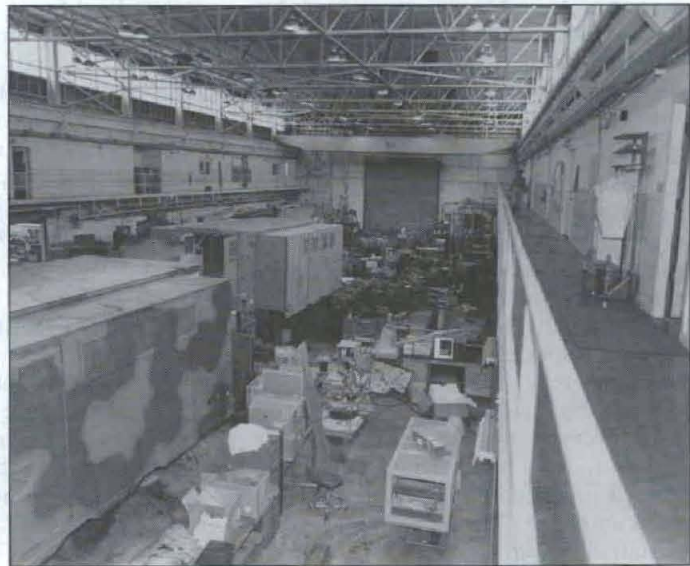
The experience and expertise from the multi-agency representatives were a valuable asset to this program. The combination of the team efforts with the use of the acquisition streamlining and reforms made this program a success in awarding a contract without protest and at a significant savings to the program.

SHARON WOODS has been the fire control procurement analyst for the project manager, Abrams Tank System for the past five years, including management of the Eyesafe Laser Rangefinder Program. She holds a master's degree in education from Michigan State University.

SKUNKWORKS:

An Innovative Approach to Acquisition

By Sanda Trousdale Martel



Interior shot of the 60,000-square-foot hangar facility where Skunkworks engineers and technicians provide hardware solutions.

Introduction

"We're in the innovation business...to serve the soldier, our ultimate customer, in a quick, responsive manner," says Dave Elder, chief of the Prototype Engineering Division at the U.S. Army Missile Command in Huntsville, AL. These words sum up the division's approach and dedication to managing programs and insuring effective use of government resources. Elder and his staff of 30 engineers, engineering technicians, model makers, sheet metal mechanics and welders comprise the operation that some refer to as "Skunkworks."

History

The term Skunkworks is used to describe a low profile, in-house development scheme to bypass traditional constraints and red tape. However, the Skunkworks name belongs to Lockheed Martin, which holds a service mark from the U.S. Patent Office because the name became so closely identified with the company after an elite group of engineers developed America's first production jet fighter behind tightly closed doors in 1943.

The name caught on with the Redstone Arsenal group during the '60s because the staff had a penchant for producing hardware solutions outside the mainstream, in a timely manner and at reduced cost to the government. The Prototype Engineering Division, System Engineering Directorate, belongs to the Research, Development and Engineering Center at Redstone Arsenal. They frequently team with other elements,

both government and contractor, to quickly bring available resources to solve problems at hand.

Customers

Customers, primarily the Army's missile project/program offices at Redstone, seek the division's expertise in the areas of engineering design, fabrication and evaluation of prototype/conceptual hardware. One of their customers is the Multiple Launch Rocket System (MLRS) Project Office. The following are some of the tasks performed by the Skunkworks for the project office:

- Performed XM451 fuze tests for use on the MLRS/Sense and Destroy Armor (SADARM) and extended range rockets;
- Built and tested the MLPA trainer;
- Designed and fabricated sled test hardware;
- Designed, fabricated and integrated MLRS ballasted rocket pods into troop usage; and
- Built and installed improved M-270 blast shields for the MLRS launcher during Operation Desert Storm.

Other customers include Patriot, Javelin, TOW, Avenger Project Offices and the Targets Management Office.

Successes

The Skunkworks staff is hardware-oriented, producing not only conceptual models but, in many cases, fieldable systems with associated documentation that will provide for future procurement. In fact, a major thrust of the organization is to enhance the

acquisition process by helping the Army to be a smart buyer. The finished product, its effectiveness, timely fielding and value added to the soldier are some of the primary objectives. "This works best when effective prototyping and system integration processes are in place and we have user oversight," Elder said. That philosophy has been demonstrated on many U.S. Army Missile Command (MICOM) programs.

Contingency Remoting System

One Skunkworks success story is that of the Contingency Remoting System (CRS) kit, needed by the Unmanned Ground Vehicle Joint Project Office to provide soldiers and Marines with the capability to safely clear a path through an enemy minefield.

Prototype Engineering developed hardware that allows the remotely-controlled operation of any M900 series 5-ton military truck. This vehicle was chosen for its ability to carry current mine detection equipment. The CRS kit consists of an actuator package, mounting hardware and associated electronics that provide precise control of vehicle steering, gear selection, the throttle, brakes, start and stop operations, as well as two undefined auxiliary functions. All electronics were designed by the Manufacturing Technologies Division, a sister organization of Prototype Engineering.

The actuator package can be installed on the 5-ton truck in about four hours using common fasteners in pre-existing holes.

Once installed, the kit is unobtrusive and allows for both conventional and remote operation of the truck. Remote operation is performed using an operator control unit which sends control tones through existing military communication radios. System operators follow behind the remoted 5-ton truck in a High Mobility Multipurpose Wheeled Vehicle (HMMWV) while the mine detection equipment on the 5-ton vehicle performs the hazardous tasks.

The original two prototype CRS kits were fabricated in-house by Prototype Engineering's machinists and technicians. After the prototype kits were completed and the concept was proven, a completed technical data package was developed and five more kits were built on contract. All seven kits have undergone 20 hours of vigorous operational testing without encountering any major problems. At present, the CRS kits are being considered to support actual contingent mine clearing missions.

Ground Based Sensor

Another successful design and system integration effort occurred during the Ground Based Sensor (GBS) vehicle development program. The GBS system is an adaptation of the firefinder artillery spotting radar that has been updated for use on the modern battlefield.

The original GBS units were built using a 5-ton truck as the primary mover in a configuration similar to the firefinder. However, this configuration did not readily lend itself to being highly mobile on the ground or transportable by smaller delivery vehicles such as the C-130 or UH-60. Therefore, the Forward Area Air Defense (FAAD) Sensors Program Office decided to proceed with the development of a GBS system that used a HMMWV as a prime mover.

The Prototype Engineering people were contacted by the FAAD Sensors Program Office to provide the design, technical data package and a prototype vehicle for this effort. The original design consisted of a storage unit, an interface assembly to tie into the HMMWV, communications racks, storage racks, a dry storage unit, and a fuel cell and RAPIER generator.

Working in conjunction with several other MICOM organizations, the unit was built, analyzed, tested and delivered for field testing in three months. The unit underwent field testing at White Sands Missile Range and performed extremely well suffering no failures of equipment designed and built at the Skunkworks.

Despite outstanding performance in field tests, the vehicle was redesigned following a decision by the FAAD Sensors Program Office. This decision was made because of the additional costs associated with purchasing and supporting the RAPIER generator, which is manufactured



Wayne Shockley, a technician in the Prototype Engineering Division, modifies the crew and cargo storage compartment and mounts a generator on the back of a HMMWV vehicle, prime mover of the GBS Radar.

in the United Kingdom. Also, although the RAPIER is in the NATO inventory, it is not in the U.S. inventory.

MICOM's Prototype Engineering Division was again tasked to provide an extensively revised design to accommodate a generator already in the U.S. inventory, a new fuel cell, and several new power conversion units in addition to the other components already mentioned. The new design has now been completed, a preliminary technical data package has been prepared and delivered to the FAAD Sensors Program Office, and production has been initiated on two prototype vehicles.

A Skunkworks solution to troublesome maintenance procedures for cleaning the HMMWV (TOW) turret ring bearing assemblies is currently saving troop and equipment down time. The requirement emerged when the Army Materiel Command Field Assistance in Science and Technology (AMC-FAST) representatives requested a fix for excessive unit down time resulting from sand entering the turret bearing rack assemblies during desert operations. The solution? Skunkworks technicians adapted fittings and a hose assembly that allows the mechanism to be flushed with water, cutting by approximately eight hours the time previously required for a mechanic to physically remove the assembly and clean it.

The list of Skunkworks achievements goes on but, as Elder puts it, "not all of our conceptual and mechanical projects culminate in quick fixes. In many cases, our early approaches have failed to meet sys-

tem or test requirements, but a failure early on can be a tremendous benefit to a program manager who's attempting to control downstream development and production costs. That's where this organization's real focus is—adding value and cost effectiveness to fielded systems."

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MILITARY SPECIFICATIONS AND STANDARDS REFORM FOR THE THEATER HIGH ALTITUDE AREA DEFENSE WEAPON SYSTEM

By Linda Y. Erickson
and Joseph M. Walters Jr.

Introduction

The Theater High Altitude Area Defense (THAAD) Project Office has aggressively pursued acquisition reform by eliminating 145 references to military specifications and standards in its objective system specifications. An extensive effort has been made to capture performance requirements, rather than only deleting references to military specifications and standards. We worked closely with subject matter experts from all areas of engineering, supportability, safety, security and transportability. A thought-provoking methodology has been developed for systematic organization of this effort to implement military specifications and standards reform on a complex weapon system. A complete data repository to archive the results of this effort will serve as a basis for discussion with other elements of the acquisition community.

THAAD Weapon System Complexity

The complexity of the THAAD weapon system made our implementation of military specifications and standards reform a significant effort. The THAAD system is the first complete system designed to defeat theater ballistic missiles directed against the United States and allied military forces, critical assets, and theater-strategic assets, such as population centers and industrial resources. It is a complete, fully integrated weapon system consisting of missiles, launchers, radars, and a Battle Management Command Control and Communication (BM/C3I) System. Each major subsystem is a system in itself.

The missile consists of a single-stage, solid rocket booster motor and a separating kill vehicle section that provides terminal homing to its target using an infrared seeker. The kill vehicle contains small rocket thrusters as part of the divert and attitude control system that directs it to the target. The missile, a hit-to-kill system, uses kinetic energy released from the hypervelocity collision as its lethal mechanism.

The launcher is a modified M1075 Palletized Load System standard Army vehicle. It is designed with an electronics package that includes a global positioning system receiver and azimuth reference unit to provide autonomous position/location determination and a SINCGARS radio for communication.

The THAAD radar operates at X-band, uses a phased array antenna, and employs solid state transmit and receive modules. The segment design includes components that provide power, antenna cooling, electronics and operator consoles.

The BM/C3I segment is composed of three separate configuration items: Tactical Operations Station, Launch Control Station and Antenna Cable Vehicle. Utilizing a modular design, the THAAD Battery Tactical

Performance Baseline

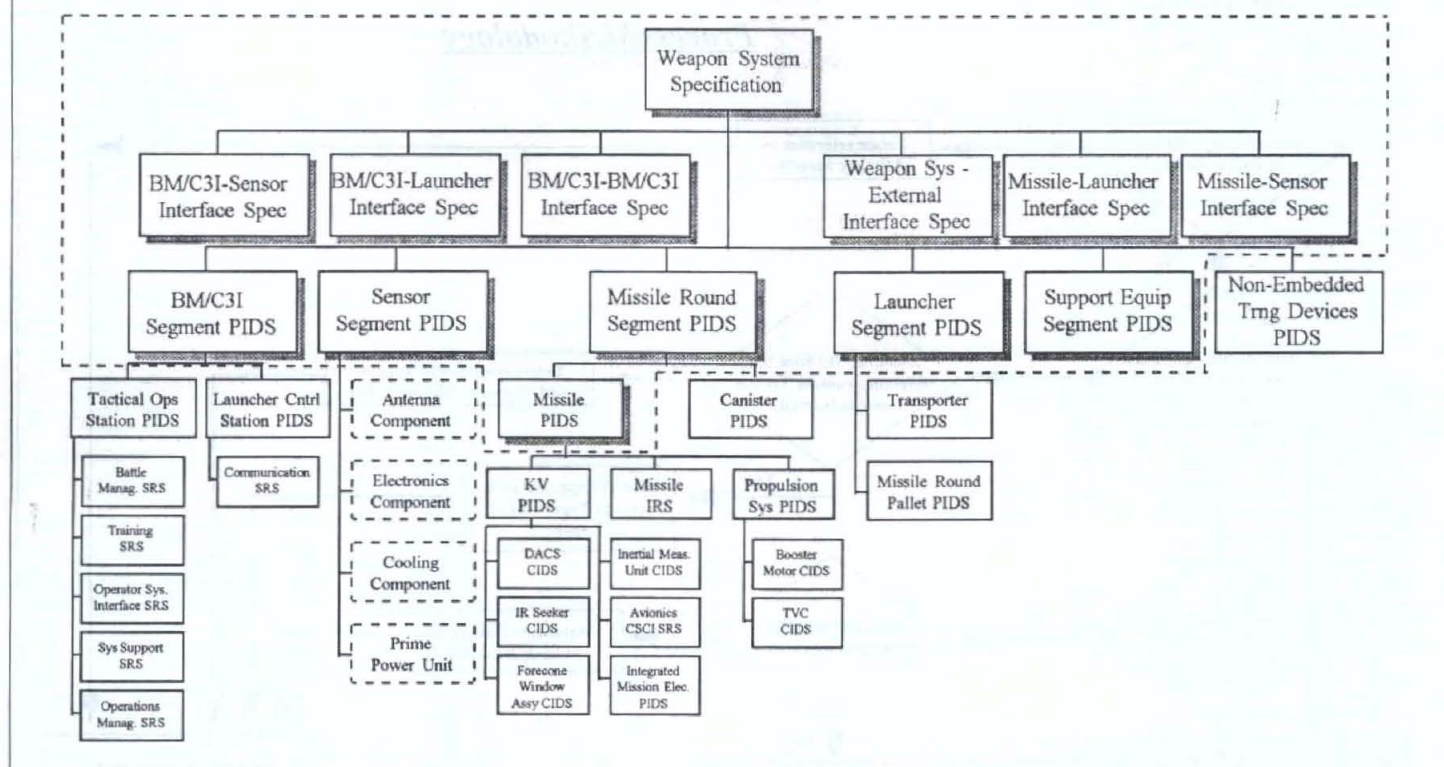


Figure 1.

THAAD objective system specification tree and performance baseline.

Operations Center provides connectivity to other THAAD elements and to adjacent and higher echelon units.

Why We Did It

Dr. William J. Perry, the secretary of Defense, initiated various acquisition reform initiatives as a result of the National Performance Review recommendations. The deputy under secretary of Defense (acquisition reform) chartered a process action team (PAT) on military specifications and standards to "...develop a strategy and a specific plan of action to decrease reliance, to the maximum extent practicable, on military specifications and standards."

The PAT report, *Blueprint for Change: Toward A National Production Base*, April 1994, identified 24 recommendations on all aspects of developing and applying military specifications and standards. The recommendations are grouped in the following seven general topic areas: Performance Specifications; Eliminating Excessive Contract Requirements; Overhauling the Standards Process; New Management Tools; The Education Imperative; Instituting Cultural Change; and General Acquisition Reform.

At this time, the major areas affecting THAAD are performance specifications and eliminating excessive contract requirements.

An Army Implementation Plan (AIP) was published on Nov. 23, 1994, that detailed specific actions to be taken. The AIP instructed each Army acquisition organization to "establish their own approach and document their tactical level acquisition reform plan in their own Master Action Plan (MAP)." The Program Executive Office (PEO) for Missile Defense MAP provided THAAD with clear guidance and direction to implement the military specifications and standards reform. Key guidance statements from the PEO Missile

Defense MAP are:

- "All solicitations for new phases of acquisition category m(ACAT) or special interest programs after 23 Dec 94 shall state needs in terms of performance specifications..."
- "All Contract Requirements Packages (CRPs) for other new solicitations ...shall state needs in terms of performance requirements/specifications..."
- "The preference is to not use a M & M (Management and Manufacturing) MIL Spec/Std."

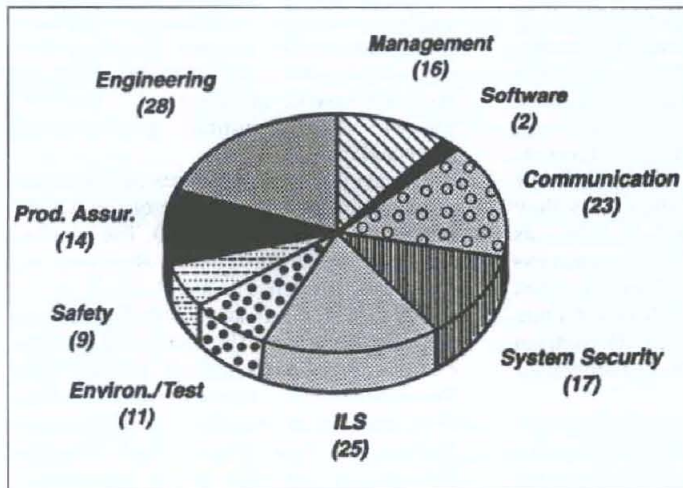


Figure 2. THAAD objective system specification reference technical classification areas.

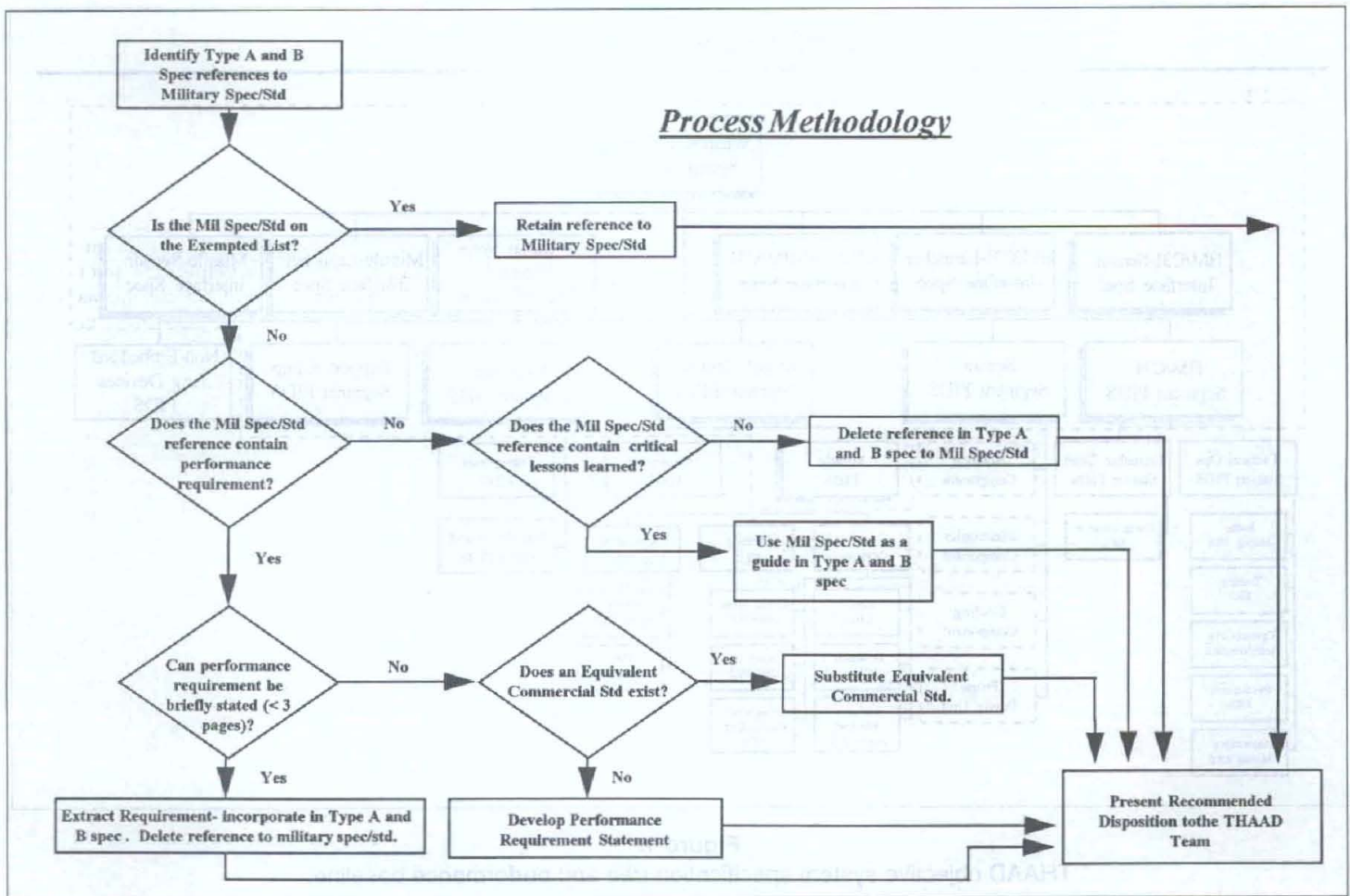


Figure 3.
THAAD military specifications and standards reform process methodology.

