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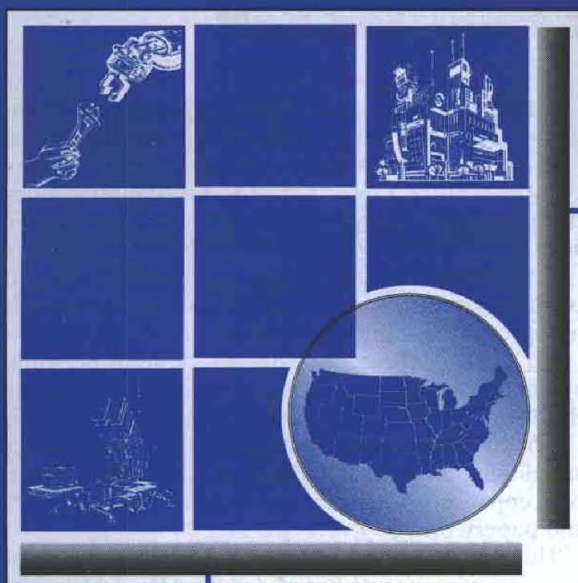
ARMY RD&A

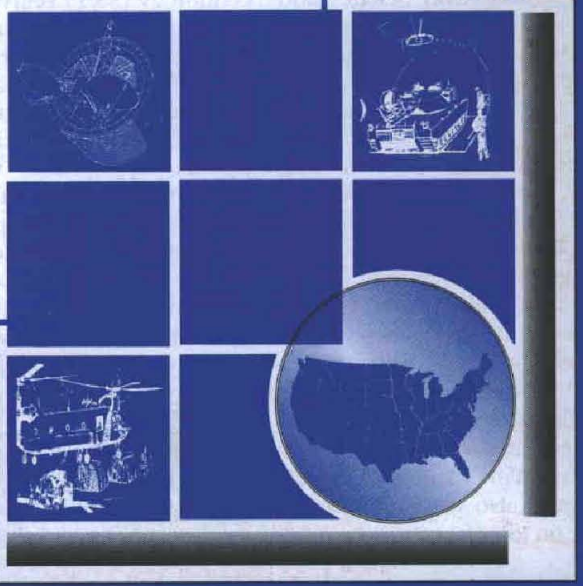
SEPTEMBER - OCTOBER 1995



- Modernization Efforts
- Laboratory Initiatives

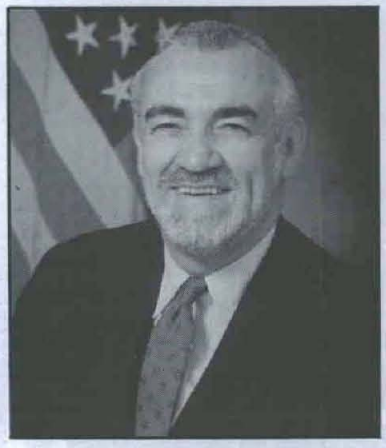
National and Defense R&D Strategy

- Science and Technology Management
- Tech Transfer
- Acquisition Reform



From The Army Acquisition Executive...

REFORMING THE LABORATORY PERSONNEL SYSTEM



I have written previously about the Vice President's "reinventing government" initiative to create a government that works better and costs less. Our Army laboratories are active participants in the reinvention process and continue to adopt innovative business practices to increase their efficiency and effectiveness. This article will describe major initiatives toward these objectives.

Whatever the military needs of the future, we will rely on Army scientists and engineers to help meet them. For this reason, it is imperative that we continue to attract top quality laboratory personnel and retain them through education, training and rewards for performance. My focus is on the increasing demand within the Army research and development community for fresh ideas and creative solutions to prepare for the challenges of 21st century warfare.

For more than a century, the federal personnel system has been evolving into a bureaucratic maze. Year after year, layer after layer, the rules and regulations have piled up. This elaborate system often does not work, particularly with regard to the recruitment and retention of highly specialized experts such as engineers, scientists, technicians, and other staff members in our federal laboratories.

In a welcome move, Congress recently approved legislation that has been signed into law to permit reform of the laboratory personnel system by streamlining procedures for recruitment and hiring, classification and development, and pay and promotion. The Army is working to establish, as an initial demonstration project, modified civilian personnel rules at four Army Science and Technology (S&T) reinvention laboratories: the Army Research Laboratory (ARL); the U.S. Army Missile Research, Development, and Engineering Center (MRDEC); the U.S. Army Medical Research and Materiel Command (MRMC); and the U.S. Army Engineer Waterways Experiment Station (USAEWES). This demonstration project is in the proposal stage pending approval by the Army, the Office of the Secretary of Defense, and the Office of Personnel Management. Before final approval and implementation, the proposal will undergo scrutiny and comment through public hearings, Federal Register postings, and Congressional and union notifications. If approved, we project that by mid-1996, more than 7,800 civilian employees will participate in this project. The other Army S&T laboratories, now also designated as reinvention labs, will participate six months after the initial four.

The demonstration project, when approved and implemented, will link entry-level salary to market forces by occupation. It also will link performance to pay, simplify paperwork on job classifications and other personnel actions, and emphasize partnerships between management and labor unions. The overall objectives are to accomplish the following:

(1) To improve hiring by allowing Army laboratories to compete more effectively for high-quality personnel, through direct hiring and selective use of higher entry salaries.

(2) To motivate and retain staff through more flexible, broader pay bands, pay for performance, sabbaticals, and a more responsive personnel system.

(3) To strengthen the manager's role in personnel management through increased delegation of personnel authorities.

(4) To increase the efficiency of the personnel system by simplifying the classification system through broad banding of occupations and grades and reduction of guidelines, steps, and paperwork.

This broad band concept has several advantages, including a reduction in the number of classification decisions required during an employee's career, an increase in the range of personnel-related pay for each level, and the prevention of progression of low performers by mere longevity.

When the project is approved and implemented, the participating Army labs may recruit qualified candidates and make immediate offers of appointment under direct hire or existing authorities. This will eliminate the present time-consuming process and serve as an excellent tool for enhancing diversity in the work force to keep Army labs competitive with academia, private industry, and nonprofit corporations. Pay progression will be based on performance.

Employee development programs are also being revised on private sector models. The laboratories will continue their employee development programs, such as local training, off-site training, long-term training, and developmental assignments. Sabbatical programs will be developed, and funded degree programs offered to employees.

The Army continues to make dramatic changes on many fronts in the way we do business. With the help of Congress we are streamlining our laboratory personnel system to cut red tape and empower the work force to excel. This action is long overdue. At present, the Army lab personnel recruitment program is highly centralized, inflexible, unresponsive and time-consuming. Pay is based on longevity, not on performance. In short, the system is broken and it must be fixed. Highly motivated, competent, well-trained people are essential to the success of the Army S&T program.

Gilbert F. Decker

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FEATURES

National & Defense R&D Strategy

Strategic Planning And Federal Science And Technology
Dr. John H. Gibbons 2

Army Modernization Forecast
GEN Ronald H. Griffith 3

Advanced Concept Technology Demonstrations: Today's Technology For The Warfighter
Larry Lynn 4

DOD Dual Use Technology And Technology Transfer
Dr. Lance A. Davis 7

Army Science And Technology Contributions To Future Joint Warfighting Capabilities
MG Edward G. Anderson III and MAJ Michael J. McGonagle 10

Joint Directors Of Laboratories ... Project Reliance: Success In The Making
MG Thomas L. Prather Jr. and Michael I. Dailey 15

Affordable Acquisition
Dr. Kenneth J. Oscar 17

Innovations For Quality In The 21st Century Army Laboratories
Dr. Richard Chait, Dr. Richard G. Rhoades, and Dr. Robert S. Rohde 21

Reinventing An Army Laboratory
Dr. John W. Lyons 24

The Increasing Relevance Of Army Research
Dr. Gerald J. Iafrate and W. Davis Hein 26

Acquisition Reform: Two Years Of Change
COL Danny L. Abbott and Mario W. Lucchese 30

Resourcing The Modernization Strategy
MAJ Robert W. Morris 34

Adequate Price Competition: A History Of Regulatory Evolution
George A. O'Reilly Jr 36

Contingency Contracting Officers And The VISA IMPAC Credit Card At The National Training Center
CPT Nicholas L. Castrinos 38

DEPARTMENTS

From The Army Acquisition Executive ..... Inside Front Cover
Career Development Update 40
RD&A News Briefs 45
Books 46
Personnel 47
Conferences 48

COVER

New and emerging technologies, integrated with revised doctrine and reinvented organizations, are impacting near and long-term national and Defense strategies.