• "The preference is to use available non-government standards (NGS) or industry-wide standards as needed; cite M & M MIL Spec/Stds for reference only, as needed; justify mandatory use of any M & M MIL Spec/Std through the waiver process."

What Was Done

This first phase of the THAAD effort concentrated on the elimination of military specifications and standards contained in the top 13 objective system specifications of our Engineering Manufacturing Development design shown in Figure 1. Our goal was to remove these military specifications and standards, unless they were exempt from acquisition reform as interface standards. The waiver process exists within the Army but is used as a last resort. The complexity and diverse technical requirements of the THAAD Weapon System presented numerous challenges for achieving our goal.

Military specification and standard references, as well as other prohibited types of documents, covered a wide variety of tech-

nical and specialty engineering areas. A summary of the classification of these references is shown in Figure 2. This effort addressed major specialty areas of safety, transportation, security, parts and materials and human engineering, as well as the detailed engineering aspects of information systems, optics, and electromagnetic environments.

The THAAD Project Office developed metrics to assist our evaluation of military specifications and standards. These metrics reflect all references within the top 13 objective system specifications. Our total was 145 separate military specifications and standards.

An executable process was necessary to accomplish our goal because of the magnitude of the task facing THAAD. The process methodology for this effort is shown in the logic flow diagram of Figure 3.

After the identification of references in the specifications, the first step was to examine the *exempted* status list. Exempted in this context means that it has been declared an interface standard by the Defense Standards Improvement Council. This council approves interface standards

for DOD. If this is true, then the referenced standard was retained.

The next step in the process was to examine the specification or standard for performance requirements. A performance requirement defines "form, fit, function, or interface." This step separated the military specifications and standards containing performance requirements from the "how-to" management documents. Any reference to a "how-to" standard was either deleted (most common case) or used for guidance if it contains critical lessons learned.

The final process involved technical assessment of performance requirements contained in the military specification or standard. If the performance requirement was briefly stated, it could be extracted from the military specification or standard and inserted in the objective system specification. Then the reference to the military specification or standard was deleted. On the other hand, there were cases when the performance requirements were lengthy. In these cases, we evaluated existing commercial standards. Several equivalent commercial standards were found to replace the military specification or standard refer-

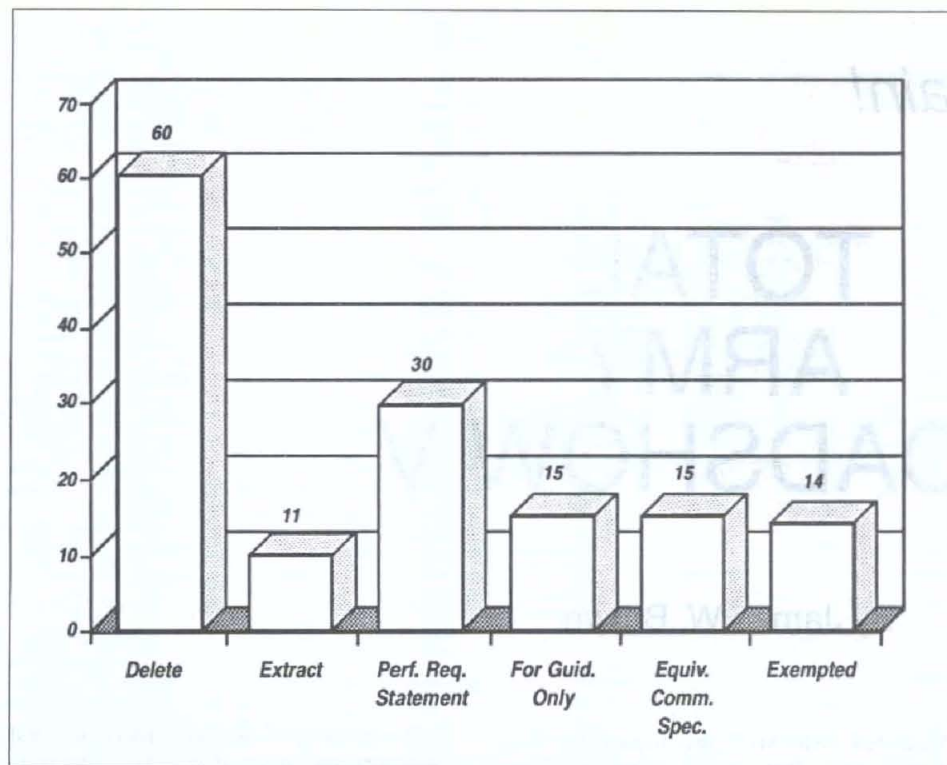


Figure 4.

Resulting disposition categories of the 145 military specifications and standards.

ences in the THAAD specifications. If a commercial equivalent standard was not found, we developed a general performance statement to capture the basic requirement.

Control and management of this complex task were key elements of our success. The THAAD Project Office developed the *Military Document Disposition* to organize the efforts of a diverse team of subject matter experts working concurrently to eliminate all references to military specifications and standards. The *Military Document Disposition* provided key information on the objective system specification reference, author of the individual disposition, recommended change, and justification. The specification reference section contains the actual usage of the military specification or standard in the objective system specification. The recommended change section provides a complete rewording of the particular reference. The justification section contains the author's reasons for making the recommended change. This control and management mechanism was a useful tool to structure the efforts of all team members.

The THAAD Project Office developed reconciliation documents to consolidate the results of all our dispositions for each objective system specification. The reconciliation documents capture the "was-is" format of our objective system specification references. The "was" portion corresponded to the actual specification para-

graph and reference. The "is" portion was the change required in the specification to comply with the reform initiative. An example of this format is provided:

"WAS" STATEMENT

3.2.4.1 Protective Coatings

Protective coatings/finishes shall be in accordance with MIL-STD-186, MIL-STD-171, and MIL-HDBK-132. Sealant shall be in accordance with MIL-A-46146. External finishes shall meet Chemical Agent Resistive Coating (CARC) requirements of MIL-STD-193.

"IS" STATEMENT

3.2.4.1 Protective Coatings

Protective coatings, finishes, and sealant shall be applied to all interior and exterior surfaces as necessary to provide corrosion protection, chemical agent resistant coating (CARC), and camouflage characteristics in accordance with the Corrosion Prevention and Deterioration Control (CP&DC) program as established by the contractor. MIL-STD-186 should be used as guidance for surface preparation, and application and quality control of paints and finishes.

This provided a convenient way to reach team consensus on the final resolution of all changes. The reconciliation documents were the basis for our Configuration Control Board change packages for the objective system specifications.

Data Repository

The THAAD Project Office and the Program Executive Office for Missile Defense are developing a user-friendly database to capture and retain all information attained by the extensive THAAD effort. This database will archive the dispositions, maintain various reports, and be a repository for sharing information with other offices. It is being designed for easy use on both PC and Macintosh platforms. The database and Beta testing were completed in September and October 1995.

Conclusions

The THAAD Project Office is successfully implementing military specifications and standards reform initiatives recommended by the PAT report and endorsed by Dr. Perry. The complexity of THAAD required a diverse team of dedicated subject matter experts to address numerous technical issues regarding specifications and standards. A workable process and methodology was developed to implement military specifications and standards reform which can apply to other Army and DOD agencies. The success of this effort is supported by the categorization metrics shown in Figure 4. A total of 145 separate military specification and standards references were completed. We are developing a data repository of the results of our efforts to assist other acquisition organizations. A clear road map and proven methodology has been established to successfully complete the work at THAAD for the remainder of our objective system specifications.

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On the Road...Again!

TOTAL ARMY ROADSHOW V

By James W. Brown

Background

Since the spring of 1992, the Army Materiel Command (AMC) has travelled annually to its major subordinate commands (MSCs) to carry a philosophy of streamlining acquisition management to the acquisition work force. The results have been very gratifying both in terms of the reactions of the participants and in the positive impacts on material acquisition programs. Through these symposiums, over 7,000 government and industry personnel received training.

This year, the training will continue, but the emphasis will be on the total Army acquisition community. With the expanded audience, this program should reach over 4,500 workers between February and December 1996. The Training and Doctrine Command (TRADOC), Forces Command (FORSCOM), Information Systems Command (ISC), Corps of Engineers, and Medical Command (MEDCOM) sites will be included in the itinerary. In addition, the Military Traffic Management Command (MTMC) and the National Guard Bureau are actively involved in the planning for Total Army Roadshow V.

The Contracting Support Agency in the Office of the Assistant Secretary of the Army (Research, Development and Acquisition) is leading the effort to coordinate a schedule of site visits and a program of instruction that will include subjects covering installation and base operations issues, construction matters, and service contracting in addition to the materiel acquisition topics usually covered in Roadshows. The subjects will also include the implementation of the Federal Acquisition Streamlining Act of 1994 (FASA) through the presentation of the Acquisition Reform Training

Modules (ARTMs) developed by the Acquisition Reform Communications Center (ARCC) of the Defense Acquisition University (DAU).

What Is the Total Army Roadshow Concept?

The theme of Roadshow V is contract and acquisition management and will focus on the total acquisition picture, i.e., it will be oriented to systems, services, installations and construction programs. The total Army nature of the training will be captured through regional Roadshows where participants will be from the host command, industry, and surrounding (typically within 200 miles) Army and other Department of Defense (DOD) activities.

The theme of Roadshow V is contract and acquisition management and will focus on the total acquisition picture, i.e., it will be oriented to systems, services, installations and construction programs.

The participants will be supervisors and managers and journeyman-level practitioners from the acquisition work force and their industry counterparts. They will be from all disciplines involved in the acquisition process, e.g., testers, engineers, logisticians, project managers, contracting specialists, and requirements developers. Many labor under the mistaken belief that Roadshow training is primarily for contracting professionals. Improvement of the acquisition process requires the participation of all who provide input or support to efforts that result in the award and management of contracts. That is why the Roadshow philosophy is heavily dependent on the participants being multi-disciplined.

There are 15 Roadshow V presentations planned. The training sites are chosen by the Army major commands (MACOMs) sponsoring each of the 15 shows. The criteria used in selecting the sites will be the size of acquisition work force at the location, the proximity of other Army/DOD acquisition work force members, and the availability of suitable conference facilities. Other factors include satellite up link capabilities, video teleconferencing facilities, and air and ground transportation systems. As of this writing, three of the MACOMs had settled on sites. MEDCOM has chosen San Antonio, TX; ISC has chosen Fort Huachuca, AZ; and AMC has chosen Huntsville, AL, Aberdeen, MD, Orlando, FL, Fort Monmouth, NJ, Detroit, MI, Rock Island, IL, Boston, MA, St. Louis, MO, Picatinny Arsenal, NJ, and Washington, DC.

The schedule for Total Army Roadshow V has been calendared, but the dates have yet to be assigned to the various MACOMs. The presentations will begin Feb. 6-8, 1996, and conclude Dec. 2-4, 1996.

The format of Total Army Roadshow will be similar to previous Roadshows. The training will cover 2-1/2 to three days. On the morning of the first day, Army Acquisition Executive the Hon. Gilbert E. Decker, the assistant secretary of the Army (research, development and acquisition) or his Military Deputy LTG Ronald Hite, will give the keynote address.

Next will be the MACOM perspective by the commander or deputy commander of the MACOM sponsoring that Roadshow. Then, Dr. Kenneth Oscar, the deputy assistant secretary of the Army (procurement), will give an overview of acquisition reform in the Army, followed by the industry speaker invited to address that Roadshow audience. The morning's activities will conclude with a question and answer period with a panel made up of the speakers.

The remainder of the training will consist of facilitator-led, four-hour workshops covering a variety of topics. While there will be some core subjects, electives will be offered to allow participants some flexibility in choosing the topics they want to learn more about.

Total Army Roadshow V planners are looking into establishing remote sites where the Roadshow training can be conducted concurrently with regional presentations. For example, the training facility at Fort Sam Houston in San Antonio, TX, has a satellite up link capability. When the MEDCOM-sponsored regional Roadshow V is held there, remote sites, with satellite down link capabilities, can be included in the first day's executive presentations and panel discussion. Facilitators will be at the remote sites to conduct the rest of the training just as at the regional site. Variations of this theme include the use of video teleconferencing and video taped presentations. In fact, these options are not mutually exclusive. They can be used one at a time, in pairs, or all at once. The only limiting factors are the availability of facilitators and facilities.

What Will Be Taught?

Core subjects will be taken from the ARTMs developed by the ARCC/DAU. The ARTMs focus on how to implement the policy changes that have occurred as a result of the recommendations from the various process action teams (PATs) established by DOD on the procurement process, contract administration, acquisition oversight and review, and electronic commerce/electronic data interchange (EC/EDI). They also focus on how to implement EASA 94 provisions, such as, simplified acquisition procedures/Federal Acquisition Computer Network (SAP/FACNET), commercial item acquisition, market research, new rules in cost and price analysis, task order contracts, contract award and debriefings, past performance evaluations, and protests, disputes

and appeals rules. Those ARTMs not chosen to be core subjects will be offered as electives. There will also be core teaching on how to form and work in integrated product and process teams (IPPTs) for effective acquisition planning and execution. The core subjects will cover two workshop periods (eight hours).

The electives will be offered concurrently and repeatedly over two or three workshop periods (eight or 12 hours). They will cover a wide range of topics, some new and some from previous Roadshows. The subjects chosen by the MACOMs as of this writing deal with the effects of acquisition reform on job order contracting, contingency contracting, modeling and simulation, and performance based service contracting. Some of the subjects picked from earlier Roadshows were best value contracting, how to write performance specifications/statements of work, and how to conduct request for proposal (RFP) scrubs. Each elective will be given in a four-hour workshop.

All workshops will consist of an introductory lecture, facilitator-led work group deliberations, and a report out period where work groups share results. The facilitators will be hand-picked experts from all the MACOMs, GS-13s/majors and above, and multi-disciplined. Each Roadshow session will have a mix of facilitators from several MACOMs.

Summary

Total Army Roadshow V is an expansion of the successful Roadshow concept. Where previous Roadshows have reached no more than 2,000 participants each, Roadshow V will reach potentially 4,500. The number of trainees reached grows even larger when remote sites are factored into the equation.

Nonetheless, the traditional quality of Roadshow training will remain high. The facilitator corps still contains top-notch professionals who are experts in their fields, well trained in the Roadshow V subjects, and committed to cultural change throughout the acquisition work force. The training materials continue to be effective, are easily understood and are thorough guides that will serve the participants as well at their desks as they will in the classroom. Finally, the executive speakers still come from the top acquisition echelons in the Army and industry. They will sometimes be controversial and provocative, but they will always be open and honest and never dull.

The addition of electives to the Roadshow format promises to be a boon for participants. It will allow flexibility and variety in the choice of subjects as well as an opportunity to pick up some of the popular topics from previous Roadshows.

As Roadshow moves into its fifth year, the excitement and anticipation are high.

Improvement of the acquisition process requires the participation of all who provide input or support to efforts that result in the award and management of contracts.

The expansion of the audience and the curriculum holds the promise of even greater achievements for the successful training series.

JAMES W. BROWN is the chief of the Acquisition Improvement Task Force in the Office of the Deputy Chief of Staff for Acquisition at HQ, Army Materiel Command. He holds a B.S. degree in electrical engineering from Tennessee State University and an M.S. degree in electrical engineering from Fairleigh Dickinson University. He is also a graduate of the Program Manager's Course at the Defense Systems Management College.

Some Key Points of 'Other Transactions'

- A recent study conducted for DOD estimates that the government pays 18 percent more for the products it buys due to government-imposed administrative requirements. Other estimates place this figure at up to 40 percent. (Coopers & Lybrand, and TASC, *The DoD Regulatory Cost Premium: A Quantitative Assessment*, December 1994)

- Both small start-up firms as well as larger companies become involved in other transactions.

- Other transactions are extremely flexible, allowing negotiations to proceed on a case-by-case basis rather than by imposing government "one-size-fits-all" rules. Patent rights is an area where flexibility is often required to meet the needs of commercially oriented companies. Other transactions have few non-negotiable provisions.

- The typical other transaction is cost-shared, with ARPA paying 50 percent or less of the cost. Its technology goal is most often to leverage commercial technology for use in a military application. Most other transactions involve consortia of industrial firms and often include academic institutions and government laboratories.

- The U.S. Senate on March 7, 1995, passed a sense of the Senate resolution which stated that: "(1) cost-shared partnerships between the Department of Defense and the private sector to develop dual-use technologies (technologies that have applications both for defense and for commercial markets, such as computers, electronics, advanced materials, communications, and sensors) are increasingly important to assure efficient use of defense procurement resources, and (2) such partnerships...need to become the norm for conducting such applied research by the Department of Defense."

ARPA SIGNS 100 INNOVATIVE AGREEMENTS OVER FIVE YEARS

The Department of Defense's Advanced Research Projects Agency has successfully pioneered the use of technology development or "other transactions" in recent years and has signed 100 of them.

Other transactions are contractual arrangements that support development without using standard procurement contracts, grants, or cooperative agreements. ARPA received authority for their use under 10 U.S.C. 2376. In 1993, Congress broadened the use of other transactions from research and development efforts and encouraged ARPA to experiment using other transactions to carry out military technology demonstration prototype projects that would normally require a formal contract.

In keeping with the DOD's effort for acquisition reform, other transactions do not follow the sometimes inflexible government policies found in the usual government procurement system and Acquisition Regulations. They are based on commercial practices and government standards. Government patent rules, accounting practices, for example, are not imposed on participants in other transactions but rather are negotiating points.

ARPA has found that the use of other transactions encourages companies to voluntarily conduct research and development for the government and become participants in Defense projects. Many companies do not adopt the government accounting and purchasing systems necessary to compete for government contracts because of the added cost burden. Companies that adopt the government-required systems sometimes become non-competitive in commercial markets, leading to the separation of the separate Defense and commercial industrial bases. ARPA's use of other transactions is one way DOD can leverage the best of commercial technology for the use of the military, even if that technology is found in companies that do not normally do business with DOD.

ARPA has been working with the military Services to encourage the use of these agreements throughout the DOD. Many of the efforts supporting ARPA's dual use initiatives use other transactions, and Service personnel involved in managing these efforts are gaining valuable experience in their use.

The growth in ARPA's use of other transactions has been dramatic. In the years 1990 to 1993, ARPA entered into 19 other transactions, which represented 8 percent of the number and 26 percent of the total value of financial instruments used by ARPA during that period. In fiscal years 1994 and 1995, ARPA entered into 81 other transactions, which represented 26 percent of the number and 72 percent of the total value of financial instruments awarded.

Examples of 'Other Transactions' Projects

Army

Electric and Hybrid Vehicle Technology Program

Company: Five consortia with member companies located throughout the United States

ARPA Agent: Training and Doctrine Command, U.S. Army Intelligence Center, Fort Huachuca, AZ

The ARPA Electric and Hybrid Vehicle Technology Program is pursuing research, development, and demonstrations of technologies for electric and hybrid vehicles directly relevant to Army combat vehicles of the future. Electric and hybrid technologies will permit future combat systems to be highly deployable, mobile, sustainable, survivable, lethal, and affordable. The program sponsors seven regional consortia; the management of five of these consortia has been transferred to the Army using ARPA-negotiated other transactions. The use of other transactions has enabled the participation of companies who don't usually do business with the Army and has permitted cost-shared arrangements.

Air Force

Manufacturing Testbed for Active Matrix Liquid Crystal Displays (AMLCD)

Company: Optical Imaging Systems (OIS), Northville Township, MI

ARPA Agent: Manufacturing Technology Directorate of Air Force Wright Laboratory, Wright Patterson AFB, OH

A domestic source for AMLCDs is critical to the Air Force for the new and upgraded aircraft cockpit displays it needs. OIS was competitively selected to establish a manufacturing testbed for Defense-critical AMLCDs in the U.S. The effort is cost-shared, with OIS providing the new building for the pilot manufacturing facility (\$50.5 million) and ARPA funding the manufacturing and process equipment (\$48 million). OIS is primarily a commercial company, and strongly disagreed with the conventional FAR-based model contract originally considered because of the perceived excessive oversight that they were unaccustomed to as a commercial company. They were also concerned about the threat to their intellectual property that they felt would occur under a FAR-based instrument. More than 60 days were expended during this initial negotiation due to the company's concerns, and negotiations were at an impasse until the Air Force brought up the possibility of using an ARPA other transaction. Once its use had been approved, negotiations were concluded in 21 days. OIS broke ground on the facility in August 1993. The Air Force feels that this project is successfully underway solely because of the use of the ARPA other transactions authority.