National & Defense R&D Strategy

Investing in the Future . . .

STRATEGIC PLANNING AND FEDERAL SCIENCE AND TECHNOLOGY

By Dr. John H. Gibbons
Assistant to the President
For Science and Technology

As military and military-savvy people, the readers of *Army RD&A* understand that important objectives cannot be left to chance. A challenging mission requires smart strategy. The administration has always embraced strategic planning. The reinventing government initiative exemplifies the reasoned, intelligent—strategic—approach to addressing the legacy of a government that is too big and inefficient. Today, the loud shouts of those who would cut investment and leave the future to chance threaten to drown out the quieter voices of reason.

Our S&T investment strategy is comprehensive and coordinated. It is built on enduring principles: That scientific knowledge is the key to the future; That technology is the engine of economic growth; and That military and economic power together secure our future.

In 1993, the president created the National Science and Technology Council (NSTC) to coordinate science, space, and technology policies throughout the federal government. This council represents the first time that the United States has had a Cabinet-level body devoted to the federal research and development enterprise. By making interagency dialogue the norm, the NSTC cuts through bureaucracy and ensures that all agencies pursue their missions with a shared vision and common goals.

Briefly stated, the national science and technology goals we have established are:

- Promote Long-Term Economic Growth that Creates Jobs;
- Harness Information Technology;
- Enhance National Security;
- Maintain World Leadership in Science, Engineering, and Mathematics;
- Sustain a Healthy, Educated Citizenry; and
- Improve Environmental Quality.

Defense is naturally the top priority of our national security science and technology program. Superior technology allows us to field the strongest military at the lowest cost—both economic and human. The military component of our national security S&T program—ably managed by the Department of Defense through the director of Defense research and engineering, the Service secretariats, and the military components including the Army Materiel Command—is detailed in the *Defense Science and Technology Strategy.*

Science and technology also play central roles in efforts to prevent and counter the proliferation of weapons of mass destruction and their means of delivery, to verify and monitor existing and prospective arms control agreements, and to ensure the effectiveness of our nuclear research and production capability.

Not all of our national security needs are purely military, however. A vibrant high technology industrial sector enhances our national economic strength while providing the technological edge on which our military advantage depends. We are committed to capitalizing on the strengths of American industry, and to breaking down the barriers between the Defense and commercial industrial sectors so that we have access to the best of both for our military applications. Finally, science and technology cooperation can help to enhance our security by addressing global stresses such as overpopulation, endemic poverty, migration, environmental degradation, food scarcity, and communicable diseases—stresses that can lead to political instability and conflict.

These dimensions of our national security science and technology program reflect the president's *National Security Strategy of Engagement and Enlargement.* Our *National Security Science* and *Technology Strategy* further articulates the goals and priorities of the national security science and technology program.

Investing in science and technology is investing in the future. A clear investment strategy helps protect our future from the arbitrary budget cuts that slash investment along with waste. This issue of *Army RD&A* makes a useful contribution to the debate as we go forward in this challenging time.

ARMY MODERNIZATION FORECAST

By GEN Ronald H. Griffith
Army Vice Chief of Staff

Developments in technology in the past 30 years have greatly changed the nature of warfare. Our victory in Desert Storm clearly demonstrated that technology is a significant force multiplier. As we move into the 21st century, we recognize that not only will technology and warfare continue to change, but America's Army must stay in front of that change. We are taking aggressive steps to redesign the force to take advantage of new and emerging technologies, integrated through sound doctrine and reinvented organizations, to build a more versatile and capable force.

We have developed a modernization strategy that focuses on increased capabilities rather than on new systems. Our modernization plan reflects the process we are taking to acquire the Army's vision for the 21st century—Force XXI. Real-time, shared, situational awareness will enable Force XXI to observe, decide, and act faster and more precisely than any enemy. Advanced technologies will enable us to focus combat power from dispersed locations at the decisive point. We have identified five information age capabilities essential to Force XXI: winning the information war; dominating maneuver; conducting precision strikes; sustaining the force; and protecting the force.

Our modernization objectives reflect the changed strategic environment and the changing nature of warfare. Our modernization efforts will enable us to set the conditions for decisive maneuver—causing rapid defeat while minimizing casualties throughout the depth and breadth of the battlefield. Our modernization strategy will allow future forces to leverage their shared situational awareness to pick the time, place and manner in which the enemy is defeated or destroyed. Although we are not buying new systems, we are leveraging advances in technology to address the future warfighting requirements. Through the use of new and emerging information technologies, we are improving our existing systems to ensure the nation has an Army capable of establishing and maintaining land force dominance.

Horizontal Technology Integration (HTI) is the linchpin of our modernization strategy for the future—upgrading existing weapon systems instead of developing new ones. Through HTI, the Army will upgrade the force, maintain its technological edge on the battlefield, and enhance its combat power through the synergy of applying synchronized and common technologies across the force rather than to one or a few systems. HTI breaks away from the traditional "mission specific" modernization approach. Second Generation FLIR capability, Battlefield Combat Identification Systems, and Digitization are the major HTI efforts underway at this time. These three programs provide capabilities that, when combined, will enable us to reduce fratricide, improve situational awareness, firepower effectiveness, and command and control.

Improved imagery and identification capability will enable our forces to rapidly and accurately acquire and identify targets. Digitization will permit the rapid distribution of "target" information, whether friend or foe, thus providing the commander and his staff a more accurate picture of the battlefield. The simultaneous integration of these technologies into different weapon systems not only provides an exponential improvement in the force, but it allows the Army to optimize scarce modernization funds. The HTI approach to modernization allows the Army to spread development and testing costs over multiple systems and then to procure subsystems at larger quantities thus taking advantage of lower unit costs. Above all, HTI will provide the warfighter with the necessary improvements in lethality, survivability, and tempo to defeat any threat on the 21st century battlefield.

We have developed a modernization strategy that focuses on increased capabilities rather than on new systems.

Today, we have the best trained, best equipped Army in the world. The Army is a changed and changing force, in doctrine, force structure, training, and equipment. We owe it to our soldiers—and to America's soldiers of the 21st century—to provide them with the best and most capable weapons systems and equipment in the world. Our modernization strategy will ensure maximum combat capability through the efficient integration of common technology across the force. Our modernization plan will enable us to meet the challenges ahead. The articles that follow describe many of the ideas and strategies we will use to transform America's Army into a force relevant in the future—FORCE XXI.

ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS: TODAY'S TECHNOLOGY FOR THE WARFIGHTER

By Larry Lynn

Introduction

It is very clear that our national defense community is facing many new challenges; not the least of which is the ability to keep up with technology and transition it to our field forces quickly, efficiently and at a price we can afford. Reduced resources are also driving a need to insure that we tie the work of the technology establishment more closely to the needs of our operational forces (the "warfighters"). We have to improve our ability to transition our best technology in a time frame that does not deliver an obsolete system or capability to the field for the first time. At the same time, it does no good to accelerate the transfer of technology unless it is associated with a clear military need, is acceptable to the user, can be assimilated easily by our forces and is affordable to operate and maintain.

The problems we are facing are not new. They didn't materialize only after the collapse of the Berlin Wall and the disintegration of the former Soviet Union. Getting operationally meaningful products to the field expeditiously has been a dilemma for the Defense Department for some time. What is new is a significantly altered national security environment, the diversity of missions faced by the Department of Defense (DOD), a relatively large reduction in resources available for national defense, and the downsizing of our total military force.

Packard Commission

In June 1986 the President's Blue Ribbon Commission on Defense Management—also known as the Packard Commission—published its report *A Quest for Excellence*. In its findings, the Packard Commission noted that: "... all too many of our weapon systems cost too much, take too long to develop, and, by the time they are fielded, incorporate obsolete technology." The commission also recognized an increasingly bureaucratic and over-regulated process, and recommended changes including some of the following to improve the overall system:

- Greater use of off-the-shelf components, systems and services. New or custom-made products should be developed only when there are none

We have to improve our ability to transition our best technology in a time frame that does not deliver an obsolete system or capability to the field for the first time.

available in the open market to meet military requirements.

• A high priority given to building and testing prototype systems before moving to full-scale development. Prototyping will let us "fly and know how much it will cost before we buy."

• Use of prototypes for early operational testing, which begins in the advanced development phase and goes on through full-scale development.

Actions have been taken to make many of the changes recommended by the Packard Commission. In addition, subsequent Defense Science Board reports have endorsed the use of "brass boards" or prototypes to improve the overall acquisition process.

Technology Demonstrations

In early 1994, the DOD initiated a new program to address problems in acquisition, system development and product transition. The Advanced Concept Technology Demonstration (ACTD) program was introduced to help revolutionize the DOD acquisition process to adapt to today's economic and threat environment. This new program was designed primarily to transfer mature technologies rapidly from the developers to the users. ACTDs, more importantly, are integrating efforts to assemble and demonstrate a significant, new military capability, based upon maturing advanced technology(s), in a real-time operation at a scale size adequate to clearly establish operational utility and system integrity. The demonstration is jointly sponsored and implemented by the operational user and materiel development communities.

Warfighter involvement is critical to the ACTD process. ACTDs are not just intended to increase the warfighter's early involvement in the technology and acquisition process. Rather, the ACTD must be driven by the military user and the user's perceived critical warfighting needs. The ACTDs objectives are to allow the user to gain a more thorough understanding of a new technology and its potential to support military operations. In so doing, it is anticipated that the user will be able to develop and refine the doctrine, tactics, techniques, procedures, and concept of operations which will exploit the new technologies. It will also allow the user, based on experience in the field, to comment on and make suggestions for improvements or modifications to the equipment or system under evaluation. With the ACTD approach, these changes can be made during the relatively informal demonstration phase of a system's life cycle.

In other cases, user input will provide the basis for a realistic set of requirements with which to enter the more structured and formal acquisition process. This means entering the acquisition process with the full input and coordination of the operational commander. Allowing the operator early and full access to the new technologies will permit a more informed acquisition decision as to functions and quantity of proposed systems. And, unlike previous demonstration programs, the ACTD seeks to provide the commander with a militarily significant residual operational capability at the end of the demonstration.

Although the ACTD program is new, ACTDs are not intended to start a series of new programs but rather to focus the existing, substantial investment of the Services and DOD agencies have made in technology programs. For example, the first eight approved ACTDs built upon $2.8 billion (fiscal year 1995-2001) of Service and agency technology efforts already programed by augmenting this investment with $200 million in additional DOD funding to move these technologies from the laboratory to the operational environment. DOD augmenting funds are for integration of multiple technology programs, perhaps from Services and agencies, into a single ACTD. This funding also provides for multiple copies of systems under demonstration where more than one is required to adequately assess military utility during exercises. DOD augmenting funds are also used to provide technical support for the ACTD for two years of operations in the field. These latter funds give the operational commanders time to determine the value, and where appropriate, to program for the retention of systems within their organizations.

Selection Criteria

To provide focus on what technologies to employ, the ACTD process has developed selection criteria which seek to assist both the technologist and military operational commander in developing a specific ACTD. These criteria have been established to provide guidelines and a framework for ACTD initiation. They are not intended to serve as rigid rules or directives because, if ACTDs are to be successful, they must be guided primarily by good common sense and sound judgment and not by an overly "bureaucratic and over-regulated process." The selection criteria include:

• The ACTD should address a major operational need and provide a significant increased military utility.

• The technology offered should be sufficiently mature that technical risks are minimal. For example, technical maturity may have been established through an Advanced Technology Demonstration.

• The sponsoring warfighter (unified commands) or user is fully committed to joint participation in the demonstration.

• Affordability of the objective system should be plausibly established in the event a decision is made to acquire.

• The ACTD time frame is about three years, more or less, consistent with the degree of technical maturity and pressing need.

The Advanced Concept Technology Demonstration program was introduced to help revolutionize the Department of Defense acquisition process to adapt to today's economic and threat environment.

• The developer has a plan which addresses all essential programmatic aspects.

• Risks (technical, operational, programmatic, and political) are identified, understood, and accepted by the parties.

• The ACTD funding requirements are defined and budgeted through completion.

• Funding is programed to provide an additional two years field support to allow further evaluation and residual contingency capability.

• The demonstration exercises provide a cost-effective basis for the user to make an informed acquisition decision.

In a period where the global proliferation of advanced technologies is unprecedented and the generational life of any technological system may be measured in months rather than years, the Advanced Concept Technology Demonstration approach provides a means of rapidly moving new capabilities into operational forces.

The deputy under secretary of Defense for advanced technology (DUSD/AT) is responsible for selecting and approving ACTDs. Ideally, a user/developer team, having combined a pressing operational need with maturing advanced technologies, will approach the Office of the DUSD/AT with an initial ACTD concept inquiry. The AT staff is available to assist in teaming development, refinement of the concept, and clarifying the basic criteria and attributes of the ACTD. When the concept is sufficiently defined and suitable, a presentation is given to the DUSD/AT, who may accept the concept for further discussion, refer it back with guidance for refinement, or terminate consideration. Once accepted, an abbreviated presentation is given the DUSD/AT's senior advisory group (the AT "Breakfast Club"), for discussion and recommendation. The Joint Staff, through the joint warfare capabilities assessment process, and the Joint Requirements Oversight Council, also provides additional input to the DUSD/AT, who then makes the final approval decision.

Because of the diversity of the technologies and military problems addressed in individual ACTDs, each comes with its own management plan. These serve as a memorandum of understanding between all participating parties in each demonstration. Most importantly, they are an agreement between the technology development manager and the operational commander. The management also lays out a schedule and defines the measures of success desired in each ACTD. An oversight group is established to assist in problem resolution. Oversight of all the ACTDs is maintained by a steering group—composed of senior DOD and Service representatives and co-chaired by the under secretary of Defense for acquisition and technology and the vice chairman of the joint chiefs of staff.

Future Considerations

Upon conclusion of an ACTD, based on the results of the exercises, one of three decisions regarding further acquisition and employment of technologies will be made:

- First, if the operational user does not find that it meets his needs as is, the effort may be terminated or restructured based on the evolved concept of operations and the lessons learned during the ACTD.
- Second, based on the recommendations of the user/warfighter, a formal acquisition program may be initiated. The milestone at which it should enter the acquisition process is variable and based on judgment.
- Third, the technology demonstrated may be transitioned directly to the warfighter. Minor or perhaps no modifications may be required to the existing equipment. This approach is particularly appropriate where only small quantities of new equipment are required. Limited quantities may be replicated to provide for user needs.

Conclusion

In a period where the global proliferation of advanced technologies is unprecedented and the generational life of any technological system may be measured in months rather than years, the ACTD approach provides a means of rapidly moving new capabilities into operational forces. In order to do this effectively, it is critical to closely integrate the warfighter into all aspects of the technology transition process. The ultimate goal of the ACTD program is to facilitate the rapid transition of emerging technologies from the laboratory into the field at substantially reduced cost compared to the past and in a manner which provides U.S. forces with timely capabilities to operate safely and effectively in a dynamic global environment.

LARRY LYNN is the deputy under secretary of Defense for advanced technology. He holds a B.S. in physics from Tufts University and attended the Massachusetts Institute of Technology Center for Advanced Engineering Studies. Lynn is also acting director of the Advanced Research Projects Agency.

DOD DUAL USE TECHNOLOGY AND TECHNOLOGY TRANSFER

By Dr. Lance A. Davis

Introduction

The Department of Defense has a long history of investment in advanced technology driven by military mission needs. Pioneering efforts in microelectronics, electronic circuits and systems, computer technology, etc., led to the spectacular warfighting capabilities evidenced in Desert Storm. These same developments stimulated the creation and/or maturation of multiple billion dollar commercial industries as well. This dual use technology development/technology transfer was recognized as valuable, but it played a limited role in the direction of DOD programs.