Navy

National Consortium on Microwave Ferrites

Company: Westinghouse, Pittsburg, PA

ARPA Agent: Naval Research Laboratory

Dr. Gary A. Prinz of the Naval Research Laboratory was the focal point for establishing this consortium, which seeks to establish a technology base to enable the integration of ferrites into high frequency semiconductor technology. Microwave ferrite technology is fundamental to a variety of DOD high frequency applications such as radar and satellite-to-ground communications. The flexibility of ARPA's other transaction authority was crucial to forming this consortium. The technology cannot be advanced by any one company because the U.S. technical base in this area is too small. The consortium brings together competitors such as Westinghouse and Raytheon, along with smaller companies, universities and government laboratories, to provide a technical base sufficient to place the U.S. in the world's leading position in this key technology.

PROCESS ACTION TEAM IDENTIFIES OPPORTUNITIES FOR IMPROVING ACQUISITION CAREER MANAGEMENT

EDITOR'S NOTE: This is the first in a series of articles that will describe how the Army is undertaking a long term initiative to improve the way we are managing our acquisition work force. This article provides a broad overview of the work recently completed by a Process Action Team charged with identifying opportunities for improving acquisition career management. As the details of implementation are generated, we'll provide updates on progress. This first article sets the stage for many more to come.

Enacted in FY91, the Defense Acquisition Workforce Improvement Act (DAWIA) was aimed at improving the overall effectiveness and professionalism of military and civilian personnel charged with manage-

ment and administration of Defense acquisition programs. The major aspects of DAWIA include:

- Recognizing acquisition as a professional career field;
- Improving the education, training, and experience levels of acquisition professionals;
- Establishing a career management structure in the Department of Defense;

AAC PAT Background

- Mr. Keith Charles appointed as DDACM on 1 Sep 1995
- Chartered an AAC Action Team...within 60 days to :
 - Provide a Strategic Vision of the Army Acquisition Corps
 - Baseline Existing AAC Structure & Policies...Identify Shortcomings & Opportunities for Improvement
 - Generate an Action Plan that Achieves Near Term Results Towards an Objective End State - Strategic Vision

Team:

| | |
|--------------------|---------------------|
| Mr. Robert Morig | AAESA |
| Mr. Carlos Piad | ODCSAQ, HQAMC |
| COL Edward Cerutti | PERSCOM |
| Mr. Gary James | RDAISA |
| Mr. Dick Childress | ADO |
| Mr. Eddie Bair | PEO IEW |
| Ms. Myrna Meisner | Army Civilian (Ret) |
| Mr. Dale Fradley | AAESA |



Figure 1.

- Establishing programs to assist acquisition personnel in their professional development.

The Army, along with the other Service components and the Office of the Secretary of Defense (OSD), then set out to implement DAWIA. We've come along way in complying with the law, however, many good initiatives in acquisition career management have yet to be fulfilled.

We have accessed 3,800 Army civilians and 2,500 military personnel into the Army Acquisition Corps (AAC). And, we're nearly complete with our first certification effort to insure that our personnel have the requisite mandated training at their current grade/rank and occupational series. Learning as we go, we are now aggressively managing Defense Acquisition University quotas to maximize our use of acquisition training resources. Though we continue to make progress...we must seize the opportunity to improve the Army's acquisition career management structures and processes.

Recognizing these opportunities, Keith Charles, deputy assistant secretary of the Army for plans, programs and policy (named deputy director for acquisition career management Sept. 1, 1995), chartered a multi-disciplinary Process Action Team (PAT) to undertake a new look at how the Army has approached acquisition career management—with a focus on the civilian component (Figure 1).

To obtain a baseline understanding of the current state of acquisition career management, the PAT hosted a number of visits from key players in the process. These included representatives from:

- The U.S. Army Personnel Command's Acquisition Career Management Office;

Strategic Overview

Develop Competent Leader / Manager

Vision

A Professional Work Force

A Small Premier Professional Corps of Acquisition Leaders Willing to Serve Where Needed and Committed to Developing, Integrating, Acquiring and Fielding Systems Critical to Decisive Victory...for the 21st Century

Corps Member Responsibilities

- Serve as a Member of a Premier Corps of Military and Civilian Acquisition Leaders; Certified to Develop, Integrate, Acquire and Field Systems Vital to the 21st Century Army.
- Participate in a Comprehensive Career Program; Including Accession, Education, Training, Experience, Assignment, Promotion and Retention.
- Willingly Serve Where Abilities Can Best be Developed and Skills are Most Needed.
- Responsible for Possessing Functional, Leadership and Managerial Skills Essential to Achieving the Highest Standards of Excellence and Ethics in Acquisition.

Figure 2.

- Functional career representatives;
- OSD's director for acquisition career management;
- The military acquisition career proponent;
- The U.S. Navy Office of the Director, Acquisition Career Management;
- The U.S. Air Force, assistant director, acquisition career management. (A complete list of other individuals who briefed the PAT is contained in the final PAT report.)

In the process of establishing the baseline, the team members identified the following missing elements they believed were essential to success:

- A Strategic Vision for the Army Acquisition Corps;
- A Clear Vision for the End State of the Army Acquisition Corps;
- A Coordinated Strategy with Functional Career Chiefs;
- A Comprehensive Plan for Career Management Data;
- "Training as a Mission" Culture in the Civilian Component;
- Central Referral and Announcement Processes;
- Integration Between Military and Civilian Components;

The strategic vision for the Army Acquisition Corps should forge the foundation for all policies and initiatives impacting the acquisition work force. To fill this gap, the PAT recommended a re-energized strategic vision for the AAC (Figure 2). The notion of "a Small, Premier Professional Corps" talks to the goals of developing the top performers and then challenging them with our most demanding jobs.

Working from this strategic vision, team members then projected out five years from now to envision an end state. This end state focused on key facets of what needs to be in place—in terms of management attributes—to achieve the vision in year 2000 and to drive near term progress (Figure 3). The strategic vision and end state, presented by the PAT, form a challenging and aggressive series of initiatives to change the culture in Army acquisition career management. Many details in terms of policy and procedures remain to be worked.

To work towards this end state, the PAT visualized a new concept for managing the acquisition work force (Figure 4). This concept pictured a core of Critical Acquisition Positions (CAPs), i.e., designated SES, GS-15, GS-14 positions, that would be centrally managed. The PAT envisioned promotions and job selections, for all CAPs, being influenced by a set of Quality Achievement Factors (QAF). Those in the centrally managed core would be afforded the services of functional assignments officers (similar to military members of the AAC) who would help them obtain enriching job experiences, and training and educational opportunities—keyed to the QAFs.

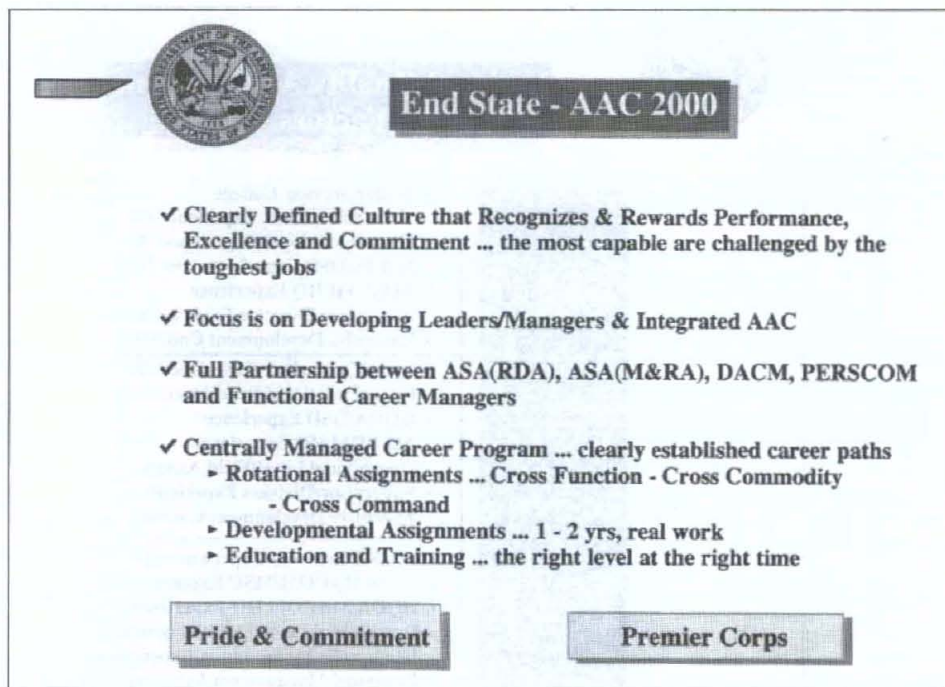


Figure 3.

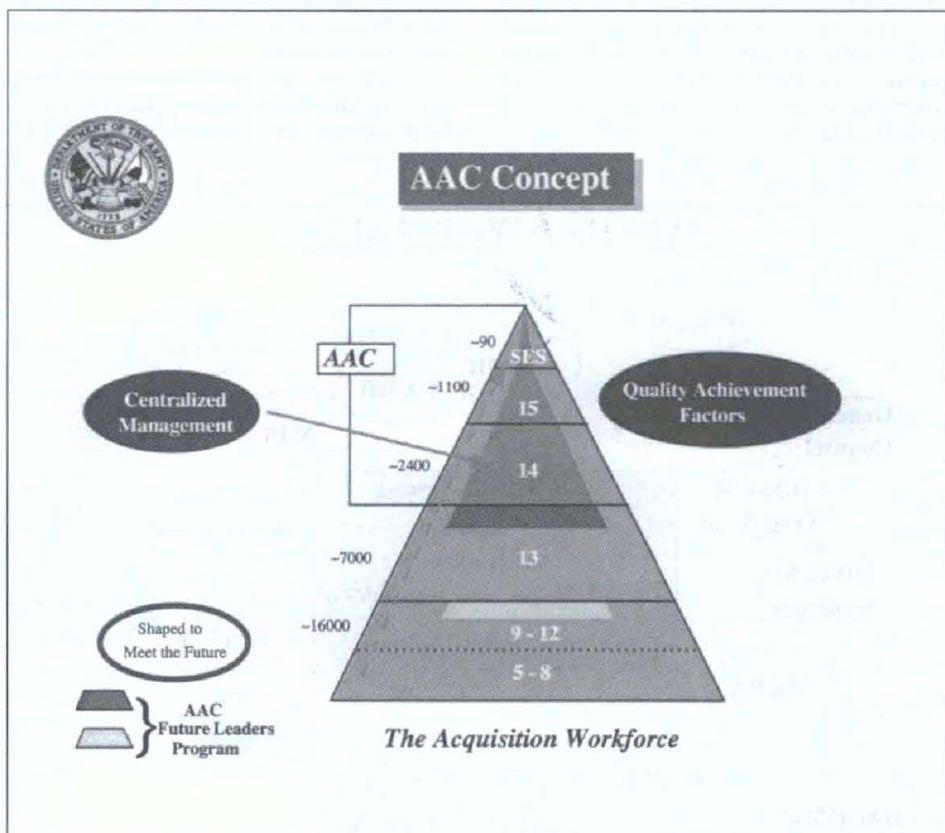


Figure 4.

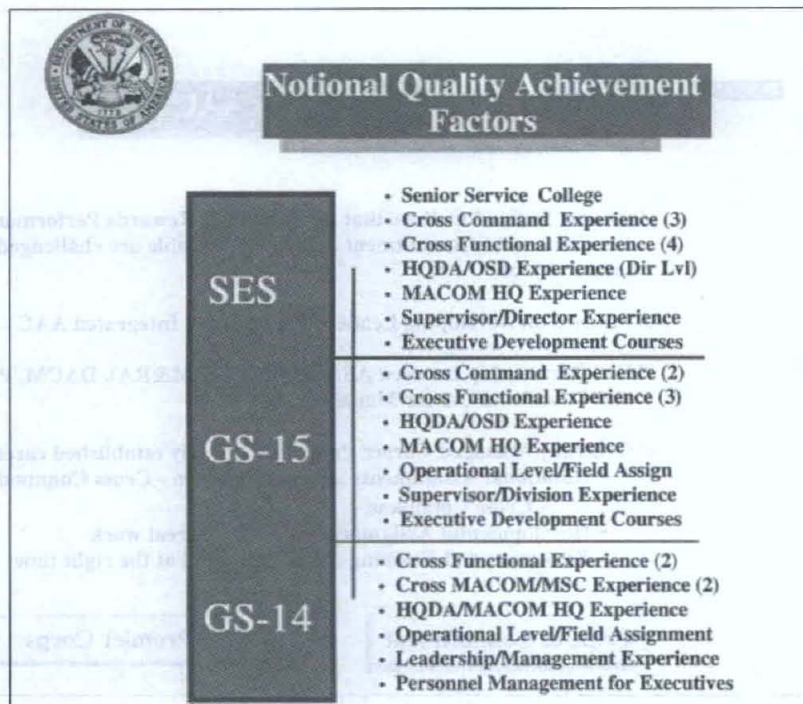


Figure 5.

Although the approved QAFs must be coordinated with program career functional chiefs, the team posed a set of notional factors for program management positions (Figure 5). More work will need to be done to insure compatibility with the other acquisition career fields included in the acquisition work force, e.g., contracting; quality assurance; business, cost estimating, and financial management; systems planning; and research, development and engineering; etc.

To generate additional ideas for improvement and to obtain executive insight into the strategic vision, end state and implementation strategy, the PAT briefed its concept to an array of Army acquisition leaders (Figure 6). The team incorporated comments and suggestions from these leadership briefings and made a series of mid-course corrections.

Finally, the PAT presented its results to the deputy director for acquisition career management on Oct. 13, 1995, and com-

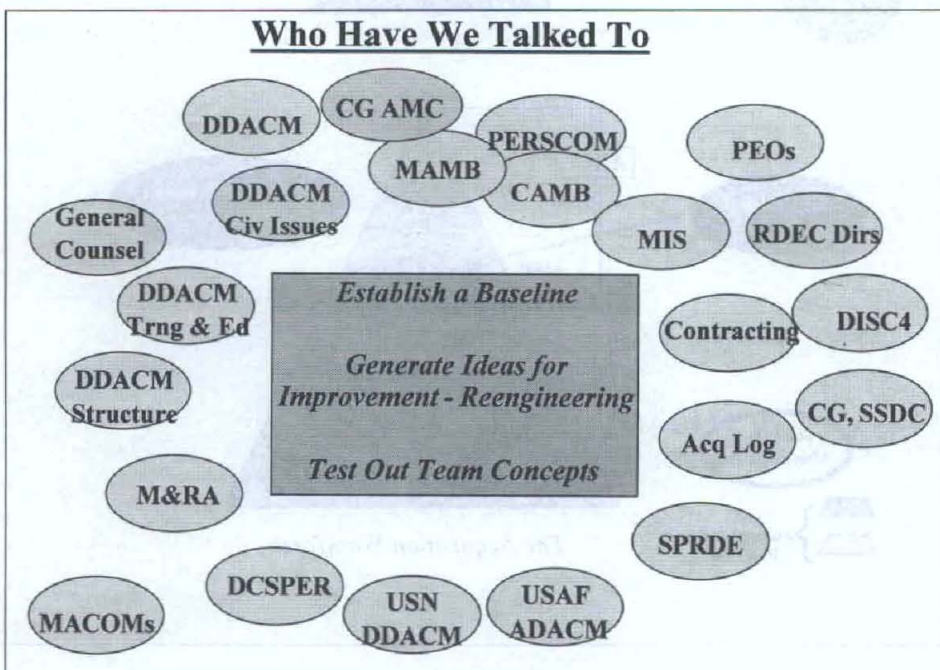


Figure 6.

pleted its deliberations in accord with the charter.

The Next Phase

Now that the PAT has completed the demands of its charter, the hard work begins. Keith Charles has directed that a set of thrust teams (teams will be composed of personnel in developmental assignments representing HQDA and acquisition major commands) be activated to flesh out the recommendations of the PAT. These thrust teams will identify avenues for implementing PAT recommendations, generate implementing policies and procedures and aggressively pursue near-term initiatives toward the end state and strategic vision for the Army Acquisition Corps. Much work remains to be done...stay tuned.

CARLOS A. PIAD is a senior acquisition policy specialist in the Office of the Deputy Chief of Staff for Acquisition, U.S. Army Materiel Command. He holds a B.S. degree in structural engineering from Tulane University and is a senior fellow of the Kennedy School of Government.

ROBERT D. MORIG is director of the Army Acquisition Executive Support Agency. He holds an M.S. degree in industrial management from Georgia Institute of Technology.

COL EDWARD A. CERUTTI is a member of the Officer Personnel Management System XXI Precursor Study Group, Headquarters, Total Army Personnel Command. A licensed professional engineer in Virginia, he holds a B.S. degree from the U.S. Military Academy and M.S. and Ph.D. degrees in mechanical engineering from the University of Arizona.

Thirty-four nominations have been selected to receive Department of the Army R&D Achievement Awards for accomplishments during fiscal year 1994. This award is given in recognition of outstanding leadership or achievements in research and development (R&D) that have resulted in improved U.S. Army capabilities and contributed to the nation's welfare. The winners and their achievements, listed by major command, are as follows:

U.S. ARMY MATERIEL COMMAND

U.S. Army Research Laboratory

Dr. Teizi Henmi, Robert E. Dumais Jr., and Martin E. Lee, all meteorologists, will be commended for their contributions toward developing the battlescale forecast model. This model will provide the Army battle command system battlefield automated systems to receive predictive weather information for the automated decision process.

Dr. Jubaraj Sabu and Charles J. Nietubicz, both aerospace engineers, and *Karen R. Heavey*, a mathematician, will be cited for outstanding research which has led to the development and application of a zonal, Navier-Stokes code for the prediction of projectile base flows with conventional, rocket-assisted, and base bleed/burn afterbodies. The developed capability is at the leading edge of computational aerodynamics for base flow and provides the Army with a significant advancement for evaluating new or modified projectile designs.

George Hauver, and Paul Netherwood, both research physicists, and *Ralph Benck*, a research scientist, will be cited for revealing new understanding in how ceramic materials can reach their theoretical capabilities in the defeat of kinetic energy projectiles. These researchers demonstrated an armor which completely destroyed a long rod kinetic energy projectile on the surface of the ceramic without damage to the ceramic layer. Their work has impacted important U.S. Army programs including continuum mechanics modeling codes, current medium caliber armor systems, and armors for future combat vehicles.

A team of researchers comprised of

ARMY NAMES R&D ACHIEVEMENT AWARD WINNERS

George C. Wiles IV, Brian T. Mays, and John S. Eicke, all electronics engineers, and *Andrew P. Ladas*, a mechanical engineer will be cited for demonstrating the ability to accurately track an artillery projectile to predict its impact point using the Global Positioning System (GPS). This system will greatly increase the accuracy and effectiveness of artillery fire as well as reduce the dependence on forward observers.

Nibir K. Dbar, an electronic engineer, will be cited for his achievements in developing novel techniques to improve heteroepitaxy and to grow selected area CdZnTe thin film by molecular beam epitaxy. This accomplishment is a significant contribution to the Army's goal of developing large infrared focal plane arrays using hybrid infrared technology.

David L. Rodkey, a supervisory electronic engineer, will be commended for leading a team of scientists and engineers to develop advanced technologies in synthetic aperture radar (SAR) and automatic target recognition. These advances, demonstrated

under the Army's SAR Target Recognition and Location System Program, will give commanders the ability to rapidly locate and identify critical mobile targets deep on the battlefield during the day, at night and in adverse weather conditions.

Frank Carson Krieger, a chemist, *Jeffrey A. Swank*, a mechanical engineer, and *Michael E. Dunn*, a mechanical engineering technician, will be cited for producing a special spin-stable thermal battery that provided the current for the successful demonstration of GPS registration round fuse. The novel design improvements, based on electrochemical modifications and thermal management, promise extensions of thermal battery technology to other military applications.

Dr. H. A. Leupold, a research physicist, and *Dr. Ernest Potenziani II*, a research physical scientist, will be recognized for their invention, prototype construction, and successful demonstration of a permanent magnet solenoid for electron beam focusing in a corps surface-to-air missile traveling

wave tube microwave source. This achievement enables elimination of power supplies, cooling systems and other unnecessary bulk and mass detrimental to ballistic use.

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

Dr. Arthur J. Bracuti and *Donald S. Chiu*, both physical scientists, will be cited for developing a new type of combustion chamber (step chamber) which controls the combustion and interior ballistic cycle of a bulk-loaded liquid propellant gun system.

Dr. M. Yvonne and *Dr. D. Lanzerotti*, both research physical scientists, will be recognized for their outstanding work in introducing ultracentrifuge, laser profilometer, atomic force microscopy and fractal statistical techniques to characterize the behavior of energetic materials during high acceleration. Their work is particularly relevant to the future development of energetic materials used in weapons with higher acceleration.

Dr. Ernest Baker, a research physicist, will be recognized for R&D which advances automated computer optimization technology. This effort has significantly contributed to the Army's continuing commitment to provide a decisive edge to the soldier in the field.

Dr. Frank Owens, a research physical scientist, will be commended for his pioneering development of the capability to predict explosive sensitivity from molecular structure. The work represents a major fundamental advance in understanding the chemistry of explosives. This work will have enormous impact on development of new insensitive explosives.

Dr. Tung-Ho Chen will be recognized for his R&D related to the vapor tagging of plastic explosives to deter international terrorism. He planned and directed a concerted, comprehensive R&D effort in the manufacture and complete physico-chemical characterization of modified composition C-4 marked with a vapor taggant for airport security.

Richard Fong, *William Ng*, and *Brian Travers*, all mechanical engineers, will be cited for R&D which advances initiation based multimode

warhead technology. This effort has significantly contributed to the Army's continuing commitment to provide a decisive edge to soldiers in the field.

George Papanagopoulos, an electrical engineer, *Mary Devito*, a computer engineer, and *Dr. Norman Coleman*, a mathematician, will be recognized for their pioneering research in software architecture, model based software design methodology, and architecture description languages for large scale embedded software systems associated with smart weapon applications. This technology substantially enhances the quality and reliability of embedded software while reducing software cost by enabling a component based software development process based on reuse and reengineering of existing components.

U.S. Army Aviation and Troop Command

CPT Gregory W. Walker and *Robert L. Wade*, a computer engineer, will be cited for merging breakthrough controls science and technology to create a multi-platform system for unmanned rotary-wing vehicles. The resulting product, the fuzzy logic adaptive controller for helicopter, was successfully flown on a drone helicopter with low-cost, off-the-shelf sensors and computers. As a result, this highly modular concept will extend the Army's utilization of future air vehicles.

Dr. Yung H. Yu, *Dr. Chee Tung* and *Judith M. Gallman*, all aerospace engineers, will be commended for their outstanding technical leadership and research work in investigations of basic physical understanding of rotor blade-vortex interaction noise and vibration as well as the effect of active blade control concepts on noise and vibration reduction. The comprehensive database from their research will serve as a landmark dataset which will guide rotor design and systems improvements for many years to come.

Edgewood RDE Center

Dr. Sharon Reutter, a research physiologist, and *LTC John Wade* will be commended for their preparation of the report, "Review of Existing Toxicity Data and Human Estimates for Selected Chemical Agents and

Recommended Human Estimates Appropriate for Defending the Soldier." This exhaustive monograph set a new standard for human estimation of chemical agent toxicity and will serve as a basis for designing chemical protective clothing and equipment.

Missile Command RDE Center

Robert R. Mitchell, a research electronic engineer and *K. Scott Lindley* and *Wendy K. Carriger*, both electronic engineers, will be recognized for R&D which led to the demonstration of a novel new form of low cost laser missile guidance. This new technique promises to allow simple guidance retrofit on presently unguided rockets to complement existing guided missiles.

Soldier Systems Command

Philip Cunniff, a research mechanical engineer, is commended for outstanding scientific and engineering expertise in materials research that has resulted in the development and implementation of an analytical model suited for continuous product improvement of textile fibers designed for personnel armor. This enabling technology allows objective assessment of trade-offs in ballistic impact performance associated with altering fiber's high strain rate performance.

Tank-Automotive RDE Center

Dr. Walter Bryzik, a senior research scientist, and *Ernest Schwarz* and *Eugene Danielson*, both research engineers, will be commended for state-of-the-art contributions in the area of advanced military diesel engines and for production spin-off of this technology to the Army fleet.

Dr. Grant Gerbart and *Thomas Meitzler*, both physicists, and *Euijung Sohn*, an electrical engineer, will be cited for the research and development of target acquisition technologies for dual use applications. These include military vehicle signatures and collision avoidance countermeasure for commercial automobiles.

Test and Evaluation Command

Dr. Martin S. Marshall, a physicist, *David J. Gladden*, a physical scientist, and *Jimmie W. Barnes*, a supervisory

electronics technician, will be commended for their exceptional performance in the design, fabrication, and development of control systems on a new state-of-the-art chemical agent vapor test chamber and corresponding optical systems. Their efforts have resulted in the successful execution of the XM21 remote detector system, the lightweight scanning chemical agent detector and several other detector programs.

U. S. ARMY CORPS OF ENGINEERS

U.S. Army Topographic Engineering Center

Robert S. Rand, a physical scientist, will be cited for his development of an application which combines computer science and hyperspectral technology that enables automated identification of materials from spectral data.

U.S. Army Corps of Engineers Waterways Experiment Station

David Bennett, a supervisory civil engineer, will be commended for his research and leadership in trenchless technology. He led a team of researchers in a comprehensive evaluation of microtunneling, mini-horizontal directional drilling, and pipeline rehabilitation methods. His effort resulted in a set of guidelines that the corps, other government agencies, and private firms use to specify trenchless methods appropriate for their requirements and site conditions.

Henry S. McDevitt Jr., a research civil engineer, will be cited for his outstanding contributions to the R&D of state-of-the-art stand-off demolition techniques using the explosively formed penetrator. This technology provides combat engineering and special operations troops with a new demolition munition that greatly enhances mission accomplishment while providing reduced risks to personnel.

Jeffrey A. Melby and *George F. Turk*, both research hydraulic engineers, will be recognized for their invention and development of a new concrete armor unit called CORE-LOC. Their invention has demonstrated significantly superior stability and structural strength over existing armor shapes for navigation and coastal protection.

Dr. Judith C. Pennington, a research biologist, and *Karen F. Myers*, a biologist, will be commended for the development of mass balance to determine the fate of an explosive in a simulated compost treatment system for remediation of contaminated soil. The information they have generated provides a strong scientific basis for evaluating the ultimate fate and hazards associated with this innovative remediation technology.

U.S. Army Cold Regions Research and Engineering Laboratory

Dr. Daniel Lawson, a research physical scientist, *Dr. Steven Arcone*, a geophysicist, and *Allan Delaney*, a physical science technician, will be recognized for the development of new techniques of using ground penetrating radar for hazardous and toxic waste detection and site characterization. The use of this non-intrusive technique significantly reduced the need for exploratory subsurface drilling and excavation.

Dr. James Welsh and *Dr. George Koenig*, both physicists, will be recognized for the development of a pioneering thermal infrared scene generation capability. They have originated significant new insights for integration and validation of a unique, physics-based simulation that allows generation of complex synthetic scenes for thermal infrared sensing devices for virtually any set of conditions or terrain features. The field activities were conducted to provide the Department of Defense with a high fidelity database for evaluation of advanced weapon system performance.

U.S. ARMY MEDICAL RESEARCH AND MATERIEL COMMAND

U.S. Army Aeromedical Research Laboratory

Dr. Roger W. Wiley will be commended for outstanding performance as a supervisory research optometrist and chief of the Visual Sciences Branch. He led a multi-agency research team in developing the test protocol and conducting a major field study to assess the impact on flight performance of prototype helmet displays for the RAH

66 Comanche helicopter.

U.S. Army Medical Research Institute of Infectious Diseases

Dr. Robert G. Ulrich, a microbiologist, will be cited for outstanding contributions to immunology and immunotoxicology. He identified the mechanism of actions of the staphylococcal enterotoxins and developed a second-generation recombinant vaccine candidate to protect U.S. Service members from this biological threat.

Dr. Jonathan F. Smith, a microbiologist, will be commended for making outstanding contributions to the diagnosis and prevention of Alphaviruses. These viral diseases cause encephalitis and pose threats to U.S. military forces.

ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

Dr. Billy L. Burnside, a senior research psychologist, will be commended for his outstanding contribution to R&D supporting the Virtual Training Program (VTP) at Fort Knox, KY. Dr. Burnside led the development, evaluation, refinement, and implementation of all training for the VTP. His efforts resulted in a structured simulation-based training program that makes innovative and efficient use of simulation networking and Janus technologies. This program is now being used to train Army National Guard and active component units, and is providing a cornerstone for the development of future simulation-based training.

CONFEREES DISCUSS INTEGRATED PRODUCT TEAM CONCEPT



Dr. Paul Kaminski, under secretary of Defense (acquisition and technology) gave the keynote address which set the tone for the conference.

More than 400 representatives from the Department of Defense, Army, Air Force and Navy, attended an Integrated Product Team (IPT) Conference, July 20, 1995, at the Defense Systems Management College, Fort Belvoir, VA.

Hosted by Under Secretary of Defense (Acquisition and Technology) (USD(A&T)) Dr. Paul Kaminski, the conference, titled, "Institutionalizing IPTs—DoD's Commitment to Change," provided an open forum to discuss ways to better use the IPT concept in the weapons systems acquisition process.

Colleen A. Preston, deputy under secretary of Defense for acquisition reform, and master of ceremonies for the conference, welcomed the attendees and introduced the keynote speaker, Dr. Kaminski. Preston noted that IPT is not just a passing concept, but a key component of the Department's acquisition process.

Kaminski, in his keynote address, stressed his hope that IPT becomes a "giant step" forward in the acquisition process. He conveyed his visions and expectations of how the acquisition process will change as a result of the IPT concept. The IPT concept, he said, is meaningful acquisition reform. Kaminski also cited trust and teamwork as the two most important characteristics of successful IPTs. Also, Kaminski presented the "Program Manager's Bill of Rights and Responsibilities," which outlines the mutual expectations of program managers and their acquisition chain of command—the USD(A&T), the component acquisition executives, and the program executive officers. Continuous insight; emphasis on prevention over cures; and focus on program success were important in the IPT effort, said Kaminski. "This must be a team effort among our war fighters, our

program managers and our functional staffs. I ask you to work with me to become agents of change in creating a legacy for U.S. forces in the year 2010," Kaminski said.

Following the keynote address, R. Noel Longuemare, principal deputy USD(A&T), gave a presentation on the OSD transition to the IPT concept. He pointed out that the IPT is a decision-making process involving not only the leadership, but all the representatives from the functional areas involved in the program. Longuemare stated that IPTs offer a method to streamline the system, allowing access to a wealth of knowledge with all stakeholders having an opportunity to participate. He described the major cultural shift involved in the IPT concept. IPTs, he noted, will improve program success and result in fewer crises and "gotchas," eliminate sequential and redundant reviews, and ensure the availability of expert help.

Dr. George R. Schneider, director for strategic and tactical systems, Office of the USD(A&T), spoke on IPT implementation and the Overarching IPT (OIPT). An OIPT includes representatives from the offices of all the Defense Acquisition Board principals and advisors. It is convened to review and resolve various problems. Another topic he discussed was the Life Cycle Cost Performance IPT, which is used for cost performance trade-offs and to establish program cost-range goals. Also, he stated that the OIPT's membership is designed to be inclusive, rather than exclusive, and stressed the need for PEOs to speak directly with the component acquisition executives, rather than "going around" the system.

Anthony M. Valletta, deputy assistant secretary of Defense (command, control, communications and intelligence (C3I) acquisi-

OSD (A&T) Direction



"I direct an immediate and fundamental change in the role of the OSD and Component staff organizations currently performing oversight and review of acquisition programs. In the future these staff organizations shall participate as members of integrated product team or teams, which are committed to program success. Rather than checking the work of the program office beginning six months prior to a milestone decision point, as is often the case today, the OSD and Component staffs shall participate early and on an on-going basis with the program office teams, resolving issues as they arise, rather than during the final decision review..."

Paul Kaminski

Reengineering the Acquisition
Oversight and Review Process

April 28, 1995

tion), expressed his support for IPTs and introduced speakers from each Service to present briefings on Service implementation of the IPT concept. These speakers included the Service acquisition executives and selected program managers. Speakers were: Gilbert F. Decker, assistant secretary of the Army (research, development and acquisition) (ASA(RDA)) and Army acquisition executive; COL William B. Sheaves III (U.S. Army), project manager—Crusader; VADM Bill Bowes (U.S. Navy), principal deputy to the assistant secretary of the Navy (research, development and acquisition) and Navy acquisition executive representative; CPT Dave Burgess (U.S. Navy), program manager—PMO 450, new attack submarine; CPT M.A. Gauthier (U.S. Navy), program manager, LPD-17, an amphibious transport dock ship; and BG John W. Hawley (U.S. Air Force), director of fighter, weapons, command and control and missile defense programs.

Following these presentations, a question and answer session provided the conferees the opportunity to direct questions to the Service representatives. Topics included: the role of program executive officers on IPTs; the impact of downsizing on the IPT process; expanded involvement of the OSD-empowered members in the IPT process; and adversarial IPT members.

ADM William A. Owens, vice chairman of the joint chiefs of staff and chairman of the Joint Requirements Oversight Council, spoke on the joint staff's role in the IPT process. He stressed the importance of working together to increase efficiency and jointness of the process without increasing cost and time.

Derek J. Vander Schaaf, DOD deputy inspector general (IG), gave the luncheon address, noting that the IG is very acquisition reform-oriented, but also believes the acquisition process is not hopelessly broken. He expressed the view that the IPT approach is



Assistant Secretary of the Army (RDA) Gilbert F. Decker (right) confers with Deputy Assistant Secretary of the Army (Procurement) Dr. Kenneth Oscar, during the IPT Conference.

changing the way acquisition is being managed—from an oversight form of management to a more participative form of management. Vander Schaaf pointed out the need for IG involvement in the IPT process, stating that the IG's Office brings a unique ability to the IPT process—that is, the ability to provide the proper perspective on all aspects of acquisition and contract administration. Vander Schaaf stated quite candidly that although the IPT is a step in the right direction, it does raise a lot of questions. He encouraged the attendees to maintain contact with the IG's Office and keep them informed about any problems early in the process.

Emmett Paige Jr., assistant secretary of Defense (C3I), spoke on the IPTs in the Major Automated Information Systems Review Council (MAISRC) process. He noted that this administration takes acquisition reform seriously. Paige said that he not only believes in oversight, but that he believes that it is important to find ways to implement intelligent oversight, or that oversight which adds value to the acquisition

process. He said that we can no longer afford one-size-fits-all or a cookie cutter approach to oversight. Paige stressed the need to remove any adversarial barriers and get on with the teamwork.

Following Paige's presentation, a panel convened to discuss the OIPT members' roles in the IPT process. The panel was chaired and moderated by Colleen Preston, and included the following members: Bill Lynn, director, program analysis and evaluation, OSD; Phillip E. Coyle III, director, operational test and evaluation; Gilbert F. Decker, ASA(RDA) and Army acquisition executive, VADM Bill Bowes, principal deputy to the assistant secretary of the Navy (research, development and acquisition) and Navy acquisition executive representative; Darleen Dryun, acting Air Force acquisition executive; Irv Blickstein, director, acquisition program integration, Office of the USD(A&T); Tony Valletta, deputy assistant secretary of Defense (C3I and acquisition); Dr. George Schneider, director, strategic and tactical systems, Office of the USD(A&T); Joshua Gotbaum, assistant secretary of Defense (economic security); David L. McNichol, deputy director (resource analysis), Office of the Director, program analysis and evaluation, OSD, and chairman, Cost Analysis Improvement Group; Dennis Trosch, assistant general counsel (acquisition and logistics), Office of the General Counsel, OSD; Eleanor Spector, director of Defense procurement, OSD; BG Gregory Martin (U.S. Air Force), deputy director, force structure and resources, J-8, joint staff; Ron Garant, director, investment, Office of the Deputy Comptroller (program/budget), Office of the USD (comptroller/chief financial officer); and John Burt, director, test systems engineering and evaluation, Office of the USD(A&T).

After the panel discussion, a question and answer session was held in order to address conferees' questions. Topics addressed in this session included: contractor involvement in the IPT process; the Single Acquisition Management Plan (SAMP); the continued need for a Service review in addition to the OSD review; and the standardization of guidance on how the IPTs operate.

Kaminski then introduced John White, deputy secretary of Defense, who commented that change is a key factor in the current DOD environment and that IPT is a part of that. He noted also that two important concepts associated with IPTs are empowerment and cooperation. White appealed to the conferees to do things more smartly and with less resources. He concluded by commending the conferees for the teamwork and effort exhibited so far, but urged them to never forget their mission to support the war fighters.

Kaminski provided closing remarks for the conference, emphasizing that the forum was very successful in getting some of the real issues out on the table. "I didn't promise you I'd have all the answers today, but we will work together as these things develop. Thank you all for attending," Kaminski concluded.

OIPT Membership



- Intent is to be inclusive vice exclusive

OIPT Membership

| | |
|--|--|
| Service Acquisition Executives | Deputy Under Secretary of Defense (Acq Reform) |
| Service Reps: | Deputy Under Secretary of Defense (Adv Tech) |
| • PEO | Deputy Under Secretary of Defense (Env Sac) |
| • PM | Deputy Under Secretary of Defense (Log) |
| • Operators | * Deputy General Counsel (Acq & Log) |
| Under Secretary of Defense (P&R) | Deputy Dir, Defense Research and Engineering |
| Under Secretary of Defense Comptroller | Dir, Acquisition Program Integration |
| Vice Chairman, Joint Chiefs of Staff | Director, Contin Acq and Life Cycle Support (CALS) |
| Assistant Secretary of Defense (C3I) | Dir, Defense Procurement |
| Assistant Secretary of Defense (ISP) | Dir, Defense Security Programs (C3I) |
| * Assistant Secretary of Defense (HA) | * Dir, Special Programs |
| Assistant Secretary of Defense (Econ Sec) | Dir, Test, Systems Engineering & Evaluation |
| Dir, Operational Test and Evaluation | Chairman, OSD Cost Analysis Improvement Group) |
| Assistant to the Secretary of Defense (AE) | * Dir, BMDO |
| Dir, Program Analysis and Evaluation | Dir, Defense Intelligence Agency |

* As Required

TARDEC'S SIMULATION EFFORTS CUT DEVELOPMENT TIME

By Joseph W. Steyaert
and Donald S. Sarna

With the aid of their extensive computer facilities, the Tank-Automotive Research, Development and Engineering Center's (TARDEC) Advanced Systems Concepts and Planning, and Design and Manufacturing Directorates, and technology centers are creating new ways to dramatically reduce the time and cost involved in the development and manufacture of tank-automotive systems. TARDEC is revolutionizing the way tanks and trucks are designed, developed, manufactured, and tested. The effort, known as virtual prototyping and virtual manufacturing, is initially being demonstrated on the M2A3 version of the Bradley Fighting Vehicle.

Virtual prototyping is the process by which advanced computer simulation enables early evaluation of the new vehicle concept, configuration, and design without committing to prototype hardware. Virtual manufacturing, done concurrently with the virtual prototyping, lays out the actual manufacturing process in a "virtual factory." Machine tool paths, machining processes, production line set-up, the timing of materials and the lines for production of parts, and vehicle system assembly can be laid out and tested prior to actual implementation on a factory floor.

The virtual prototyping/manufacturing team consists of engineers, designers, and developers with their unique computerized facilities spread across several different TARDEC organizations. The team produces excellent results as they use virtual reality, system simulation, computer-aided design and manufacturing (CAD/CAM) to design everything from the system's armor structure to its crew controls and displays.

The process begins with war fighting requirements from the user community via

the Battle Labs and directorates of combat developments, advanced technologies, and industry state-of-the-art components. Solid models of alternative concepts are generated. Analytical models can be applied to the solid model to evaluate mobility, vehicle dynamics, track and suspension, survivability, vulnerability, stealth, and lethality. Analytical results are reflected in changes to the solid model to optimize the design through an iterative process. Trade-offs between conflicting requirements can be done in conjunction with the user.

Resulting concept vehicles are next evaluated using wargame models such as GROUNDWARS and CASTFOREM. These models are used to determine the operational effectiveness of new concept designs under varying battlefield scenarios. The objective is to determine which concepts offer the greatest payoffs and should be carried further through the process.

The selected concept then proceeds to a detailed design phase in which the 3-D model is refined to incorporate actual components, concurrent engineering, and logistic support factors in the design. This results in an electronic Technical Data Package (TDP) and a virtual mockup of the end-item vehicle system. Concurrently, the virtual factory is designed with emphasis on producibility. The virtual factory of the future will emphasize flexible manufacturing. The factory machines will be computer controlled and able to manufacture a variety of parts based on an input from the electronic TDP.

The virtual mockup defines a crew station envelope which is used to establish the crew station design using a soldier-in-the-loop crew station simulator under static and dynamic conditions. System simulation

allows the soldier to evaluate the crew station, controls, and display functionality and effectiveness without the expensive commitment to prototype hardware construction. A reconfigured simulation based on soldier recommendations for better locations of controls, display changes, station configuration, or information clarification can be presented and its effectiveness gauged against the original design.