In the present geopolitical and DOD budgetary environment, development of dual use sciences, technologies, products and processes becomes a priority for the DOD. Not only does dual use development make good economic sense for the nation, it is a crucial element in the DOD's drive to satisfy its military requirements in the face of declining resources. Performance at any cost must be replaced by affordable systems, whose costs are reduced by the volume production efficiencies allowed by complimentary commercial applications of military technologies. The DOD must stimulate the development of military and commercial technology along parallel paths so that technology upgrades driven by dynamic commercial markets will be compatible with Defense system application.

DOD Dual Use Technology Strategy

The department presented its dual use technology strategy in February 1995 in *Dual Use Technology: A Defense Strategy for Affordable, Leading-Edge Technology*, which was published by the Office of the Under Secretary of Defense for Acquisition and Technology. It speaks to the issues cited above and defines a key element of the strategy as investment in R&D on technologies that have both commercial and military applications and encouragement of the adoption and improvement of these technologies by industry, so that Defense ultimately has a richer base of technology on which to draw.

The DOD strategy report indicates an investment of about $2 billion in dual use science and technology (S&T) projects, mostly through the Advanced Research Projects Agency (ARPA). (These projects are defined as those 6.2-exploratory development and 6.3-advanced development projects where explicit attention is given to commercial as well as military application of the technology.) The report omits about $500 million in projects at the Services and other Defense agencies, so that the overall DOD dual use investment amounts to about one-third of the total, or approximately $8 billion DOD S&T investment. The dual use numbers do not include the $1.2 billion basic research (6.1) portion of the S&T budget which, by its nature, offers generic dual use potential.

Mechanisms

Dual use development and technoloy transfer occur through a number of complimentary mechanisms, ranging from interactions with universities and industry through the core programs of the Services and Defense agencies, to the Technology Reinvestment Project (TRP), the Small Business Innovation Research Program, Cooperative Research and Development Agreements, the Federal Defense Laboratory Diversification Program and countless personal interactions between DOD, university and industry personnel.

Core Programs

The DOD S&T investment represents an ongoing long-term commitment to develop the technologies required to ensure our national security. Its success depends on establishing relationships with industry of sufficient continuity that critical technologies can be nurtured to maturation. The explosive growth of the Internet is but one recent example of the benefit of such continuous activity. For nearly two decades, ARPA has invested in a variety of network developments. Initial funding was for the ARPANET, the first packet switched network. ARPA also funded the development of the Internet and its associated network protocol architecture and, with the collective leadership of the National Science Foundation (NSF) and the Department of Energy, has seen it grow to encompass 30,000 networks and 2,500,000 computers. A further perspective on the historical contributions of DOD to dual use technology is provided by the brochure, *Defense Basic Research* issued by the director, Defense research and engineering in December 1994.

Some key dual use initiatives presently being pursued in DOD include the following:

- **Electronics Manufacturing**—An increasing proportion of the value of military systems is dependent upon electronic products—up to 40 percent in some cases. DOD will invest more than $500 million in supplier technology, infrastructure and advanced applications research in FY 95.
- **Flat Panel Displays**—Flat panels, which are millimeters thick, very light, rugged and portable, represent the next generation of display technology needed for the battlefield of the future. DOD plans to spend a total of about $580 million on the National Flat Panel Display Initiative over the next five years, with industry providing a similar amount.
- **Microelectromechanical Systems (MEMS)**—MEMS technology merges information processing and communication with sensing and actuation. DOD investments (more than $30 million in 1995) are aimed at realiz-

ing advanced MEMS devices and processes, developing and fielding MEMS systems, and catalyzing a MEMS infrastructure for design, fabrication and evaluation of MEMS devices.

• **Advanced Composites for Aircraft**—Superior materials open up new engineering possibilities for the designer by offering the opportunity for more compact designs, greater weight efficiency, reduced operating cost and longer service life. DOD will focus on areas of pervasive military and commercial impact in partnership with firms that have a demonstrated commitment to commercializing these technologies. Funding for these efforts for FY 95-96 will be about $147 million.

• **Integrated High Performance Turbine Engine Technology (IHPTET)**—The IHPTET Program aims to double propulsion system capability for aircraft and cruise missiles. It seeks to accomplish these goals by increasing the thrust/weight ratio while reducing the fuel consumption of turbine engines, and improving durability and maintainability. DOD funding for IHPTET will be about $135 million in FY 95. Seven engine manufacturers are participating in the program on a cost sharing basis.

• **Rotorcraft Technology**—As military demand for rotorcraft declines, commercial sales become increasingly important for sustaining a robust and dynamic technology base. DOD proposes to bolster the industrial base for rotorcraft by establishing the National Rotorcraft Technology Center. Project costs of $10-12 million per year will be matched by industry. This investment will leverage the approximately $100 million per year of ongoing Army, Navy, NASA and FAA rotorcraft science and technology programs.

Technology Reinvestment Project (TRP)

The TRP was created based on the Defense Conversion, Reinvestment and Transition Assistance Act of 1992 (10 U.S.C. 2491 et seq). TRP is a multiagency effort led by ARPA and is a cornerstone of the DOD dual use investment strategy. It is divided into three activity areas: Technology Development, Technology Deployment, and Manufacturing, Education and Training. These three areas are intended, respectively, to facilitate the development and maturation of critical Defense technologies by leveraging the interest and resources of the commercial sector to work with government agencies as partners with common interests and shared risk; to build a "dual-produce" capability in U.S. manufacturing by deploying new manufacturing technologies and methodologies that allow military products to be produced alongside commercial versions of the same product; and to create a new generation of manufacturing experts which will come to know "dual use" and "dual produce" as the routine way of doing business.

The response to the FY '93 solicitation for TRP was overwhelming. Some 2,800 proposals were received requesting $8.5 billion in funding and offering $13 billion in cost share. From these proposals, TRP selected 212 projects for negotiation, committing $605 million in federal funds. Since each of these efforts must be cost shared by at least 50 percent, this represents a total project value of almost $1.5 billion.

Recognizing that the number of successful proposals was a relatively low fraction of proposals received, TRP project managers provided guidance to potential respondents by issuing a solicitation for a "focused" competition in April of 1994. Proposals were requested on the seven technology topics listed below, to be funded at about $170 million:

- High Density Data Storage Systems
- Object Technology for Rapid Software Development and Delivery
- Interoperability Testbeds for the National Information Infrastructure (NII)
- High Definition Systems Manufacturing (e.g. Flat Panel Displays)
- Low Cost Electronic Packaging
- Uncooled Infrared Sensors
- Environmental Sensors

A more general competition was announced in the fall of 1994.

The 103rd Congress expressed a need for assurance that each TRP project clearly address a military use within the dual use context. This was stated in Report 103-321, page 234, U.S. Senate Committee on Appropriations. This concern intensified in discussions of the 104th Congress relating to the recission of previously appropriated DOD funds. The uncertain outcome of these deliberations delayed issuance of a 1995 solicitation for TRP. The Department holds that TRP supports military requirements and, indeed, as indicated above, the development of dual use technology is critical to the acquisition of affordable defense systems.

Small Business Innovation Research (SBIR)

The SBIR Program was initiated by Public Law 97-219 on July 22, 1982 (15 U.S.C. 631, 638). Its purpose is "to stimulate technological innovation, to use small business to meet federal research and development needs, to foster and encourage participation by minority and disadvantaged persons in technological innovation and to increase private sector commercialization innovations derived from federal research and development." The program was reauthorized by Public Law 102-564 on Oct. 28, 1992 (15 U.S.C. 631, 638). Beginning with the FY 94-1 solicitation, the Office of the Director, Defense Research and Engineering, has screened SBIR topics to assure that they have dual use as well as commercialization potential.

SBIR is a three-phase program. Phase I is a exploratory phase and allows funding up to $100K for a six-month effort. Successful Phase I efforts move to a Phase II contract, which allows funding up to $750K for two years. Phase III anticipates the use of non-SBIR funds to pursue commercialization of the Phase II results.

From the inception of the program in FY 83, through FY 94, the DOD received 91,193 Phase I proposals and made 11,707 awards. Of these awards, 3,836 received Phase II awards.

SBIR is funded by a set aside levied against all DOD extramural research, development, test and evaluation funds. For FY 95, the set aside is 2 percent and the SBIR budget is $445 million. In FY 97, the set aside increases to 2.5 percent, which should raise the SBIR pool to greater than $500 million.