The soldier-in-the-loop simulation efforts reduce costs, enhance user/developer dialogue, and assure a more effective product "up front" in the development cycle and long before release to the field.

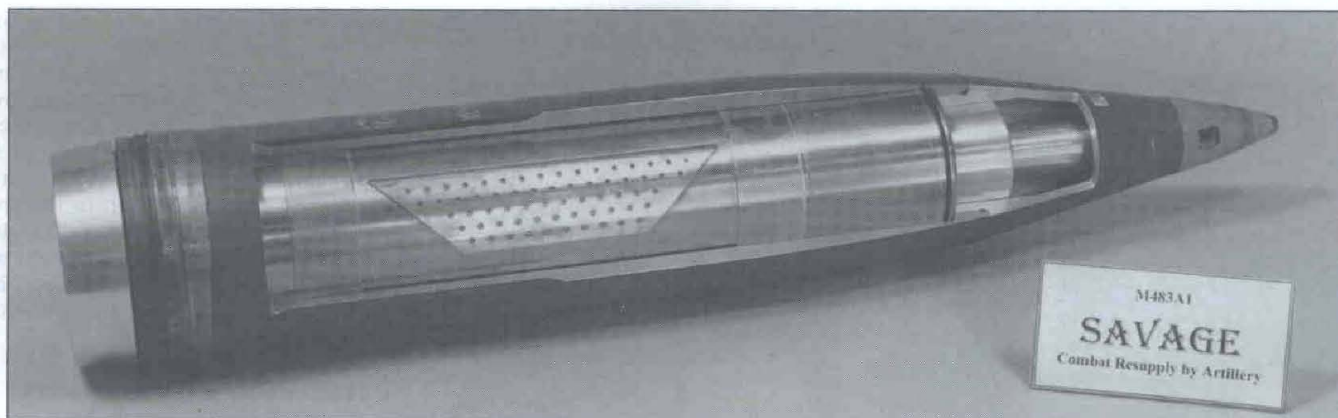
The actual electronics integration strategy utilizes a System Integration Lab, a laboratory "hot mockup," to resolve hardware and software integration problems prior to committing to hardware for a test bed or vehicle prototype. A test bed vehicle is then fabricated for testing under a wide range of controlled conditions using physical simulation facilities. This provides greater user and developer test and evaluation flexibility at a significant cost savings and technical risk reduction.

The electronic TDP and virtual factory provide the basis for transition to manufacturing. This results in significant time savings, reduction of scrap material, and a smooth transition into production. Production is based on a paperless CAD/CAM-to-factory machine system that provides for faster and more reliable tool setup and part manufacture. Ultimately the goal is to electronically transfer the part design directly to a flexible manufacturing facility for production.

Historically it takes from seven to 12 years to bring a tank through the cycle from concept formulation to the field. With virtual prototyping and manufacturing the goal is to reduce the time by 50 percent, at reduced cost, and with the end product being more acceptable to the user. Current programs are targeted at this reduced acquisition time.

JOSEPH W. STEYAERT is the chief of the Tank-Automotive Research Development and Engineering Center's Software Engineering Division. He has a B.S. degree in electronics engineering from the University of Detroit and is a registered professional engineer in Michigan.

DONALD S. SARNA is the director of the Vetronics Technology Center at the Tank-Automotive Research Development and Engineering Center. He holds B.S.E. and M.S. degrees in physics.



Savage projectile prototype showing resupply canister enclosed within an M483A1 shell body.

COMBAT RESUPPLY BY ARTILLERY

A Partnership Between Defense and Industry Investigates

Emergency Combat Resupply to Ground Forces by Cannon Artillery

Introduction

Resupplying ammunition to troops by firing artillery shells at them seems contradictory. Even stranger still is the idea of providing medical supplies to soldiers by sending projectiles in their direction. But there exists the possibility to do just that. What started as a conversation between two Army infantry officers teaching mechanical engineering at West Point has emerged as the Savage initiative, a project to investigate the delivery of critical supplies to ground units by fitting parachute-equipped resupply canisters inside 155mm artillery shells. It's an idea that has caught the attention of government agencies, private industry, and surprisingly, even the Army Medical Corps.

The Walter Reed Army Institute of Research (WRAIR) has been investigating ways to resupply crucial medical fluids to troops in combat. Today's increased emphasis on sharing information through technology transfer led to researchers at WRAIR learning of the Savage initiative at West Point. In addition to carrying ammunition, they had one suggestion: put fluid inside the canisters. With that, the Savage system grew to consist of two projectiles, the Ammunition Resupply Projectile (ARP) which delivers 5.56mm small arms ammunition, and the Medical Resupply Projectile (MRP) which delivers bags of intravenous fluid.

By MAJ Charles E. Dean
and COL William P.
Wiesmann, MC

The possibility of combat resupply by artillery is currently being investigated by a partnership between the Army and industry. The MRP is being developed jointly by the Edgewood Research, Development, and Engineering Center (ERDEC) and the Army Research Laboratory (ARL) in conjunction with WRAIR. The ARP is being developed by the Fire Support Armaments Center (FSAC) at Picatinny Arsenal. Several members of the defense industrial base have joined Team Savage, including Olin Ordnance, Irvin Industries, Paranetics Technology, and G.G. Greene Metal Specialties Company.

Historical Need for Rapid Resupply

Countless historical examples demonstrate both the need for emergency resupply and the results when crucial materials do not reach the intended units in time. Despite the advent of new technologies, our forces continue to fight without a system that can deliver critical supplies quick-

ly, accurately, and safely without being impeded by enemy forces, terrain, or weather.

The lack of critical supplies in combat leads to several consequences. When units begin to experience shortages in ammunition they frequently break off engagements, restrict their weapons fire, surrender, or, ultimately, die with empty rifles. When soldiers die of wounds in battle, many of these combatants perish from excessive loss of bodily fluids. Combat statistics show that of these soldiers, most of them not only die within the first hour of injury, but the majority succumb to their wounds within the first 15 minutes.

The primary goal of combat trauma medicine is to reach the wounded soldier with sufficient resuscitation capability within the first 15 minutes of wounding. Combat medics and ground soldiers carry intravenous fluid bags into battle. As soldiers get wounded, rapid resuscitation by fluid replacement is crucial to saving their lives and the on-hand supplies of intravenous fluids are consumed rapidly. Unfortunately, replacement intravenous fluid bags become very difficult to acquire.

From the beginning of the Second World War to the present, major advances have been made in developing new vehicles for permitting humans to transport and deliver combat logistics. Among these technologies



MAJ Charles Dean and West Point's machinist Jeff Butler examine prototype components for the resupply canister that Butler fabricated.

are aircraft that deliver numerous cargo bundles by parachute, helicopters that fly directly to embattled units, and more versatile wheeled vehicles that can better negotiate rough terrain. These "conventional" systems all have great strengths but they are also all restricted by weather, terrain, and enemy action. Frequently, the use of these technologies has led to losing valuable time while preparing and executing the resupply missions, poor weather delaying or hampering the operation, loads being delivered to the wrong locations, and humans and their vehicles being destroyed.

Advantages of Savage

The Savage system has numerous advantages over present delivery systems. Savage utilizes supporting artillery to provide an extremely rapid means of cargo delivery that does not risk human injury or equipment loss, nor waste time as commanders organize and then execute a solution to the logistical crisis. Savage shells will travel at speeds close to 1500 miles per hour and can range 20 kilometers in only 90 seconds (parallel efforts are being initiated that will enable Savage to intelligently deliver cargo out to ranges exceeding 40 kilometers). An artillery platoon equipped with 155mm howitzers will be able to resupply an infantry battalion with its 24-hour basic load of 5.56mm ammunition in only 12 minutes of firing. That same artillery platoon will be able to provide a 500mL bag of intravenous fluid for each soldier in a

600-man battalion in six minutes of firing. Savage will be accurate and forward observers can either adjust its delivery into the center of a perimeter or to a separate location where it is most needed. Savage will be quiet and the ARP can covertly shift the balance of firepower in a unit's favor without the enemy's knowledge. Savage will be inexpensive since already existing M483A1 shell bodies will carry the resupply canisters. No time, labor, or money will be expended to design, test, or produce the projectile bodies, thus significantly reducing the overall program cost.

How Savage Works

When a unit requests Savage resupply, each shell will be fired over its position. High above the unit's location, the main projectile fuze will function and initiate the expulsion charge within the nose of the shell and eject the resupply canister from the base end of the projectile. The now empty shell body will continue along its original trajectory and land at least one kilometer away from the requesting unit. As soon as the resupply canister departs the shell body, a drogue parachute will deploy to slow and de-spin the canister. As the resupply canister continues to fly toward its target, a timing device will cause the main parachute to deploy at a low altitude. Low level opening of the main parachute is desired to maximize the accuracy of delivery by minimizing undesired drift. As the main parachute deploys, a second timer will

activate to initiate the canopy release assembly one minute later. The main parachute will slow the descent velocity of the canister and will provide early warning to ground forces of the canister's arrival. After the load lands, the canopy release assembly will sever the suspension lines from the canister to permit the canister to drop to the ground should its parachute become entangled in trees, telephone poles, etc. Activation of the canopy release will be contained within the assembly and will not pose a safety hazard to anyone holding the device.

Partnering with Industry

The concept of Savage and the possibility that it offers for turning the tide of battles has drawn the attention not only of many individuals within the military but also of several companies within industry. The Army armaments community has produced very aggressive plans to prove the concept of both the ARP and the MRP in under 10 months. The team's industrial partners will help design and build the equipment to test the system. Olin Ordnance, a company highly experienced in projectile manufacturing, has teamed up with FSAC to produce the prototype resupply canisters that will carry both the ammunition and the intravenous fluid loads. Irvin Industries and Paranetics Technology will likewise work with the Aeroballistics Branch at Picatinny Arsenal to design and produce prototype parachute systems for the accurate delivery of the payloads.

The G.G. Greene Metal Specialties Company is designing flexible stripper clips, carrying 10 bullets each, to be easily loaded into the cylindrical resupply canister (ARPs will deliver both 5.56mm bullets on 10 round stripper clips and linked 5.56mm ammunition for the M249 Squad Automatic Weapon). This Savage partnership will enable the proof-of-concept studies to proceed with maximum cooperation between all parties involved while minimizing the economic risk for any individual partner. This partnership is a solid blend of experience, engineering design capabilities, and manufacturing know-how of all its members. Each member of the team will bring his or her organization's unique talents into a program designed with the welfare of the American soldier as its primary focus.

Proof-of-Concept

In order to demonstrate the feasibility of the Savage system, a proof-of-concept study is underway for each of the two projectiles. ARL and ERDEC are working to demonstrate the survivability of intravenous bags and the stability of the MRP. Shock table tests at ARL have already shown that conventional intravenous fluid bags can be packaged to withstand the forces of cannon launch. ERDEC's spin-test apparatus will ensure projectile stability prior to test firings. As this article was submitted for

publication, the MRP was scheduled for initial firings at Aberdeen Proving Ground in November 1995. ARL's study of the MRP will also involve early sub-scale test firings using 155mm illumination projectiles. These M485 projectiles already contain parachutes and canisters for the illumination candles. The candle materials, however, will be removed and replaced with intravenous fluid bags. The M485 projectiles, which have significantly smaller cargo volume than M483A1 shells, will serve as quick test beds for determining how the bags launch, travel, and land under parachute.

Picatinny Arsenal's Fire Support Armaments Center (FSAC) is working with industry to design the generic resupply canister, its ARP peculiar sub-components, and the parachute system. A common can-

ister and parachute design will be used in both the ARP and the MRP. Shock tables will be used to examine the survivability of 5.56mm ammunition and expulsion tests will analyze the canister ejection from the projectile.

Modeling Savage's Battlefield Contribution

A proper analysis of any new system frequently involves computer simulation. The Department of Systems Engineering at West Point is preparing to use advanced computer models to investigate Savage's contribution on the battlefield. This study will compare the ability of light infantry units to fight intense battles with and without Savage resupply. As part of this investigation, the computer analysis will show the change in quantities of both enemy and

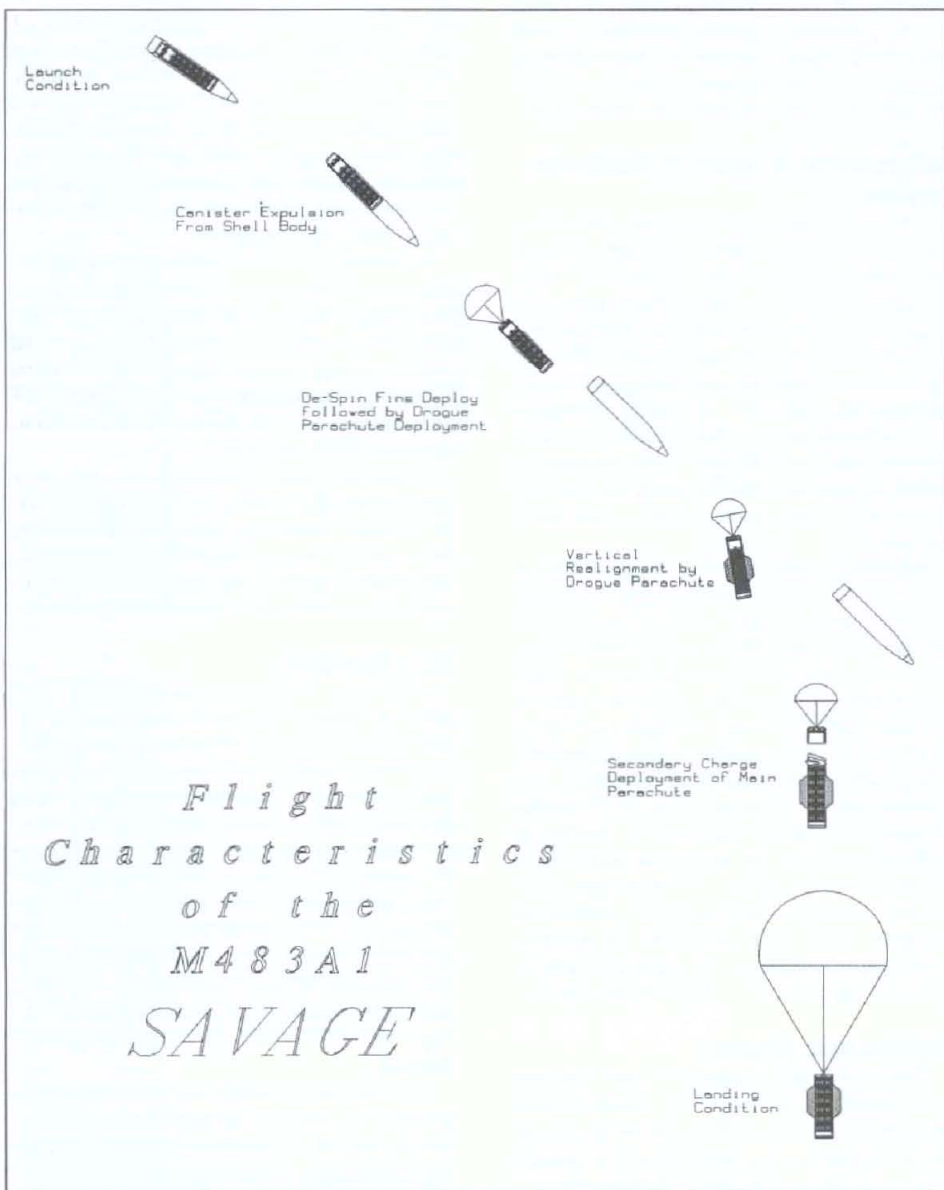
friendly soldiers killed and wounded during these scenarios, and what detrimental effects, if any, may be experienced in augmenting conventional artillery fires to include Savage delivery.

Conclusion

The Savage system will provide a unique and effective means of rapid resupply that will supplement existing practices to result in more responsive support of soldiers in battle. The Savage system not only sets a historical precedent as an unusual approach to resupply, but also serves as an important example of how soldiers, scientists, and researchers can join forces to serve the American soldier.

MAJ CHARLES E. DEAN conceived the concept of combat resupply by artillery and is the project leader for Team Savage. He is an assistant professor in the Department of Civil and Mechanical Engineering at the U.S. Military Academy. He holds a B.S. from West Point, an M.S. in mechanical engineering from the Massachusetts Institute of Technology, and is an infantryman who has served in both airborne and mechanized infantry divisions.

COL William P. Wiesmann, MC, has been actively involved with biomedical research at the National Institutes of Health and the Walter Reed Army Institute of Research for the past 20 years. He received his medical degree from Washington University where he also completed internal medicine training, a nephrology fellowship, and advanced training in biomedical research. He currently serves as the director of combat casualty care research, U.S. Army Medical Research and Materiel Command.



Savage trajectory characteristics showing separation of resupply canister from shell body and parachute deployment sequence.

DEFENSE CONVERSION AND DUAL-USE TECHNOLOGY EFFORTS

Introduction

With the end of the Cold War, the U.S. Department of Defense (DOD) is faced with the task of downsizing the very same armed forces responsible for the Cold War victory. However, caution must be taken to ensure that a strong and viable military is maintained which is both well-trained and well-equipped.

Military commanders are responsible for the training and readiness of the forces, but they must rely on the Defense industrial complex to continue to provide them with state-of-the-art equipment. The days of military expansion and technological advancement brought on by enormous Defense budgets are a thing of the past in this post Cold War era. Without an identifiably strong threat, we are now faced with the task of how to best spend the "peace dividend" associated with military downsizing.

There is much debate among politicians, DOD, industry executives, and lobbyists on how to best convert Defense savings to cure the social and economical ills of the country. All seek answers which will ensure Defense industry viability and global competitiveness. One solution which offers promise, and possesses universal support is the concept of dual-use technology. Dual-use refers to the components, processes, and systems which have both military and commercial uses. Dual-use is not a "cure-all," but a key piece in the Defense conversion puzzle.

This article identifies and analyzes U.S. Defense conversion efforts designed to maintain a strong and technologically superior Defense industrial base despite shrinking Defense spending. Particular emphasis is placed on dual-use technology efforts in the Defense communications and electronics (C/E) sector of the Defense industrial and technology bases.

Defense Conversion Defined

Let's start with a working definition of Defense conversion. Defense conversion is generally defined as the process of/for demilitarization of the contractors making up the Defense industrial base. Note this definition avoids the political pitfalls of a

By MAJ William T. Chatman

more specific (and politically correct) definition provided by the General Accounting Office: "Defense conversion refers to a number of Federal programs intended to help individuals and communities cope with cutbacks in military spending and to support the defense technology and industrial base."

Advanced Research Projects Agency

The Department of Defense's Advanced Research Projects Agency (ARPA) defines the term dual-use "with respect to products, services, standards, processes, or acquisition practices, respectively, that are capable of meeting requirements for military and non-military application." Note, technology can flow in either direction after originating in either Defense or commercial markets. This flow ties dual-use to Defense conversion. "Dual-use is the end result of a ... successful Defense conversion process."

ARPA has established a unique niche as DOD's agency for fostering and managing dual-use efforts. ARPA is a lean organization of only 160 employees, but wields a great deal of respect, and controls an ever-increasing budget. Five of ARPA's offices control direct research toward core technologies in electronics, microelectronics, computing, software, and materials, and control over 80 percent of its \$2.25 billion budget. In a move intended to formalize ARPA's previously *de facto* role as the dual-use technology agency, in February 1993, President Clinton ordered them to drop the "Defense" from their name. But the administration stopped short of assigning ARPA as the lead agency in U.S. technology policy.

Economic Impact

The economic impact of the Defense drawdown on the Defense industrial base in general, and the C/E industry in particular, is somewhat uncertain since the market appraisals depend on the prognosticator.

The Defense Conversion Commission concluded that, "the financial viability of

the 25 largest DoD prime contractors is not at risk and that they will probably manage the drawdown successfully."

In its analysis of the industrial base, the U.S. Army Industrial Engineering Activity predicts, "Of all the U.S. industries which have an involvement in production of defense-related products, the electronics industry will be the least affected by major defense budget reductions now being implemented." Since DOD procures its C/E equipment from a small number of large Defense contractors, C/E market conditions are dependent on the future strength of the major Defense companies.

According to the Logistics Management Institute's Defense Economic Impact Modeling System, DOD purchases 50 percent of the nation's communications and search and navigation equipment from an industry grouping projected to suffer a 21 percent reduction in its business base between 1991 and 1997.

However, the Electronics Industry Association (EIA) projects that, while overall Defense spending will decrease during the next 10 years, Defense spending on electronics hardware is expected to remain relatively unchanged over the same period.

EIA Position

A number of factors support the EIA position. First of all, DOD no longer leads, but follows the commercial sector in key technology fields such as electronics and information processing. Since commercial customers are driving product demand and development, leading edge technologies are frequently being developed first for the commercial users. DOD is finding its needs are being given lower priority, and must therefore hope to "spin on" promising new commercial advancements into military applications. Any Defense market losses are expected to be made up for in commercial markets.

Secondly, as funding for major weapon systems is reduced, some new start programs will be canceled in favor of upgrading/enhancing current systems. By extending weapons system life cycles through the addition of more capable electronics, this strategy supports goals of cost reduction

and industrial base sustainment.

Lastly, most analysts feel that electronics, in general, are the easiest types of technology to transfer from military to commercial applications. The Global Positioning System (GPS) and heads-up display technologies are good examples of new-found, easily transferred dual-use technologies.

Dual-Use Technologies

Indeed, all of the Defense C/E contractors are poised to take advantage of new commercial business through dual-use technologies.

The ITT Corporation, maker of the Single Channel Ground-Airborne Radio System (SINCGARS) and various types of military night vision equipment, has developed consumer prototypes of night vision goggles for use by pleasure boaters and civilian helicopter pilots of emergency medical service aircraft.

General Motors (GM) Hughes Electronics, maker of the Army Data Distribution System, the M1A1 Tank Thermal Sight and Thermal Imaging Systems, and heads-up displays and avionics for several military aircraft, has undergone a major program to convert Defense technology to consumer applications. Areas already under development are automobile heads-up displays and direct broadcast satellite entertainment systems among others.

GTE, maker of the Army's Mobile Subscriber Equipment System (MSE), has developed a new asynchronous transfer mode (ATM) switch for commercial applications. Rockwell International is aggressively marketing the NAVSTAR GPS system as a commercial vehicle tracking system and position location device for mass transit systems, trucking and rental car companies, and police and fire departments.

Additionally, Westinghouse Electronics Systems, Martin Marietta, and Lockheed Electronics are using information, data processing, and remote sensing technologies of military origin for such civilian uses as air and highway traffic control systems, drug interdiction, and office security systems.

Contractor Restructuring

Planned reductions in Defense spending have forced major Defense contractors to adjust the structures of their organizations to become leaner in the face of anticipated excess capacity. Recent restructuring in the form of corporate acquisitions, mergers and joint ventures supports an overall strategy of: rationalization (concentrating on core Defense capabilities and shedding unprofitable Defense business units), increasing exports, and diversifying into new markets.

While corporate managers within the Defense C/E industry understand the necessity to embrace the dual-use concept, there is a cultural hurdle to cross in order

to move into commercial markets. Business practices have changed from the "good old days" of boundless R&D, funded by DOD under cost plus fee contracts. Customers in the commercial C/E sector demand quality, value, and service. They seldomly pay for R&D, and never buy from suppliers under cost reimbursable types of contracts. Because of this, the dual-use concept has become an extremely attractive method for getting the government to share the risks and costs of R&D which the commercial customer is unwilling to support.

Identifying Barriers

The C/E industry is getting more involved in influencing U.S. industrial base policy by identifying barriers that must be removed to better facilitate Defense-commercial transition. In 1993, in support of these efforts, the EIA conducted a survey of 33 companies which collectively received a third of the Defense budget. The survey revealed that DOD C/E firms perceived significant changes in government laws and regulations were required if they were to be competitive in commercial markets. Specifically, industry sources identified: excess government paperwork requirements, concerns over safeguarding of proprietary information, government audit/accounting procedures which force separate government and commercial sides to business units.

In order to successfully implement industrial base policy, DOD and other government agencies must eliminate various regulatory barriers to technology transfer and dual-use efforts. Two specific barriers have been targeted for change under the umbrella of acquisition reform: overuse of military specifications and standards; and government business practices, audit and oversight requirements. These and other sweeping acquisition reforms are addressed in the Federal Acquisition Streamlining Act of 1994 for which government agencies are currently drafting implementing regulations and guidance.

For years, all companies manufacturing goods for the government have complained of our reliance on cumbersome, outdated, unnecessary, and costly military specs. For years, these complaints have fallen on the deaf ears of government procurement officials accustomed to using detailed design specs to tell Defense contractors precisely "how" to manufacture items. Finally, Defense Secretary Perry has directed DOD, "to use performance and commercial specifications and standards in lieu of military specifications and standards, unless no practical alternative exists to meet the user's needs."

Additional Barriers

Additional regulatory barriers to compa-

nies in the Defense industry are the government-unique oversight, accounting, and management practices imposed upon government contractors.

Excessive government oversight drives up the prices we pay for Defense systems. The requirement for contractors to submit cost or pricing data is valid, in some instances, to ensure that both the government and the contractor are negotiating on a level playing field.

The requirement for contractors to use cost accounting standards can also help the government achieve cost oversight and reduce fraud, but the additional costs caused by these and other oversight requirements are significant.

A RAND study estimated that the existing regulatory regime imposes an additional 10 to 50 percent to the cost of doing business with the DOD. In fact, these additional costs (estimated \$15 to \$75 billion) are so high that any losses incurred by eliminating such stringent and costly oversight requirements would certainly be acceptable by commercial standards.

These requirements discourage dual-use contractors, or any Defense contractor, from consolidating their commercial and government business within the same plants. Unless they segregate their facilities, labor and material, companies will be forced to charge higher overhead rates to both its government and commercial customers. Any effort to force higher overhead onto commercial products will stifle dual-use pursuits.

Conclusion

In conclusion, Defense conversion and dual-use efforts are critical to the preservation of such national assets as the industrial and technology bases. The C/E sector of the Defense industrial base provides good examples of both the promise and shortcomings of Defense conversion and dual-use in the face of the current and changing Defense acquisition environment.

MAJ WILLIAM T. CHATMAN is an Army Acquisition Corps officer currently pursuing an M.S. degree in management, with a sub-specialty in systems acquisition management at the Naval Postgraduate School in Monterey, CA.

Tuskegee University Research Consortium...

INTELLIGENT RESIN TRANSFER MOLDING FOR INTEGRAL ARMOR APPLICATIONS

By Diane S. Kukich

A multidisciplinary, multi-institutional research consortium has been selected to team with the U.S. Army and industry in the development of a manufacturing approach for future armored combat vehicle systems, such as the Army's Composite Armored Vehicle (CAV). Through the DOD Infrastructure Support Program, the Tuskegee University Research Consortium was recently awarded \$9.4 million to study intelligent resin transfer molding (RTM) for integral armor applications.

In addition to Tuskegee University, the consortium includes the University of Delaware Center for Composite Materials (UD-CCM), the University of California—San Diego (UCSD), Prairie View A&M University, North Carolina A&T State University, U.S. Army Research Laboratory (ARL), U.S. Army TARDEC, McDonnell Douglas, and United Defense Limited Partnership. Four of the participating academic institutions are now Army Centers of Excellence—UD-CCM for manufacturing science of polymeric composites, UCSD for dynamic properties of advanced materials, and North Carolina A&T State University for electronics and communication, and Tuskegee for integral armor.

According to Professor Shaik Jeelani,

principal investigator (PI) and director of the Consortium and associate dean of the Tuskegee School of Engineering and Architecture, the research program comprises four major objectives, all feeding into the development of intelligent RTM for integral armor applications:

- Sensing and control for RTM processes
- New developments in RTM process modeling for integral armor applications;
- Bonding and repair of integral armor components; and
- Performance evaluation of RTM-manufactured integral armor components.

Following development of the technology—including equipment, software, manufacturing, modeling, testing, and simulation know-how—it will be transferred to Tuskegee University and the other HBCUs (historically black colleges and universities) in the consortium. In addition to research, the program will include the development of educational modules, including classroom courses, labs, and video courseware, as well as outreach and exchange programs. Researchers at McDonnell Douglas Aerospace will provide technical education and assistance in RTM equipment installation and use.

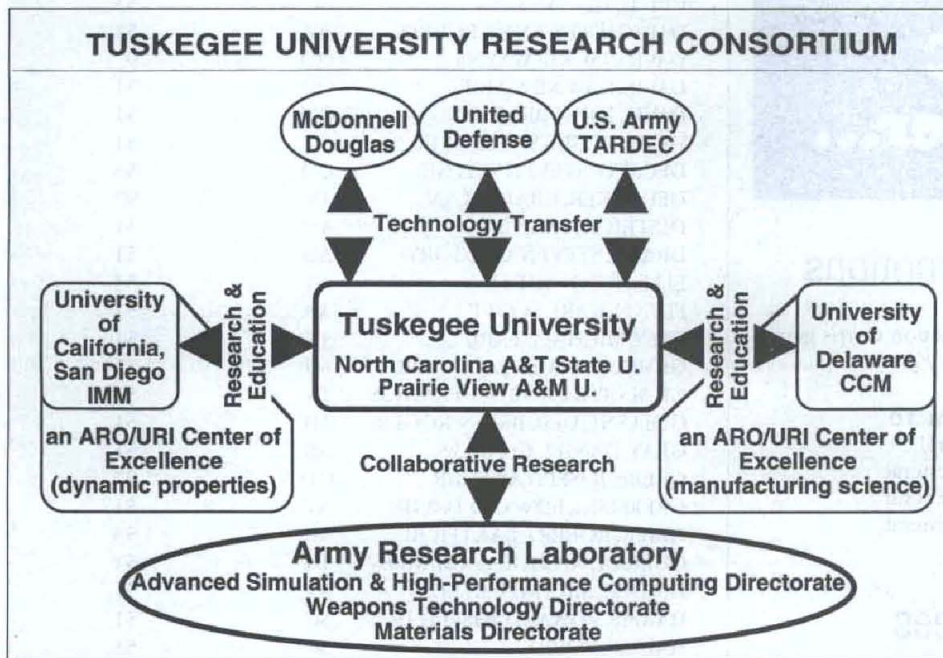
Both UD-CCM and UCSD will contribute

to the research and education components of the program. UD-CCM brings to the program a strong background in manufacturing science and process modeling. Research at UD-CCM has had a strong manufacturing component for the past decade, with faculty, students, and professional researchers investigating a number of processes for the fabrication of composite parts. One set of processes—collectively referred to as liquid molding—involves the injection of resin into a mold containing a preform, or network of fibers that forms the "skeleton" of the part. Liquid molding includes resin transfer molding, which uses a two-sided closed mold, and vacuum-assisted resin infusion (VARI), an innovative adaptation of RTM that uses one-sided low-cost tooling.

Dr. Hassan Mahfuz, associate professor of mechanical engineering and PI at Tuskegee University, emphasizes other aspects of the consortium. First, the technical tasks complement those being performed at Tuskegee under existing grants and contracts from various government agencies and industries. Besides the ARO grant, the Center of Excellence for Advanced Materials at Tuskegee University (CEAM-TU) has several programs—all in the areas of processing, characterization, and analysis of composite materials—that comprise the core of the consortium's technical tasks. "With the ARO grant in place and with the technical collaboration from UD-CCM, UCSD, and ARL under the consortium, Tuskegee University is set to enter into a research area of national and international visibility," says Mahfuz. "Even more important, the consortium will bring Tuskegee students into the forefront of technical research."

According to John W. Gillespie Jr., associate professor of materials science and PI at the University of Delaware, the benefits of liquid molding include tailorability; the ability to mold large, complex parts to net shape; parts integration (including elimination of joints and encapsulation of ribs, cores, and inserts); and short cure-cycle times. RTM and VARI have been selected as candidate composites manufacturing methods for major CAV components in terms of cost, manufacturing feasibility, and mechanical and ballistic structural performance.

"Composite structure integral armor techniques have been identified through the CAV program as offering superior ballistic performance while providing armored vehicles with structural strength and stability," Gillespie says. He explains that integral armor composites are any structures especially designed to provide the vehicle both ballistic and structural performance—ballis-



The Tuskegee University Research Consortium members will be the primary beneficiaries of products and capabilities through the proposed research.

tic performance is designed into the structural component.

UCSD will contribute to the program primarily in the area of ballistic modeling and testing of thick-section composites, according to Professor Sia Nemat-Nasser, PI for UCSD. "We're developing ballistic simulation models for RTM-manufactured and bonded integral armor components," Nasser explains, "as well as devising, performing, and analyzing ballistic, fatigue, and static load testing of RTM-manufactured and bonded integral armor components." A post-doc from UCSD recently spent several weeks at Tuskegee setting up a Hopkinson bar for ballistic testing. Such personnel exchanges—both short and long term—will play a major role in the "hands-on" approach taken to technology transfer in the program.

Dr. Bruce Fink, a scientist in residence at UD-CCM from ARL's Materials Directorate (ARL-MD) and the Army PI for the Tuskegee program, says, "This program has helped to create an RTM research center of mass in the Delaware area. Through a combination of tech transfer of previous knowledge, leveraging of existing programs, collaborative research under newly funded programs, and continuous communication with several large and small manufacturers, ARL-MD is filling the critical gaps in RTM manufacturing capability in the United States."

The program benefits greatly from an

existing database of RTM processing and manufacturing knowledge at UD-CCM, according to Fink. As an example, ARL researchers have adopted and further developed LIMS (Liquid Injection Molding Simulation), a flow modeling computer code developed at UD-CCM by Suresh G. Advani, associate professor of mechanical engineering. In addition, more than 100 RTM-related research documents have been published based on UD-CCM research over the past four years, and with the relocation of ARL-MD's RTM equipment to the UD-CCM facilities, significant research capabilities are in place. ARL-MD researchers permanently located at UD-CCM with expertise in sensing, thick-section mechanics, processing, and materials are providing assistance with the transfer of existing capabilities and the integration of ongoing collaborative efforts.

A critical term in the title of the Tuskegee research project is "intelligent." Intelligent RTM manufacturing uses sensors, process models, and actuators to control and hence optimize the RTM process. Additionally, intelligent, or smart structures may contain embedded current-carrying leads used as sensors to determine in-service loading responses such as deflections, local strains, vibrations, and so on. Many of these structures are manufactured using liquid molding techniques such as RTM and VARI.

According to Fink, the government has

assisted in the development of a liquid molding process sensing procedure used for process control and optimization. Fink explains that the procedure, which is known as SMART Weave, "uses electrical leads, similar to those often used as smart material sensors leads, which are placed in a grid-like fashion in one or more planes within the mold. The sensing system is used to acquire real-time resin flow and cure state information, which, in turn, is used to intelligently control the process, making production more economical and enabling the production of more complicated parts by a traditionally economical process. It is plausible that these same SMART Weave sensors could be used throughout the service of the manufactured part as smart structure material sensors." SMART Weave is an important component of the research plan for the Tuskegee program.

According to George Thomas of United Defense Limited Partnership (UDLP), the contract with Tuskegee is crucial to the Army and the other parties involved because the results could be immediately implemented. "I would like to see the research process mature to the point where we could insert the findings into new vehicle system and begin testing. CAV-ATD is the biggest Army research program, and Tuskegee's findings are very important to the advancements of the vehicle." UDLP is the primary industrial contractor for the CAV program's Advanced Technology Demonstrator. Thomas represents the defense ground-vehicle industry on the Tuskegee program's executive committee.

"The committee makes sure the research conducted by Tuskegee is practical and affordable," Thomas says. "The Army wants a composite armor that's stronger, lighter, and less costly. We give Tuskegee guidance to focus the research in the right direction so they know all the requirements and don't waste time solving problems we've already solved."

A program kick-off meeting held at Tuskegee in July drew more than 50 attendees from participating universities, companies, and DOD branches. With that kind of participation, there is little doubt that one of the program's key missions—to promote interaction with scientists and engineers in the laboratories of the government and private industry through active research collaboration—will be met.

DIANE S. KUKICH is an editor at the Center for Composite Materials at the University of Delaware.

From The AAC Career Manager...

AAC General Officer Promotions

Congratulations to the following Army Acquisition Corps general officers selected for promotion in fiscal year 1995:

| Name | Promotion To |
|----------------------|-------------------|
| John F. Michitsch | Major General |
| Harry D. Gatanas | Brigadier General |
| Daniel L. Montgomery | Brigadier General |
| Willie B. Nance, Jr. | Brigadier General |

FY 95 Major Selectees

Congratulations to the following acquisition officers recently selected for promotion to major.

| NAME | BRANCH | FUNCTIONAL AREA |
|-----------------------------|--------|-----------------|
| ACREE, JOSEPH ERIC | FA | 53 |
| AKINS, ELTON DOMINIC | AD | 51 |
| ALT, OLIVER BLANE | IN | 51 |
| ANDERSON, ZELMA ALPHONSO | AR | 53 |
| ARAGON, ARTHUR JOHN JR. | MP | 97 |
| ARN, MARK RANDALL | EN | 51 |
| ARUZZA, JOHN ANTHONY | FA | 51 |
| ATKINSON, JAMES WAYNE | AD | 51 |
| BAILEY, CALVIN DOUGLAS | TC | 53 |
| BAIN, STAN DAILUS | AG | 53 |
| BAKER, JANICE MARIE | SC | 51 |
| BENDA, GREGORY STEVEN | OD | 51 |
| BERLIN, JACOB LANIER | SF | 53 |
| BLACKWELL, BOBBY FITZGERALD | IN | 97 |
| BONK, STEVEN STANLEY | SF | 97 |
| BOYD, CRIS JAMES | SC | 53 |
| BRANCH, GARRY LEE | FA | 97 |
| BUTLER, MATTHEW CARLTON | FA | 97 |
| CAMPBELL, ROBERT KENNETH | AG | 53 |
| CAMPBELL, SCOTT ALAN | EN | 97 |
| CASTRINOS, NICHOLAS LOUIS | IN | 97 |
| CAVALIER, MICHAEL PAUL | AV | 51 |
| CHANDLER, MICHAEL RAY | SC | 51 |
| CHAPMAN, JAMES JEROME | FA | 51 |
| CHARLES, ROOSEVELT LEO | FA | 97 |
| CLARKE, MATTHEW | EN | 97 |
| CLEMONS, DANIEL COY | OD | 53 |
| COLONDRES, JOSE RUBEN JR. | AD | 97 |
| CONKLIN, DARYL LEONARD | FA | 97 |
| CONTRERAS, ANDRES | AR | 51 |
| COOPER, CRAIG ALAN | AG | 53 |
| CROSS, MAUREEN WOODRUFF | MP | 51 |

| | | |
|------------------------------|----|----|
| CRUTCHER, MELVIN | SC | 53 |
| DAUGHERTY, ANNE ROBBIN | AV | 51 |
| DAVID, JACKIE WAYNE | OD | 97 |
| DAVIS, DAWNE MARIE | OD | 51 |
| DAVIS, JOHN BRADLEY | QM | 51 |
| DAVIS, JULIUS WILLIAM JR. | SC | 51 |
| DECATO, STEVEN WAYNE | OD | 53 |
| DEDECKER, CRAIG ALAN | IN | 97 |
| DIETRICH, SHANE | AD | 51 |
| DRAKE, STEVEN GREGORY | AD | 51 |
| ELLIS, JOHN ADDLEY | FA | 53 |
| FLYNN, KARL SCOTT | AR | 51 |
| FREY, MICHAEL EARL | IN | 51 |
| GIGRICH, JAMES SALVADOR | MI | 51 |
| GILMARTIN, ROBERT FRANCIS | IN | 51 |
| GOLLSNEIDER, BRIAN ROGER | MI | 51 |
| GRAY, DANIEL CHARLES | AR | 51 |
| GREBE, JOSEPH ARTHUR | OD | 97 |
| GREKOSKI, EDWARD DAVID | AV | 51 |
| GRIER, ROBERT BAXTER JR. | MI | 53 |
| GUERRA, NICHOLAS CHARLES | IN | 51 |
| HAIDER, MICHAEL KELLY | AV | 51 |
| HARMS, EDWARD JOSEPH JR. | SC | 51 |
| HARRIS, BOBBY | SC | 51 |
| HARVEY, CHRISTOPHER | SC | 51 |
| HERBERT, LINDA RENEE | TC | 51 |
| HERMALIK, GEORGE CARMEN | MI | 51 |
| HINDS, RUSSELL ANDREW | IN | 51 |
| HORROCKS, BRENT JAY | FA | 53 |
| HUDSON, JEROME | SC | 51 |
| JACOBS, RONALD JR. | AD | 53 |
| JACOBSEN, SCOTT ALAN | AV | 51 |
| JUSTIS, DANIEL NEAL JR. | IN | 51 |
| KIM, CHONG HUI | SC | 97 |
| KIRKPATRICK, ROBERT EDWARD | AD | 53 |
| KOPRA, TIMOTHY LENNART | AV | 51 |
| LAPORTE, CYPRIEN JOSEPH | AR | 97 |
| LEATHERS, EDWIN WESLY JR. | AR | 51 |
| LEE, STEPHEN HAYES JR. | OD | 51 |
| LINDSAY, MICHAEL ANTHONY | QM | 97 |
| LONG, JOHN EDD III | AR | 51 |
| LOTWIN, ANDREW MARTIN | MI | 53 |
| LUNN, ROBERT HUNTER | AV | 53 |
| MABRY, MARK JENNINGS | OD | 51 |
| MANSIR, MARTIN JOSEPH | SC | 51 |
| MARINO, THOMAS RALPH JR. | AD | 51 |
| MCCLOUD, DAROLD VINCENT | EN | 51 |
| MCKSYMICK, ERIC MATTHEW | IN | 51 |
| MEISTER, DAVID PHILLIP LOUIS | SC | 51 |
| MIDDLETON, JOHN M. | FA | 51 |
| MILLER, MONTE BENEDICT | SC | 53 |
| MITCHELL, KENNETH L. | AD | 97 |
| MOCKENSTURM, JEFFREY JOSEPH | OD | 51 |
| MULLIS, WILLIAM STERLING | FA | 53 |
| MUNOZ, DANIEL MARK | AV | 53 |
| MYERS, JAMES MICHAEL | MI | 51 |
| NASERS, GARY DAVID | CM | 51 |
| NIETO, ANTHONY JAMES | MI | 51 |
| NOBLE, EARL DAVID | FA | 53 |
| NORRIS, JAMES WESLEY | CM | 97 |
| ODONELL, WARREN NEAL | FA | 51 |