The 1992 reauthorization of SBIR emphasized the program's goal of increasing private sector commercialization of technology developed through federal research and development. In support of this goal, the DOD and NSF jointly sponsor regional and national SBIR meetings, to introduce potential new participants to the program, and "Phase II" meetings, to provide a forum for Phase II winners to display their technologies and meet with potential commercialization partners/investors. The components active in SBIR (Army, Navy, Air Force, ARPA, the Ballistic Missile Defense Organization (BMDO), the Defense Nuclear Agency and the Special Operations Command) are all making increased efforts to track successful commercialization. Accounts of bud-

ding Phase III successes are provided, for example, in the 1994 Technology Applications Report from BMDO. For more information, write to: The BMDO Technology Applications Office, c/o National Technology Transfer Center, Washington Operations, 2121 Eisenhower Avenue, Suite 400, Alexandria, VA 22314.

Cooperative Research and Development Agreements (CRADAs)

The Stevenson-Wydler Technology Innovation Act of 1980 (P.L. 96-480) (15 U.S.C. 3701 et seq) established the transfer of federal technology as a national priority. It required that each federal laboratory with more than 200 scientists and engineers have an Office of Research and Technology Applications to act as an interface with state and local governments and the private sector for technology transfer. The Federal Technology Transfer Act of 1986 (P.L. 99-502) amended Stevenson-Wydler to authorize government-operated laboratories to enter into CRADAs with non-federal parties, thus providing a viable mechanism for technology transfer.

CRADAs offer the best mechanism for researcher to researcher interactions between federal laboratories and non-federal parties. While the focus of the law is transfer of federal technology, it is clear that such interactions expose federal scientists and engineers to leading edge technology in the private sector, allowing for the "spin-on" of information to the government as well as "spin-off" to the private sector.

A CRADA is defined as any agreement between one or more federal laboratories and one or more non-federal parties under which the government, through its laboratories, provides personnel, services, facilities, equipment, intellectual property, or other resources with or without reimbursement (but not funds to non-federal parties) and non-federal parties provide the same toward the conduct of specified research and development efforts which are consistent with the missions of the laboratory. A CRADA is not a procurement contract and, thus, the Federal Acquisition Regulations (FARs), supplements to the FARs and the Competition in Contracting Act (P.L. 98-369) do not apply. Hence, a non-federal party interested in initiating a CRADA is not subject to competition requirements.

Early attempts to enter into CRADAs were treated with caution by the DOD and other federal agencies because they represented a new instrument for government-private sector interaction. Agreements were subject to careful headquarters review. CRADAs are now frequently approved at the laboratory director level and this has contributed to a rapid increase in the number of active agreements. As of April 1995, the DOD has about 835 active CRADAs, as compared to about 240 in October 1992 and only a few prior to 1990.

Federal Defense Laboratory Diversification Program (FDLDP)

Section 2514 of 10 U.S.C. requires the secretary of Defense to establish a Federal Defense Laboratory Diversification Program to encourage greater cooperation in research and production activities carried out by Defense laboratories and industry. The Defense laboratories, in coordination with the Office of Technology Transition (OTT), are directed to carry out cooperative activities with industry to promote transfer of Defense or dual-use technologies from Defense laboratories to industry. The OTT was created by 10 U.S.C. 2515 and is charged to monitor research and development activities of the Department of Defense, identify R&D activities that result in technological advances that have potential for non-Defense commercial applications, and serve as a clearinghouse for and coordinate and actively facilitate the transfer of such technological advances to the private sector.

A Broad Area Announcement for the FDLDP was issued on April 12, 1995, with proposals due 45 days from that date. It contains 19 topics selected from those proposed by the Defense laboratories. These 19 topics will compete for about 10 $1 million awards. In order to foster an integrated development team environment, 80 percent of the award will go to the contractor team (and requires 50 percent cost sharing) and 20 percent will go to the laboratory scientists/engineers actively engaged in technical aspects of the project. A successful output of an FDLDP project will be a brass board/prototype which will bring a technology to the threshold of commercialization (spin-off) or system integration (spin-on).

A principal purpose of the FDLDP is to pursue the DOD dual use strategy to invest in R&D on technologies important to both Defense and commercial applications. The program is of modest size, but the competition among the laboratories encourages them to bring forward their best technology transfer opportunities for funding. In the continuum between research, development and enginering, FDLDP projects are intended to involve more mature technologies toward the engineering end of the spectrum, as opposed to CRADAs, which typically emphasize early stage research.

Conclusion

The earliest thinking on DOD technology transfer, as typified by Stevenson-Wydler, was based on the desire to provide private sector access to the huge investment made by the nation in developing Defense technology, in the interest of increasing the global competitiveness of U.S. industry. This remains a worthy goal, but the present fiscal environment dictates that the DOD must consider technology transfer as a two-way process, allowing access to commercial technology as well as spin-off of Defense technology. Moreover, cooperative development of dual use technology must be considered a critical element in the goal of DOD to achieve affordability of future weapons systems, not just an effort to utilize Defense dollars to promote economic competitiveness. The authorities and programs which have evolved to offer a variety of mechanisms for dual use technology development/technology transfer all contribute to the overall DOD goal of fostering the creation of an integrated Defense and commercial industrial base better able to respond to DOD needs at lower cost.

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ARMY SCIENCE AND TECHNOLOGY CONTRIBUTIONS TO FUTURE JOINT WARFIGHTING CAPABILITIES

By MG Edward G. Anderson III and MAJ Michael J. McGonagle

Introduction

The transformation of the Army from a forward deployed, industrial age force to a CONUS based, power projection, information (knowledge) based Army requires continual review and assessment of new technologies and innovative concepts, both doctrinal and materiel. This article will outline Army science and technology (S&T) efforts and how these efforts improve the capabilities of the Army in joint operations.

Since its creation in 1775, the U.S. Army has fulfilled the urgent need our forefathers saw for a land force to defend the nation. In less threatening times the need was seen as temporary, and a powerful national army was viewed as potentially dangerous to the fledgling republic. Those were much simpler times; missions and threats were well defined.

Today's Army must be prepared to conduct a wide range of missions to support the nation ... from disaster and humanitarian relief, to peacekeeping, to war. Each mission is unique and requires specific solution sets; the one constant in each is the American soldier.

Since man evolved on land, land combat will be the final arbiter of conflicts. Likewise, it is the actions of land forces which decide the outcome of Military Operations Other Than War (MOOTW). Our laws, specifically Title X, United States Code, charge the Army with responsibility for "prompt and sustained combat incident to operations on land;" this role relates to the Service functions directed by DoD Directive 5100.1. While the contributions of air and naval forces are essential to the success of joint operations, their ultimate purpose is to support land operations.

Army forces rarely operate alone. They are employed as part of, and comprise the major portion of, a joint force. Jointness allows each Service to bring its particular strengths to augment sister Services, thus filling potentially disastrous capability gaps. Joint operations are not new. Early in the Civil War, Army General Ulysses Grant coordinated his successful attacks of Forts Henry and Donelson with Navy Flag

Officer Andrew Foote. These operations were the beginning of a joint campaign along the Mississippi River that eventually split the Confederacy.

Modern joint operations are complex orchestrations of multiple Service and agency capabilities; unity of command is a key principle of war—a single commander is responsible for mission accomplishment. That commander, the joint force commander (JFC), integrates available forces and develops an overall campaign plan—not plans for separate land, air, and naval campaigns. Joint Publication 3-0, *Doctrine for Joint Operations,* specifies there is only one campaign, the joint campaign.

Force XXI—The Future Army

During his tenure as Army chief of staff, GEN Gordon R. Sullivan put forth his vision for the future of our Army: "America's Army: A Total Force ... Trained and Ready to Fight ... Serving the Nation at Home and Abroad ... A Strategic Force ... Capable of Decisive Victory!" (*Army Focus 1993,* page 2, Headquarters, Department of the Army, Washington, DC, September 1993.) This vision characterizes the radical change which is now reshaping the structure of our Army as well as our concept of how the Army will be employed.

To reach this 21st century Army we must modernize our equipment along with our training, doctrine and organizational structure. Force XXI is the modernization vision for the Army of the 21st century. "Force XXI is the transformed Army of the 21st Century—in its entirety." (*Force XXI ... America's Army of the 21st Century,* page 6, Louisiana Maneuvers Task Force, Fort Monroe, VA, January 1995.) Force XXI is not a goal; it is a journey. A journey to transform from the Cold War Army of the 1980s, through the Desert Storm Army of the 1990s to the nation's strategic force of necessity for the next century. The characteristics of this 21st century Army are shown in an accompanying figure.