CAREER DEVELOPMENT UPDATE

| | | |
|-----------------------------|----|----|
| OLIVER, CHRISTOPHER MICHAEL | OD | 51 |
| OLSON, THOMAS MYRON | AD | 53 |
| OPENSHAW, SHANE THOMAS | AV | 51 |
| OSTROWSKI, PAUL ADAM | SF | 51 |
| OTTOMAN, EDWARD JOHN | OD | 97 |
| PARKER, MICHAEL ALLEN | MI | 51 |
| PARRISH, MICHAEL DAVID | AV | 97 |
| PAITEN, JEFFERY CLARK | AD | 51 |
| PEOPLES, CARMEN P. | SC | 51 |
| PETERSON, KEVIN BRYAN | FA | 51 |
| POE, MATTHEW DUANE | SC | 53 |
| RAMSAY, THOMAS ALAN | OD | 51 |
| REDMAN, MICHAEL KENT | CM | 51 |
| RHODES, WILLIAM BRUCE | QM | 51 |
| RHODIE, ALICE MARIE CRUMB | TC | 97 |
| ROBINSON, WILLARD LUTHER | IN | 53 |
| ROMBOUGH, DOUGLAS HARLAN | AV | 51 |
| ROSSO, DANIEL CHARLES | IN | 97 |
| RUIZ, GABRIEL | SC | 53 |
| SCHAEFER, TERRY JON | OD | 51 |
| SCHUMITZ, ROBERT WAYNE | IN | 97 |
| SCHWARZ, RICHARD RAYMOND | TC | 51 |
| SILAS, LAWRENCE S. | QM | 97 |
| SIMPSON, JAMES EUGENE | AD | 97 |
| SLAUGHTER, DARRELL ANDREW | OD | 51 |
| SMITH, CHRISTOPHER FRANCIS | AV | 51 |
| SOFRAN, GREGORY ARTHUR | SC | 53 |
| SOUTHERLAND, JOE DAVID | AG | 53 |
| STARK, TYRONE KYLE | IN | 51 |
| STEVES, MICHAEL ROGER | AD | 51 |
| STONE, ROCKY DEAN | QM | 53 |
| SURDU, JOHN ROBERT | IN | 53 |
| TAMILIO, DOUGLAS ALAN | IN | 51 |
| TARCZA, KENNETH ROBERT | AR | 51 |
| TODD, RONALD CARTER JR. | FA | 51 |
| TORRENT, FERNANDO LUIS | SC | 53 |
| TRESHANSKY, DAVID MICHAEL | IN | 97 |
| VIGNA, ALFRED JOHN | AV | 51 |
| WAGNER, ERIC CHRISTIAN | AR | 97 |
| WASON, JOHN DUANE | FA | 51 |
| WATTS, CHARLES DAVID JR. | AD | 97 |
| WEATHERLOW, BRIAN KEITH | QM | 51 |
| WENDEL, JOHN MARTIN | IN | 51 |
| WESTBROOK, KATHRYN M. | TC | 51 |
| WESTEN, MARVIN EDWARD | QM | 51 |
| WICAL, STEVEN CRAIG | MP | 97 |
| WICKHAM, TRACY LYNN | OD | 97 |
| WOOD, BRADLEY JAMES | AV | 97 |

Senior Service College Selections

Congratulations to the following Army Acquisition Corps officers selected to attend Senior Service College.

| NAME | BRANCH | FUNCTIONAL AREA |
|---------------------------|--------|-----------------|
| BIRDSONG, GEORGE MOOTY | CM | 51 |
| CARMONA, WALDO FRANCISCO | AV | 51 |
| CARTWRIGHT, CHARLES | FA | 97 |
| CLIFFORD, MICHAEL RICHARD | AV | 51 |

| | | |
|----------------------------|----|----|
| COXE, ROBERT LLOYD JR. | FA | 53 |
| DILLARD, JOHN THOMAS | IN | 51 |
| FOWLER, CHARLES SHERRILL | SF | 97 |
| GREANEY, KEVIN JOHN | SC | 53 |
| GRISWOLD, ROBERT KELLEY | FA | 51 |
| HANFORD, CRAIG BRADLEY | AV | 53 |
| HORNER, STEPHEN CLARK | SC | 51 |
| KAMSTRA, MARK RICHARD | OD | 97 |
| KEYNER, HUGO | SC | 51 |
| KILLIAN, JOHN DARWIN | IN | 51 |
| KIRSCH, ROBERT ALVIN II | SC | 53 |
| LAYMON, WILLIAM ARTHUR JR. | OD | 51 |
| LEWIS, WILLIAM DEAN | AV | 51 |
| LOCKARD, DENNIS KEITH | IN | 97 |
| OMLIE, AUSTIN RICHARD | AV | 51 |
| PARSONS, STEVEN ALAN | FA | 51 |
| PHILLIPS, WILLIAM NORRIS | AV | 97 |
| SHEEHAN, JED ALLAN | AD | 51 |
| SIOMACCO, EDWARD MICHAEL | SC | 51 |
| SWINSON, MARK LENG | OD | 51 |
| TART, RANDAL GERALD | MP | 53 |
| TAYLOR, JAMES ROBERT | FA | 51 |
| VONDRA, CHARLES FRANCIS | OD | 97 |
| WARD, BARRY MICHAEL | FA | 51 |
| WEBSTER, CECIL RAY | IN | 51 |
| WELLS, JAMES ARLIE | OD | 51 |

Command and Staff College Selectees

Congratulations to the following officers on their selection to Command and Staff College.

| | | | |
|--------------------------|-----|------------------------|-----|
| AKINS, Elton D. | CPT | GALLOP, David L. | CPT |
| ALTAVILLA, Peter A. | MAJ | GARCIA, Nestor | MAJ |
| BEDELL, Cynthia M. | MAJ | GIGRICH, James S. | CPT |
| BELL, Joseph M. | MAJ | GILMARTIN, Robert F. | CPT |
| BLACKWELL, Bobby F. | CPT | GREBE, Joseph A. | CPT |
| BURTNETT, Richard J. III | MAJ | GUERRA, Nicolas C. | CPT |
| BUSHEY, Martin | MAJ | HALL, Randy R. | MAJ |
| CAMPBELL, Jon W. | MAJ | HARRIS, Jamie A. | MAJ |
| CAMPBELL, Larry W. | MAJ | HARVEY, Christopher J. | CPT |
| CAMPS, David C. | CPT | HAY, Ralph G. | MAJ |
| CROUCH, Thomas W. | MAJ | HERBERT, Linda R. | CPT |
| CUMMINGS, Terrence | MAJ | HIGGINS, Scott Y. | MAJ |
| DAVIS, Dawne M. | CPT | HODGE, Tony F. | CPT |
| DECATO, Steven W. | CPT | IDDINS, Jeffrey B. | MAJ |
| DEDECKER, Craig A. | CPT | JACKSON, Karen J. | MAJ |
| DEJONG, Ronald J. | MAJ | JACOBS, Roland S. | MAJ |
| DIETRICH, Shane | CPT | JACOBS, Ronald Jr. | CPT |
| DIETZ, James E. | CPT | JIMINEZ, Anthony R. | MAJ |
| DOLGOFF, Scott J. | CPT | KING, Dion J. | MAJ |
| DOYLE, Norbert S. Jr. | MAJ | KIRNES, Andre C. | MAJ |
| EDWARDS, Keith R. | CPT | KLUMPP, Joseph J. | MAJ |
| ELLIS, Carl M. | MAJ | KOPRA, Timothy L. | CPT |
| EVARO, Victore J. | CPT | LEE, Stephen H. Jr. | CPT |
| FAHY, Stephen R. | MAJ | LEPINE, Paul R. | CPT |
| FINK, James V. | MAJ | LIPSIT, Carl A. | MAJ |
| FLYNN, Karl S. | CPT | LONG, John E. III | CPT |
| FOLK, William D. Jr. | MAJ | LUNN, Robert H. | CPT |
| FREAR, Deborah L. | MAJ | MANNING, Barry G. | MAJ |

CAREER DEVELOPMENT UPDATE

| | | | |
|--------------------------|-----|---------------------------|-----|
| MANSIR, Martin J. | CPT | RASMUSSEN, Christopher M. | MAJ |
| MATTHIAS, Gregory J. | CPT | REIFF, Jack A. | MAJ |
| MCDANIEL, Michael A. | MAJ | RUIZ, Gabriel | CPT |
| MCQUIRE, William T. | MAJ | SACKS, John R. | CPT |
| MCRAE, Lawrence W. Jr. | MAJ | SAFLIN, Stephen T. | MAJ |
| MEAD, Timothy G. | MAJ | SANTENS, Michael G. | MAJ |
| MEISTER, David P. | CPT | SILAS, Lawrence S. | CPT |
| MERCER, Thomas E. | MAJ | SMITH, Bobby L. | CPT |
| MIDDLETON, John M. | CPT | SMITH, Melton R. | CPT |
| MOCKENSTURM, Jeffrey J. | CPT | SPEAR, Ronald L. | MAJ |
| MUNN, Randy W. | MAJ | STIEFEL, Jeffrey I. | CPT |
| MUNOZ, Daniel M. | CPT | SWEENEY, Joseph E. | MAJ |
| NICOLELLA, Anthony J. | CPT | TAYLOR, Sheila E. | MAJ |
| NORRIS, James W. | CPT | VOLLMECKE, Kirk F. | CPT |
| OBLACK, Thomas H. | MAJ | WAGNER, Eric C. | CPT |
| OELBERG, Gregory P. | CPT | WARREN, Matthew | MAJ |
| OPENSHAW, Shane T. | CPT | WASON, John D. | CPT |
| PARKER, Eric S. | MAJ | WENDEL, John M. | CPT |
| PELCZYNSKI, Anthony S. | MAJ | WHITWORTH, Mary K. | MAJ |
| PENNINGTON, Hozie W. Jr. | MAJ | WILLIFORD, William S. | MAJ |
| POE, Matthew D. | CPT | WOOD, Bradley J. | CPT |
| PRESGRAVES, Donald C. | CPT | | |

8th Annual Software Technology Conference Announced

The Departments of the Air Force, Army and Navy have joined forces to present Software Technology Conference (STC) '96, the premier Software Technology Conference in the Department of Defense (DOD). The conference will be held April 21-16, 1996, in Salt Lake City, UT. The purpose is to increase the DOD's awareness and understanding of proven software technologies and process improvements. The focus is on matching problems with solutions as representatives from government, industry, and academia present their ideas and solutions through tutorials, presentations, and ad hoc "birds-of-a-feather" discussions. The conference will include more than 100 presentations and over 200 exhibits. Presentations and tutorials will address software issues related to: quality, testing, architectures, engineering environments, networking, process improvement, project management, artificial intelligence, simulation and modeling, requirements, technology transition, and reuse. An estimated 3,000 participants are expected to attend. Additional information can be found on the World Wide Web, <http://stsc.hill.af.mil> (137.241.33.1). Further conference questions should be directed to: Dana Dovenbarger or Lynne Wade at the Software Technology Support Center, ATTN: OO-ALC/TISE, 7278 4th Street, Hill AFB, UT 84056-5205. They may also be reached by phone at (801)777-7411 or DSN 458-7411; by fax at (801)777-8069 or DSN 458-8069; or by e-mail at dovenbar@oodis01.hill.af.mil or wade@software.hill.af.mil.

On the Horizon...

Acquisition Corps Accessions

Based on a decision briefing to LTG Ronald V. Hite, director, Army Acquisition Corps, on Oct. 6, 1995, a new strategy has been approved for the Annual Army Acquisition Corps (AAC) Accession Board. The 1995 board, which convened in December, accessed 80 percent of the Year Group '88 requirements and designated a greater percentage of officers with functional areas (FA) 53 and 97 than previous boards. In the past, the objective of accessing 100 percent of a given year group during their "first" look, eliminated the opportunity to later access high quality, field grade officers into the AAC. The percentage and functional area adjustments allow the Acquisition Corps to access a higher quality inventory and ensure our future systems are guided by quality officers with strong basic branch backgrounds.

Advanced PM Course Field Review

In an effort to continue to offer an Advanced PM Course (APMC) which meets both the current and future needs of the acquisition work force, the DOD Acquisition Management Functional Board working through the Defense Systems Management College (DSMC) has begun a process to visit various locations (U.S. Army Missile Command, U.S. Army Communications-Electronics Command, etc.) to conduct one-day field reviews of the course competencies which form the baseline for what gets taught in the APMC. Input from branch-level functional experts via a database/automated process will result in approved changes to the APMC offered as early as the fourth quarter of FY96.

Master's Degree Funding

In the near future, funds will be provided for acquisition officers to pursue a master's through either a degree completion or after-duty-hours program. This funding, different from the Army's Tuition Assistance, will open up a much better means by which acquisition officers can obtain advanced degrees on their own time. Details will be forthcoming in a future issue.

ACAT III PM Course

DSMC's development of this two-week, hands-on course specifically for program managers and deputy program managers (PM/DPMs) is on schedule with a first offering on or around Jan. 22, 1996, and subsequent classes once a quarter. Plans are for this course to become mandatory for ACAT III PM/DPMs. The ACAT III PM Course requirement is in addition to the Pre-Command Course(s) that PMs attend at various branch schools.

AAC Updates

One- to two-page updates on current AAC information are distributed by the AAC Proponency Branch via e-mail on or around the first of each month. If you want to be included on the mail list for these updates, send an e-mail to the appropriate proponency officer listed below:

CAREER DEVELOPMENT UPDATE

OASA(RDA) AAC Proponency Points of Contact

LTC Mark Jones e-mail: jonesm@belvoir-aim1.army.mil
Chief, AAC Proponency DSN: 655-4061
LTC Bill Gavora e-mail: gavoraw@belvoir-aim1.army.mil
FA 51 Proponency DSN: 655-5213
LTC Earl Rasmussen e-mail: rasmusse@belvoir-aim1.army.mil
FA 53 Proponency DSN: 655-4060
MAJ Vickie
Diego-Allard e-mail: diegoalv@belvoir-aim1.army.mil
FA 97 Proponency DSN: 655-4059
Tom Drinkwater e-mail: drinkwat@belvoir-aim1.army.mil
Civilian Proponency DSN: 655-5212

FY97 Military Acquisition Position List Review Board

Current plans are for LTG Ronald V. Hite, director, Army Acquisition Corps, to convene the FY 97 Military Acquisition Position List (MAPL) Review Board at Fort Belvoir, VA, from Feb. 26 - Mar. 1, 1996. The board, chaired by a brigadier general, will review all MAPL positions. In coordination with MACOMs, the board will have the authority to make changes to grade, functional area, and IAW AR 611-101, and to remove selective positions from the MAPL that score low on the Order of Merit. Additional information on the MAPL can be obtained by contacting LTC Bill Gavora on DSN 655-5213 or e-mail to gavoraw@belvoir-aim1.army.mil.

Software Acquisition Management Courses

The SAIS-ZA's memo, signed by Gilbert F. Decker, assistant secretary of the Army (research, development and acquisition) and Army acquisition executive, on Aug. 1, 1995, strongly supported the "high, priority" of Software Acquisition Management (SAM) courses and detailed nine critical competencies relative to software acquisition management. The Basic SAM Course (SAM 101) is nine days and will be available in July of 1996. The Intermediate SAM Course (SAM 201) is 14 course days. An initial course was offered Oct. 30, 1995, and a second course is scheduled for Jan. 16, 1996. The Advanced SAM Course (SAM 301) is 14 course days with an initial course offering of Feb. 5, 1996. Additional information on SAM Courses can be obtained from the AAC Home Page (<http://www.army.mil/aac-pg/aac.htm>) or by contacting LTC Earl Rasmussen, FA 53 proponency officer, on DSN 655-4060, or e-mail to rasmusse@belvoir.aim1.army.mil.

Army Reserve Personnel Center Notes ...

The process of recommending officers for membership in the Army Acquisition Corps—Reserve Component (AAC-RC) is still ongoing. To become a member of the AAC-RC, you must:

- Be in the grade of major or above;
- Have a baccalaureate degree from an accredited educational institution authorized to grant baccalaureate degrees;

- Have at least 24 semester credit hours (or equivalent) of study from an accredited institution of higher education from among the following disciplines: accounting, business finance, law, contracts, purchasing, economics, industrial management, marketing, quantitative methods, and organization and management, OR at least 24 semester credit hours (or equivalent) from an accredited institution of higher education in the person's career field and 12 semester credit hours (or equivalent) from among the disciplines listed above;

- Possess at least four years acquisition experience.

Other Avenues For Membership Into The AAC-RC

Items b, c, and d do not apply if you:

- Have 10 years acquisition experience as of Oct. 1, 1991; or
- Are a member of another Service acquisition corps or AAC as a civilian employee.

Interested officers who believe they meet the above prerequisites should call MAJ Niels J. Zussblatt at 1-800-325-4958.

In order to reduce mail handling time, correspondence for the AAC-RC may be sent to the following address: ARPERCEN, ATTN: ARPC-OPF-OD (MAJ ZUSSBLATT), PO BOX 32466, ST LOUIS MO 63132-0866. Do NOT send any certified, registered, express, United Postal Service, or return receipt requested mail to this address. The Post Office will return those types of mail to the sender.

All individual mobilization augmentee (IMA) officers are reminded that the deadline for annual training requests is March 31, 1996. IMA officers are encouraged to ensure that their requests are submitted as soon as possible. Once an order is published, the funding is obligated. Orders may be amended if your plans and/or the agencies' requirements change.

IMA and individual ready reserve (IRR) officers who need to obtain additional retirement points can take logistics correspondence courses through the Army Logistics Management College at Fort Lee. The courses are listed in DA Pam 351-20 (*Army Correspondence Course Program Catalog*). In order to enroll, troop program unit officers should submit DA Form 145 (January 1992) through their unit. IMA and IRR officers should submit DA Form 145 through their personnel management officer at ARPERCEN.

There has been some confusion about physicals for IRR and IMA officers. You must have a current physical (now valid for five years) in order to perform any active duty. Four to six months prior to the expiration of your physical, you should receive orders to take a new one. If you do not, please call your personnel management officer and request physical exam orders. When your exam is complete, remind the exam facility that you are an IRR or IMA officer and they will forward the original to the ARPERCEN Physical Exam Branch. You should keep a copy for your records. A complete physical is documented on SF 88 and SF 93 (both sides) for soldiers under 40. Physicals for soldiers over 40 are also recorded on SF 88 and SF 93 (both sides), but must include the following in addition: intraocular tension, EKG with

interpretation, fasting blood sugar, lipid profile (cholesterol), digital rectal exam results, and DA Form 5675 (Health Risk Appraisal). If any of this information is not provided, the Physical Exam Branch will not update your physical and you will not be able to perform active duty.

77 Graduate From MAM Course

On Sept. 1, 1995, 77 students graduated from the Materiel Acquisition Management (MAM) Course at the U.S. Army Logistics Management College, Fort Lee, VA. Research and development, testing, contracting, requirements generation, logistics and production management are examples of the materiel acquisition work assignments offered to these graduates.

COL Tom Haller, project manager of the CORPS Surface-to-Air Missile (CORPS SAM), Huntsville, AL, gave the graduation address and presented diplomas. The Distinguished Graduate award was presented to MAJ David Velasquez, Lockheed Martin, (U.S. Army Missile Command), Orlando, FL. The Outstanding Graduate award was presented to MAJ Richard Hansen, Office of the Product Manager, PALADIN/Field Artillery Ammunition Support Vehicle (PALADIN/FAASV), Picatinny Arsenal, NJ.

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

PERSCOM Notes...

Command and Staff College Slating

The Military Acquisition Management Branch (MAMB) began Command and Staff College (CSC) slating in October and should complete slating by early January 1996. In addition to the 99 Army Acquisition Corps (AAC) officers selected by the FY 95 board, there are 108 officers on the deferred CSC list. Allocations for seats in 1996 have not been distributed. Based on last year's allocations, MAMB anticipates a total of about 102 seats for the eligible population of 207 officers. All officers wishing to attend a sister Service college (Air Force, Marine, Navy) should have completed ALL non-resident course work. To request a sister school, submit a memorandum to MAJ Ed Dowling at the following address: U.S. TOTAL ARMY PERSONNEL COMMAND, TAPC-OPB-E ATTN: (MAJ ED DOWLING), 200 STOVALL STREET, ALEXANDRIA, VA 22332-0411. Include sufficient justification as to why you should be considered for the school you desire.

Attendance at a sister Service school is highly competitive. Last year, the Corps received six seats for Navy, 12 seats for Air Force and one seat for the Marine Corps.

Civilian News . . .

CAPL Build Currently Underway

The director of Army acquisition career management (DACM) recently launched an effort to re-engineer the Army Acquisition Corps and the Army acquisition work force so as to develop the best acquisition leadership for the 21st century. As a key initial step toward achieving this goal, the DACM has initiated the building of the civilian acquisition position list (CAPL). The criteria to be applied are found in DoD 5000.52-M, *Acquisition Career Development Program*.

The CAPL build consists of two phases. Phase I requires commands to designate critical acquisition positions (GS-14, GS-15 and SES), using the specified criteria, and to identify incumbents of candidate critical acquisition positions for central management by the U.S. Total Army Personnel Command. The objective of centralized career management is to assist Army Acquisition Corps members in becoming acquisition leaders and to provide the best qualified civilian candidates for acquisition leadership positions. Phase II will involve the designation of the remaining acquisition positions (GS-13 and below). The Office of the Deputy DACM, in conjunction with career program functional chief representatives, will review all designations.

The initial CAPL build, as well as successive annual reviews, will be accomplished through electronic media, thereby significantly reducing the time required to conduct the review.

GS-13 Corps Eligibles

The Army acquisition executive and the director for acquisition career management (DACM), in coordination with the assistant secretary of the Army (manpower and reserve affairs) have established a plan to provide for competitive transition of GS-13s in the acquisition work force into the Army Acquisition Corps (AAC). The program will be run in two phases. The objective of Phase I will be to identify GS-13s that satisfy Defense Acquisition Workforce Improvement Act requirements for AAC membership and confer the status of Corps Eligibles (CEs) on these individuals. CE status will allow GS-13s to compete for GS-14 Critical Acquisition Positions without a waiver, as well as provide additional training opportunities beyond those required for career field certification.

The near term implementation process will be to examine all Level III certified GS-13s, verify that they meet education requirements for accession into the AAC, and make them CEs. Phase II will allow CEs to compete for board selection into a Competitive Development Group (CDG). The focus of the CDG will be to place members in challenging acquisition positions of a multifunctional nature, thus preparing individuals for positions of greater responsibility in the AAC.

LETTERS

Dear Sir:

In his article, "Contingency Contracting Officers and the VISA IMPAC Card at the National Training Center" (September-October 1995, *Army RDE&A*), CPT Nicholas Castrinos writes about how the 2nd Armored Division will conduct contingency contracting at the NTC with IMPAC credit cards. While I'm sure that this is an excellent training opportunity, my experience tells me that his "train as you fight" thesis regarding use of the IMPAC credit card at the NTC and making a comparison to Operation Uphold Democracy is not fully valid.

In his opening paragraph, CPT Castrinos leads the reader to believe that the IMPAC credit card was widely in use during Operation Uphold Democracy. During the first four months of that operation (September-December 1994), the exact opposite was true. There were only three card holders from the 10th Mountain Division in country. What follows are four problem areas the division experienced that need to be addressed while considering use of the IMPAC credit card for a contingency operation:

- **Funding.** CPT Castrinos does address a good plan for funding card holders in a deployment. The reason here is because, like the NTC, the theater will have its own funding. The card holder will have to ensure that the theater resource manager issues a bulk-funded document to each card holder for use in the AO. The card holder also needs to annotate the theater Account Processing Code (APC) on statements of account for reconciliation.

- **Control.** CPT Castrinos says that a rotation approving official will be in control of all credit card holders. If this individual is not the approving official or the alternate approving official in garrison, how can he/she legally perform this function during deployments? Also, if a slice element comes from a different headquarters with its own funding (and does not go through the theater), how is this individual going to control that unit's card holder? There is no guarantee that this approving official will even know that a slice element has an active card holder in the AO.

- **Reconciliation of Statements.** How will a deployed credit card holder reconcile his/her Statement of Account while deployed? Statements are mailed to the card holder's unit. Unless the card holder has a reliable unit mail clerk who will forward the mail

(assuming that the mail will be faster than a few weeks), the card holder will not receive the statement. The home station finance office may pay the bill to avoid interest payments, but it is still the card holder's responsibility to reconcile accounts.

- **Vendors.** The biggest problem for the three card holders in the beginning of Operation Uphold Democracy was a lack of vendors who would accept a credit card. Most business concerns in Haiti either were not set up for credit card transactions or wanted to be paid in cash. Of course, this problem will always be contingent upon the location of the deployment. What was a challenge in Haiti would not be a challenge while deployed for disaster relief operations in south Florida after Hurricane Andrew, for example.

The solution to these problems is two-fold. First, the Field Ordering Officer (FOO) system will have to remain in place, and I am glad that CPT Castrinos did not forget to mention it in his article. The unit FOOs performed the bulk of all small dollar purchases during the first months of Operation Uphold Democracy. Second, the theater can establish its own credit card program. This way the theater can train and assign its own credit card holders. The funds come from the theater J-8, the theater contracting office can provide oversight of the program, and statements can be reconciled with the finance office in country. Once a card holder redeploys back to his home station, the card can be terminated. A system similar to this is in place in Haiti now. Even so, only the Contingency Contracting Officers have been issued cards.

Every deployment scenario will require different types of contracting support. The contracting challenges faced by Contingency Contracting Officers in Haiti will doubtless be different anywhere else. We need to remember that a contracting SOP developed for use at the NTC can be a very valuable asset to begin planning for a contingency operation, but highly suspect to the economic and social environment of the region where a unit deploys.

Sincerely,

PAUL A. MCDERMOTT

CPT, FA

Contingency Contracting Officer

10th Mountain Division

Fort Drum, NY

RD&A NEWS BRIEFS

Army Awards Mentor-Protege Contract

A Department of Defense mentor-protege contract was awarded in the amount of \$2.8 million on May 18, 1995, to Texas Instruments (TI) in support of the JAVELIN weapon system. The purpose of the mentor-protege effort is to provide incentives for DOD contractors to assist small disadvantaged businesses in enhancing their capabilities to increase their competitiveness and broaden their business base. TI will be providing assistance to Ballo Precision Parts, Inc., a small disadvantaged business (SDB) supplier of electronic packages and other metalized parts, and MINCO Technology Labs, Inc., a SDB supplier of a variety of electrical and environmental screening operations.

The contract will be used to provide training, manufacturing production enhancement equipment, and in-house technical

support to each of the protege businesses. Training shall focus on customer requirements, business process management, cycle time reduction, Statistical Process Control (SPC), teaming activities, and Six Sigma methodologies. In addition, the agreement will provide test station equipment, hardware, software and systems for job scheduling and manufacturing floor control efforts.

TI selected the two SDBs because of their successful history of providing critical packages and military-tested die used in hybrid devices. The electronic packages and semiconductor die are two of the largest hybrid material cost drivers. The JAVELIN program utilizes these two SDBs in production to meet the SDB subcontracting planning goal. This SDB provides JAVELIN with electrical and environmental screening operations on unencapsulated semiconductor die used in hybrids.

COL Michael A. Roddy III manages the JAVELIN Project for the Army at Redstone Arsenal, AL, under the direction of George Williams, program executive officer for tactical missiles. The JAVELIN mentor-protege contract is the first awarded by the program executive officer for tactical missiles.

From The Acquisition Reform Office...

This is the first of many articles to be published from the Army Acquisition Reform Office. The purpose of this article is to inform the reader of the Army's efforts in making the cultural changes needed to implement acquisition reform in support of Force XXI and modernization. Transitioning to Force XXI is a tremendous undertaking. Acquisition reform plays a small but integral role in successful modernization implementation. The efficiencies gained by acquisition reform will allow the Army to modernize with more equipment and maintain operational force structure. This article provides just a few examples of what the Army is doing to foster the cultural change. By publicizing new and innovative changes, we hope to change thought processes by letting everyone know change is alive and well in the Army. Training the acquisition work force is another mode of indoctrinating cultural change. Therefore, a synopsis of an on-going action called "Roadshow" which teaches acquisition reform is also included.

What is Acquisition Reform?

Acquisition reform is a philosophy of continuous process improvement focused on reengineering the acquisition system by promoting innovation and good business judgement and changes to law, regulations, and processes that impede smart practices.

Army Acquisition Reform Team

In August 1995, Dr. Kenneth J. Oscar, deputy assistant secretary of the Army (procurement), created the Army Acquisition Reform Office. The function of this team is to collect, document and disseminate accomplishments/lessons learned; manage, prioritize, and accelerate future reform initiatives; and keep the Army leadership up to date on acquisition reform developments. The office is located in the Pentagon, Room 3E443, telephone (703)697-2542/2543 or 2558.

Publicizing "Good News" Stories

One of the objectives of the Army Acquisition Reform Office is to publicize "good news" stories from the Army acquisition community. The purpose of publicizing good news is to let the acquisition community know how the Army is implementing smarter and better ways of doing business.

Everyone must save time and money in these days of streamlining and making others aware of "better business" can maximize the success of reform efforts Army-wide. In order to facilitate cataloging of "good news" stories, the following groupings of initiatives have been developed: requirements generation, cost, procurement, acquisition management, contract management, and training. Examples of these initiatives can be reviewed on page 31, Figure 3 of the September-October 1995 issue of this publication.

To aid in evaluating and cataloging "good news" submissions, include the following information:

- **Background:** (What constituted the need for improvement);
- **Program:** (What is the program and group of the initia-

tive):

- **Baseline:** (Each initiative must have a baseline for use in computing acquisition reform);
- **Cost Savings:** (Cost reductions from the baseline budget that result in program funds being recouped for use elsewhere. Only type where dollars are available for other purchases);
- **Cost Avoidance:** (Reduction from historical program costs, i.e., achieving mission despite decreased budget or avoiding increased program costs through innovation);
- **Reinvestment:** (What has been done with the savings (time or money) due to implementation of the efficiency. If actual savings have not yet been realized annotate when you anticipate the savings and how the anticipated savings will be reinvested);
- **Process:** (A description of the process improvement utilized to obtain efficiencies);
- **Point of Contact:** (The name and phone number of the individual who can provide additional information);
- **Validation:** (The major command (MACOM) command should concur with the process and savings stated).

Major Subordinate Commands (MSC's) should submit all "good news" stories directly to their MACOM which will in turn perform an evaluation and submit appropriate stories to SARD-PPR.

"Good news" stories should be submitted to the Deputy Assistant Secretary of the Army (Procurement), Acquisition Reform Office, Room 3E443, SARD-PPR, The Pentagon, Washington, DC 20310. You may also submit your stories by e-mail to the following address: erwins@sarda.army.mil or jeskar@sarda.arm.mil.

Total Army Roadshow

"Roadshows" are acquisition training seminars designed to provide face-to-face instruction in the principles and practices of the Army's current acquisition thrusts. Experience has shown training the work force in acquisition reform generates savings in time and money and produces process improvements well worth the investment.

The Army Materiel Command (AMC) has been conducting Roadshows since 1992 with great success. Given this fact, Gilbert F. Decker, assistant secretary of the Army (research, development and acquisition) and Army acquisition executive, decided to make future Roadshows a "Total Army" effort and concurred in the next Roadshow season scheduled to take place from February through December 1996.

The theme of "Roadshow V" or the first total Army Roadshow is "Contract and Acquisition Management." The Acquisition Reform Training Modules (ARTMs) for Roadshow V include: Acquisition Reform Overview; Integrated Product Teaming (IPT); Acquisition Planning/Market Survey; Streamlining Acquisition of Commercial Items; Task Order/Job Order Contracting; Contingency Contracting; Performance Based Service Contracting; Best Value Contracting; and Modeling and Simulation.

Roadshow I, completed in April 1992, was a series of one-day seminars presented at AMC major buying commands. Roadshow II, completed in May 1993, presented acquisition improvement principles, such as the reduction of functional requirements/RFP scrub and use of multi-disciplined teams for all phases highlighted in Roadshow I in more detail. The focus of Roadshow III was acquisition improvement practices, i.e., use of functional support templates and partnering. Roadshow III was conducted during the first and second quarters of FY 94.

The use of Performance Specifications and Best Value Source

ACQUISITION REFORM

Selection were the topics for Roadshow IV. This Roadshow was concluded in July 95, with the final seminar being taught in Washington, DC. Roadshows address all aspects of the acquisition process, from requirements generation to soldier feedback on fielded systems. The Total Army Roadshow will provide a learning experience for everyone associated with the acquisition process and is a significant and rewarding undertaking. A detailed article on Roadshow V appears on page 24 of this issue. The following Roadshow V schedule is published for planning purposes only. These dates and locations are subject to change.

| Date | Location |
|-----------------|--------------------|
| Feb 5-9, 1996 | Huntsville, AL |
| Feb 26-29, 1996 | Aberdeen, MD |
| Apr 7-10, 1996 | Orlando, FL |
| May 13-16, 1996 | Central New Jersey |
| Jun 3-6, 1996 | Detroit, MI |
| Jun 24-27, 1996 | Rock Island, IL |

| | |
|--------------------|---------------------|
| Jul 15-19, 1996 | Boston, MA |
| Aug 5-8, 1996 | St. Louis, MO |
| Aug 19-22, 1996 | Northern New Jersey |
| Sep 16-19, 1996 | Washington, DC |
| Sep 30-Oct 3, 1996 | San Antonio, TX |
| Oct 21-24, 1996 | Norfolk, VA |
| Nov 4-7, 1996 | Atlanta, GA |
| Nov 18-21, 1996 | Washington, DC |
| Dec 2-5, 1996 | Sierra Vista, AZ |

The audience for each *proposed* date and location will be comprised of approximately 1/3 sponsoring activity employees, 1/3 DOD employees within commuting distance, and 1/3 industry representatives. If additional Road Show information is required, contact the U.S. Army Contracting Support Agency, 5109 Leesburg Pike, Suite 916, Falls Church, VA 22041-3201, telephone DSN 761-7569 or Commercial (703)681-7569.

CONFERENCES

Diagnostics, Failure Prevention Conference Announced

A joint conference on integrated monitoring, diagnostics, and failure prevention will be held April 22-26, 1996, in Mobile, AL. Sponsors of the conference are the Department of Defense Joint Oil Analysis Program Technical Support Center, the Society For Machinery Failure Prevention Technology, and the University of Wales, Swansea.

The conference provides an effective means for the exchange of ideas and technology among the maintenance, condition monitoring, diagnostics and failure prevention communities. The sponsors share the common goal of maximizing the service life of machinery and structures at minimum cost without compromising availability or safety.

Presentations at the conference will include research, development, applications and case histories in the fields of machinery and lubricant condition monitoring, nondestructive testing, lubricant analysis, vibration analysis, performance analysis, reliability analysis, failure analysis, maintenance concepts, diagnostics, prognostics, life extension, sensors technology, and more.

For additional information, contact Allison M. Toms, JOAP-TSC, 296 Farrar Road, Ste B, Pensacola, FL 32508; (904) 452-3192.

Electromagnetic Launch Technology Symposium Scheduled

The Eighth Symposium on Electromagnetic Launch Technology will be conducted in Baltimore, MD, April 21-24, 1996. The Institute for Advanced Technology (IAT), University of Texas at Austin, now federated with the Army Research Laboratory (ARL), will host the symposium in conjunction with the ARL Weapons Technology Directorate (ARL/WTD). The symposium will consist of three days of unclassified oral and poster presentations.

This international symposium provides updates on research being conducted by key researchers from around the world. In previous symposia, a broad spectrum of potential applications

of electric launch systems have been presented, including: military applications (primarily associated with achieving higher velocity or longer range weapons systems); launch of aircraft into flight using electromagnetic catapults; launch of materials directly into space; and acceleration of materials to extremely high velocities, either for ultra-high pressure physics research or for accelerating fusile material into nuclear fusion reactors. It is anticipated that these areas and others such as coilguns, computational techniques, power conditioning and energy storage, and system analysis/integration will be presented and will provide the technical foundation of the next electromagnetic launch symposium.

For further information concerning the symposium, please contact Patrick Sullivan, Julie Grosser, or Patricia Hummel at (512)471-9060, or fax (512)471-9096.

AWARDS

Dr. McCroskey Receives Von Karman Medal

Dr. W.J. McCroskey, a senior research scientist at the Army Aeroflightdynamics Directorate, NASA Ames Research Center, has received the 1995 von Karman Medal of the NATO Advisory group for Aerospace Research and Development (AGARD). One of the highest international honors in aerospace, this award was initiated in 1972 in memory of Dr. Theodore von Karman, a famous aeronautical scientist who founded AGARD shortly after World War II. The award recognizes outstanding contributions to aerospace science and technology and to progress in scientific and technological cooperation among the NATO nations in conjunction with AGARD activities.

McCroskey is the seventh American to receive the award. He was cited for technical achievements related to helicopter aerodynamics and for active participation in AGARD programs over the past 20 years. He was also credited for his efforts in smaller NATO nations, such as Greece, Portugal, and Turkey.

My American Journey

Random House, Inc., 1995
By Colin Powell with Joseph E. Persico

Reviewed by MAJ Tom Gilbert, a frequent contributor to Army RD&A, and an Army Acquisition Corps member currently attending the Air Command and Staff College.

The long-awaited autobiography of GEN Colin Powell was resoundingly worth the wait. Not unexpectedly, this book struck the number one position nationwide on book sales the first week on the market. This was my first experience standing in line to purchase a book. I must admit to a degree of trepidation that they would be gone before I reached the counter.

This riveting story of Powell's rise from the depths of the South Bronx to attain the highest position in military service is both exhilarating and insightful. The reader can see the world through Powell's eyes and come away with a renewed faith in the American dream and a deep appreciation for the author. Powell tells his life's story in the first person narrative and examines his life with clarity and admirable objectivity.

The author takes you on a journey of his lifetime. We are permitted a glimpse into his personal life and given a front row seat as he progresses in his career. For the RD&A professional, we are provided secrets into the inner workings of the military establishment at progressively higher levels as seen from a soldier's perspective. Using incredible and laudable tact, he examines the swings of the pendulum as he encounters both positive and negative experiences during his meteoric trek. Powell, always true to his service, survives

and eventually earns the privilege of becoming the military's top soldier.

Colin Powell is a moralist with a steadfast code of ethics. Beyond the soldier values of duty-honor-country, his world is bounded by inspirational credos of professionalism, honesty, respect, tradition, patience, tolerance, and fair play. At 643 pages, the reader will grasp the depth, power and intellect behind the man. If we learn nothing else from Powell's work, conceivably the most eloquent message may well be the significance of positive vision and unwavering values. He cites 13 truisms that he calls "Colin Powell's Rules." They are:

- It ain't as bad as you think. It will look better in the morning.
- Get mad, then get over it.
- Avoid having your ego so close to your position that when your position falls, your ego goes with it.
- It can be done!
- Be careful what you choose. You may get it.
- Don't let adverse facts stand in the way of a good decision.
- You can't make someone else's choices. You shouldn't let someone else make yours.
- Check small things.
- Share credit.
- Remain calm. Be kind.
- Have a vision. Be demanding.
- Don't take counsel of your fears or naysayers.
- Perpetual optimism is a force multiplier.

Perhaps the most striking aspect of Powell's approach is his lack of self-aggrandizement. He sees his life through an objective lens and, despite his phenomenal success, remains humble and nonself-congratulatory. His life's story is truly inspirational not only for the military reader but to anyone who needs confirmation on what is right about America. After reading his book, I felt renewed conviction as a military professional and a deepened, heartfelt respect for the man behind the words.



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