Downsizing of the force and the shift from forward deployment to a CONUS based, power projection Army has forced increased reliance on technology, particularly information technologies. It has also forced our reliance on sister Service capabilities in support of the joint land battle.

Information technologies will allow commanders to view the battlefield more clearly, in greater detail, and at extended ranges; thus allowing repositioning of forces to attack enemy vulnerabilities and the introduction of sea and land based tactical aircraft as well as sea based firepower.

Our shift to CONUS basing increases the deployment timelines to many parts of the globe. This causes the Army to rely more heavily on sister Services for transport and protection of assets enroute; it also forces increased reliance, by the National Command Authority, on forward deployed forces, flexible deterrent options, and rapidly deployable forces to defuze situations to either eliminate or limit the necessity of armed U.S. involvement.

The Army is an equipment intensive force. Every soldier needs a weapon of some type. If we expect the Army of the 21st century to be more than a smaller Desert Storm Army, we must modernize and replace our equipment or we risk sending our sons and daughters into battle outnumbered and out-

Service Functions - Army

"Prompt and sustained combat operations on land--specifically, forces to defeat enemy land forces and to seize, occupy, and defend land areas"

"Air and missile defense"

"Forces for Joint amphibious, airborne, and space operations"

"Support and conduct of special operations"

21st Century Army Characteristics

- Doctrinal Flexibility
- Strategic Mobility
- Tailorability and Modularity
- Joint, Multinational, and Interagency Connectivity
- Versatility in War and Operations Other Than War

gunned.

Desert Storm reinforced our belief in the importance of advanced battlefield technology, but given limited resources and the nature of our acquisition system, it takes a long time to field new systems and capabilities. Our potential adversaries also recognize the importance of advanced battlefield technology; they, however, can rapidly acquire advanced systems and capabilities "off the shelf."

Army procurements are requirements driven. For combat equipment, this requirement is expressed as a mission need or battlefield deficiency which generates a "requirements pull." While this method is required for acquisition, it is a shortsighted way to initiate technology development and could lead to systems being fielded without technologies which significantly increase our warfighting capabilities.

"Technology push" is another method of initiating technology development. While controlled and guided by the Army S&T Master Plan, technology push allows the technologist the freedom to explore new ideas. This freedom has led to some significant improvements in the Army and will continue so long as we retain our warfighter focus and maintain our investment in technologies promising significant operational improvements.

Army Science and Technology

Army science and technology provides the technological tools which, when fielded, will increase the capabilities of U.S. soldiers in a variety of missions. Our investment in S&T can provide affordable and timely technology, training, and support that meets the warfighters' needs; develop and maintain a world class network of government and private S&T capabilities for shortened acquisition cycles which are responsive to rapidly changing world situations; and, produce affordable technologies for future weapons systems.

Digitization

Our efforts to "Digitize the Battlefield" are excellent examples of technology push. Digitization will enable the linking of combat, combat support and combat service support units throughout the battlefield. It will enable units to pass operational and logistical data accurately and quickly. It allows leaders to make decisions—with accurate information—in near real-time; it allows shooters to be shooting—thus applying the maximum combat power; and it allows supporters to provide the needed supplies and support at the critical time and place. Digitization is the tool which allows our force, using current and future systems, to apply maximum combat power on the battlefield.

New Systems

Since our goal is to design and field a force which is not just smaller, but better than the Desert Storm force, there must be some major equipment programs to provide "leap ahead" capabilities to the force. The Army has two such programs: Comanche (the next generation armed reconnaissance helicopter) and Crusader (the Advanced Field Artillery System).

Comanche is a multi-mission (armed reconnaissance and light attack) helicopter with an embedded air combat capability. It has a built-in interface with the digitized battlefield and takes advantage of numerous advanced technologies to reduce its signature, and increase its lethality, survivability, sustainability, and deployability. Its capabilities far exceed those of the current reconnaissance helicopter fleet.

Crusader is the Army's next generation indirect fire cannon and artillery resupply system for the heavy force. The Crusader Program is comprised of a self-propelled howitzer (SPH) and an armored resupply vehicle (RSV). The SPH is an advanced 155mm howitzer system which provides a significant increase in artillery survivability/lethality, mobility and operational capability through advanced technologies.

The RSV provides the capability for resupply of ammunition and fuel to the SPH. Inserting high payoff technologies in robotics, automation, expert systems, and vetronics, the RSV will have decreased crew sizes, therefore, providing potential manpower savings.

Our shift to a power projection force has led to renewed recognition of the criticality of the early entry operations and increased our emphasis on the capabilities of our early entry forces. We are currently working several programs to increase the lethality and survivability of these forces, while maintaining or enhancing their deployability.

S&T Programs

The 21st Century Land Warrior (21CLW) Top Level Demonstration (TLD) will provide the soldier's link into the digitized force. It is the most recent follow-on to the Army's successful Soldier Integrated Protective Ensemble (SIPE) Advanced Technology Demonstration (ATD). It draws from numerous technology programs in the

21st Century Land Warrior Top-Level Demonstration Components

- Generation II Soldier ATD
- Objective Individual Combat Weapon ATD
- Integrated Sight Modules Technology Demonstration (TD)
- Forward Observer/Forward Air Controller ATD
- Advanced Image Intensifier ATD
- Mine Detection TD
- Multipurpose Individual Munition TD
- Personnel Status Monitor
- Chemical/Biological Detector
- Inertial Navigation System

ACTD Characteristics

- Focus on a Joint warfighting deficiency;
- Technologies, while advanced, should be sufficiently mature to allow ACTD completion in less than five years
- Provide an operational capability to the user as an ACTD residual;
- Provide the warfighter with additional information to facilitate doctrinal and materiel decisions.

Army, Marine Corps, and at the Advanced Research Projects Agency.

The 21st Century Land Warrior will significantly enhance the capabilities of the individual soldier and Marine, resulting in enhanced survivability, situational awareness, and lethality at both the individual and unit levels.

Advanced Concept Technology Demonstrations

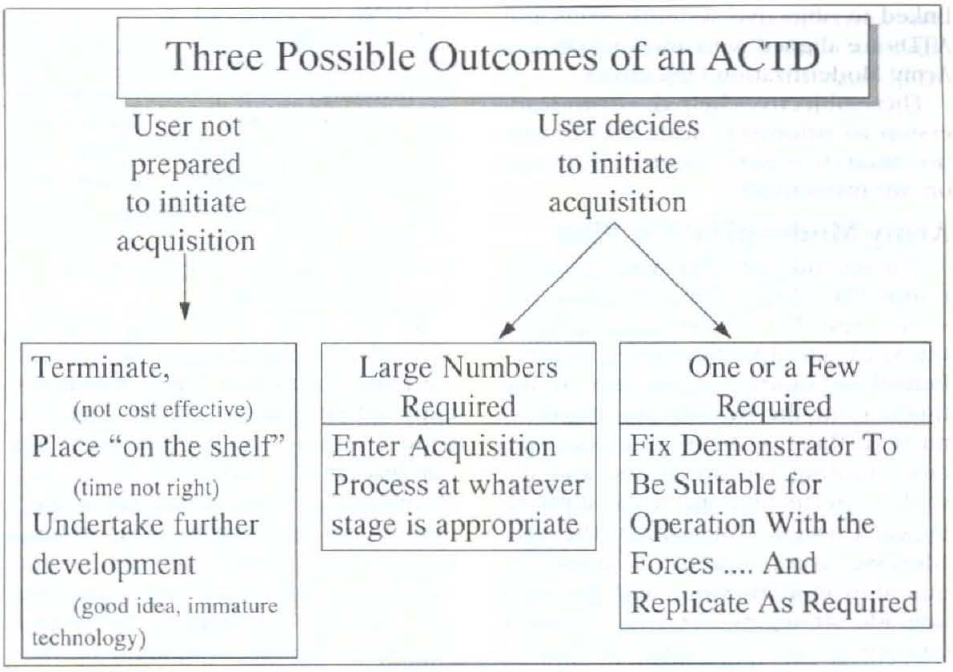
Advanced Concept Technology Demonstrations (ACTDs), an OSD initiative, grew from the Packard Commission recommendation for rapid prototyping. ACTDs apply advanced technologies to warfighting problems to provide an advanced capability in a limited timeframe.

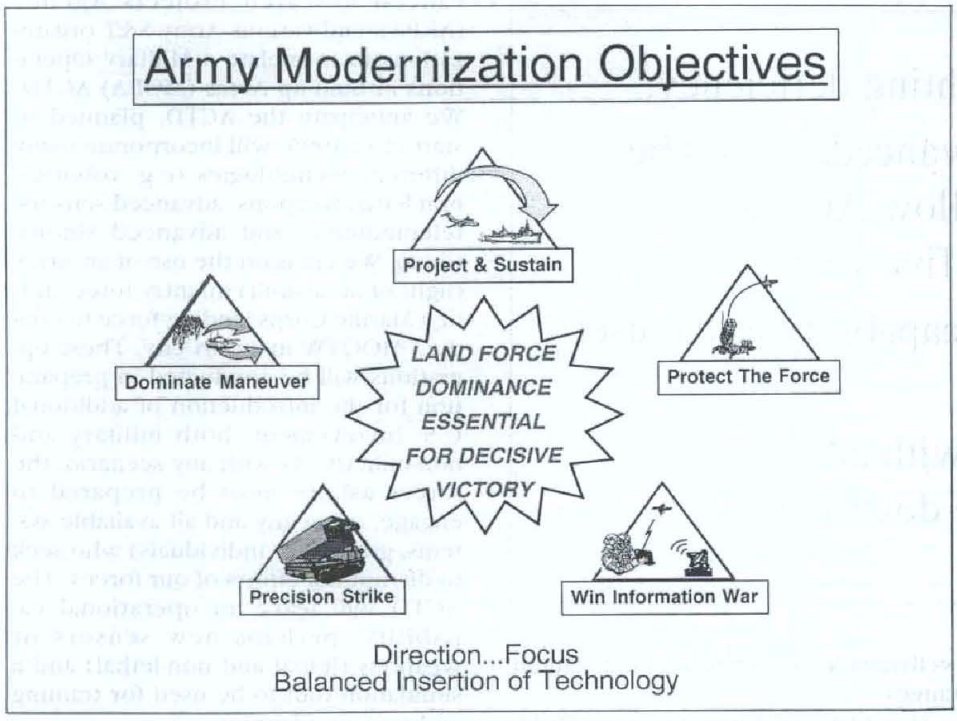
The Rapid Force Projection Initiative (RFPI) ACTD will demonstrate a "system of systems" approach to increase the lethality and survivability of our light forces. Using advanced technology, RFPI systems will automatically analyze enemy information received from a variety of "hunter" sensors (e.g., UAV, IREMBASS, Remote Sentry), for appropriate weapons pairing, and distribute the target data to selected "stand-off killer" systems (e.g., HIMARS, Automated Fire Control Howitzers) for target attack. Increased lethality and survivability are achieved by extending the battlespace—allowing detection and attack of enemy forces well outside their effective engagement ranges.

The Army-led Joint Precision Strike Demonstration was the basis for the Rapid/Precision Counter Multiple Rocket Launcher ACTD. This ACTD will provide the joint force commander the capability to engage short timeline, high priority targets. This capability would allow the JFC to rapidly and precisely engage Mobile Multiple Rocket Launchers during their reload period (following their first salvo) or while they are enroute to a reload/resupply point.

We are currently working with TRADOC, the Marine Corps, the Advanced Research Projects Agency (ARPA), and various Army S&T organizations to formulate a Military Operations in Built-up Areas (MOBA) ACTD. We anticipate the ACTD, planned to start in FY1996, will incorporate many different technologies (e.g. robotics, non-lethal weapons, advanced sensors, telemedicine, and advanced simulations). We envision the use of an Army (light or air assault) infantry force and/or a Marine Corps landing force to conduct MOOTW in a port city. These operations will be conducted in preparation for the introduction of additional U.S. involvement, both military and non-military. As with any scenario, the forces ashore must be prepared to engage, using any and all available systems, groups (or individuals) who seek to disrupt the efforts of our forces. The ACTD will leave an operational capability, perhaps new sensors or weapons (lethal and non-lethal) and a simulation tool to be used for training and mission planning.

Although all ACTDs leave behind a residual operational capability, they are primarily designed and managed in such a manner as to provide the warfighter with the most information possible upon which to base future acquisition decisions. There are three possible outcomes of an ACTD as shown in the figure below.





Science and Technology Master Plan

Army modernization is documented in two parts. The first, the Army Science and Technology Master Plan, is a non-system-specific laydown of Science and Technology Objectives (STO) and Advanced Technology Demonstrations (ATD). While not specifically linked to objective systems, STOs and ATDs are aligned with and support the Army Modernization Objectives.

These objectives help the Army leadership to prioritize future modernization funds to ensure the greatest return on our investment.

Army Modernization Plan

The second part is the Army Modernization Plan (AMP). The AMP details the system specific modernization plan of the Army. The AMP describes currently fielded and future systems, lays out the timeline for the fielding and improvement of these systems, discusses specific training requirements, and describes the technology work supporting each system. Additionally, the AMP addresses force structure changes required by modernization and discusses upgrade strategies—Vertical Technology Insertion (VTI) and Horizontal Technology Integration (HTI).

Force Modernization is a Service responsibility but has significant joint warfighting implications. The Army neither plans nor executes its modernization in a vacuum. We must consider the impact of our modernization upon other Services and the plans of the warfighting Commanders-in-Chief (CINCs).

At the height of the Cold War, the U.S. Army, with 781,000 soldiers, was the fifth largest land force in the world. Still we were smaller than the Warsaw Pact forces we prepared to fight. Our modernized equipment, flexible doctrine, and extensive training, coupled to high quality soldiers, ensured a qualitative edge to overcome this numerical disadvantage.

As we draw down our force to 475,000 (the eighth largest land force), we must ensure our forces retain and expand that qualitative edge. Our doctrine continues to evolve, providing our leaders the flexibility to try new techniques and take advantage of every operational opportunity. Our training is tough and realistic, and our soldiers are smarter and better motivated than ever before. Our biggest challenge is providing modern equipment to these soldiers.

Just as the technological advances of the 1970s and 80s ensured a peaceful victory in the Cold War and battlefield success in the Persian Gulf, the technological breakthroughs of today will save American lives and ensure success in our future operations. In this age of fiscal constraint, we must focus our technologies to solve identified deficiencies while seeking technologies which promise significant capability increases.

When U.S. forces are again called upon, our objective must be decisive victory with minimal casualties. Army S&T, coupled with the on-going efforts of other government (DOD and non-DOD) labs, academia, and industry, seeks to increase our force effectiveness, thus assuring this victory. S&T can help lighten our load, decrease our force response timelines, reduce our logistical burden, increase the precision and lethality of our weapons and increase our survivability. These capabilities are key if the U.S. Army is to continue to remain a viable force in service to the nation, *if we are to remain "America's Army."*

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Joint Directors Of Laboratories . . .

PROJECT RELIANCE: SUCCESS IN THE MAKING

By MG Thomas L. Prather Jr. and Michael I. Dailey

"If you can trust yourself when all men doubt you"

The science and technology (S&T) community had come to a crossroad in 1990. We could not continue our "old established" way of doing business if we were to survive in these austere times. "Purple labs" were being preached on the "Hill" as the wave of the future but the S&T leaders in the Department of Defense (DOD) thought there was a better way to improve S&T.

Project Reliance was established under the joint directors of laboratories (JDL) in December 1990, to bring synergy and critical mass to the Services' science and technology programs. The JDL's charter under the joint logistics commanders was modified to "optimize efficient use of the technology base and laboratory resources ... through cooperative actions in program planning, reviews and assessments, and cross-fertilization of in-house funding, expertise and facilities." It was a dream fraught with obstacles and an initiative with the potential to change the course of S&T in the DOD.

"If you can dream—and not make dreams your master"

This new initiative of JDL/Reliance would have to change the way we did business in S&T in order to be considered a success. Where the Services once went their separate ways in S&T research, we would now team-up to avoid duplication. Where we once kept Service funding within the confines of the Service labs, we would now fund other agency/Service labs for research efforts. Where we once adhered to the old adage of "not invented here," we would now rely on each other for technical expertise, basic research, and critical S&T applications. Where we once talked of cooperative actions, we would now make those actions reality.

"If you can think—and not make thoughts your aim"

In order to accomplish this "reliance" on each other, the Services and other S&T activities had to make a concerted effort to implement the proposed changes and to formalize the new process. Governing bodies were formed to manage and direct the new process, and technology panels were established that brought together key players in each technology area, in each Service/agency. A network of cooperation and agreements was undertaken to divide the S&T workload where possible, and to ensure all related S&T work was coordinated at the working level. Now five years after its inception—What is the status of JDL/Reliance?

"If you can meet with Triumph and Disaster"

Have we been triumphant or successful with JDL/Reliance? Success is a relative concept—not easy to define and even harder to achieve. A disaster in one area could lead to a triumph in another. To an Olympic swimmer, triumph or success might be defined as a world record and an Olympic Gold Medal. To a local swim club member, it might be a personal best in a chosen event. To a beginner swimmer, it might be the simple act of making it from one side of the pool to the other without the need of a lifeguard. To date, JDL/Reliance has not won Olympic Gold, nor has it required the rescue efforts of a lifeguard. It has, however, demonstrated personal best results (triumphant) in each of the technical panel areas. The following are just a sampling of the many "success" stories the Army has experienced as a result of the JDL/Reliance efforts.

- **Advanced Materials:** Through informal mutual agreements, the Army and Navy have developed and demonstrated new surface treatments and coatings that reduce corrosion and wear of engineering materials for engines (helicopters) and transmissions. They have also developed new heat-resistant rubber components, eliminating duplication of efforts and resulting in unspecified cost savings to

each Service.

• **Air Vehicles:** Through memorandums of understanding and verbal agreements between the Army, Air Force, Navy, Advanced Research Projects Agency (ARPA), and National Aeronautics and Space Administration, the Integrated High Performance Turbine Engine Technology Program has been established to double aeropropulsion capability by the year 2003. By using existing assets and eliminating duplicative efforts, savings in the 6.3 arena are expected in the range of $36 million for the three Services.

• **Battlespace Environments:** In a handshake agreement, the Army, Navy and Air Force agreed that future research and development (R&D) for theory and models of the transport and diffusion of gasses and aerosols would become the responsibility of the Army. All other Service R&D efforts in this area would be terminated.

• **Chemical and Biological Defense:** The Air Force has placed a team of their science and engineering personnel at the Army Edgewood Research, Development and Engineering Center, thus forming a critical mass for areas of mutual interest. The Marine Corps agreed to terminate all tech base funding for chemical and biological defense relying on the Army to meet their needs. This will be a cost avoidance of about $2.2 million for the Marines.

• **Computer Sciences:** In a handshake agreement between Army and Navy on smart focal plane arrays, the Army stands to save about $75,000 by using a Navy testbed. The Navy stands to save about $750,000 by using the Army Basic Acquisition Agreement for smart plane arrays.

• **Conventional Weaponry:** Through a lab-level handshake agreement, the Navy has been given access to the Army's pulsed power module for electric guns. This is a cost avoidance of about $12 million and an acceleration of the Electric Gun Electro-Thermal Chemical Program by about two and a half years. The Navy also agreed to let the Army use their deformable warhead at a cost avoidance of about $6 million. The Army will have also avoided about $15 million due to tech base agreements in insensitive munitions propulsion.

• **Directed Energy Weapons:** Under a formal Memorandum of Agreement between Army, ARPA, the Ballistic Missile Defense Organization, and Navy, the Mid-Infrared Advanced Chemical Laser/Sea Lite Beam Director High Energy Laser System at the Army White Sands Missile Range Program was developed. This test facility could only be assembled by the combination of resources (dollars, hardware and expert personnel) of the varied participants.

• **Electronic Devices:** The Army, Air Force, Navy and ARPA have reached an agreement on microelectronics component applications and rapid prototyping that should result in a cost avoidance of $100 million. The total cost of the four-year program is expected to reach $152 million. In the area of multichip assemblies and subsystems of solid state radio frequency components, a cost avoidance of approximately $2 million per year is expected.

• **Electronic Warfare:** The Army, Navy and Air Force have agreed to a division of electronic jamming efforts. This will eliminate duplication of efforts in this mutual area of interest.

• **Human Systems Interface:** Cooperative efforts between the Air Force, Army and Navy in advancing and adapting aural interface technologies (improved hearing) has resulted in Army savings of more than $3.5 million in development costs.

In the five years of JDL/Reliance under a joint logistics commanders' charter, the JDL/Reliance has captured the interest of the director of defense research and engineering (DDR&E) and, in fact, was used as the basis for the next step in the ever changing S&T world—Defense Reliance. This step brings in more players in the S&T community and broadens the scope of the original JLC charter. The concept, the panels, the administration, and leadership of the JDL is being used as the springboard for future S&T planning throughout DOD.

So—Where is JDL/Reliance today? Webster defines *success* as a favorable termination of a venture. The above examples and the increasing interest of the DDR&E attest to the fact that we are nowhere near termination of this venture and are in no position to declare success and go home. But the far end of the pool is in sight, our personal best (triumphs) are getting better and closer together, and it is not hard to imagine the term success attributed to Reliance and the JDL—success in the making.

So we continue to trust our original judgment on the establishment of JDL/Reliance. We can still dream of better things and develop plans for their implementation, never losing sight of the ultimate goals of an efficient tech base and an organization that can make the world of technology work for all of us.

"If you can trust yourself
when all men doubt you
But make allowance for their
doubting too ...
If you can dream—and not
make dreams your master
If you can think—and not
make thoughts your aim;
If you can meet with Triumph
and Disaster
And treat those two imposters
just the same;
... Yours is the Earth and
everything that's in it."

—Rudyard Kipling

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AFFORDABLE ACQUISITION

By Dr. Kenneth J. Oscar

Introduction

Faced with less money to acquire equipment and fewer people to manage the acquisition process, the Army is aggressively striving to leverage what we do have without sacrificing quality or performance. And we are succeeding!

Traditional acquisition practices created to support a Cold War mobilization base and large standing force limited our access to the best and most modern technologies and program management processes. As our business and acquisition costs and cycle times increased, the gap widened between the operational capability we had and what available technology could offer.

Traditional acquisition practices were the by-product of risk avoidance that relied on detailed military specifications and standards, ponderous heel-to-toe oversight, extensive testing and inspection, and cumbersome contracting procedures. The acquisition concepts we are now putting into place offer the Army the latest technologies while simultaneously driving down the cost of acquisition. An additional benefit of this new affordable acquisition process is that it allows the Army to modernize through the use of rebuys and spare parts. There are four pillars to affordable acquisition: performance specifications, investment strategy, virtual acquisition, and best value.

Performance Specifications

The first step to affordable acquisition was the elimination of military specifications and standards that tell suppliers how to meet requirements. At the root of the problem is 31,000 military specifications and standards. We struggle hard, but often fail to keep them abreast of rapidly developing technology. The greater the divergence between the military and the commercial sectors, the less likely military equipment can be purchased from commercial sources, and the more likely the equipment will be more expensive and have less capability and performance than comparable commercial products. "How-to" MILSPECS often constrain the supplier to outdated or obsolete processes and prevent him from using his talents and energies to meet the requirement in a better, and less costly way.

Performance specs don't tell the supplier how to build the product or provide the service, but instead state user needs in terms of form, fit, function, performance, and interface. Performance specs are not new to acquisition, but they were often crowded out by the detailed "how-to" specs.

Use of performance specifications lowers acquisition costs and provides up-to-date technology to the warfighter. Performance specifications also support continuous improvement through technology insertion in rebuys

Performance specs don't tell the supplier how to build the product or provide the service, but instead state user needs in terms of form, fit, function, performance, and interface.

and spares procurements. A good example is the SINCGARS radio used in Army vehicles and helicopters. The Comanche helicopter relied heavily on advanced modeling and "man-in-the-loop" simulation. The results were impressive. One third fewer test aircraft were required and the number of flight hours for operational testing were reduced by 75 percent! There was a savings of $4.5 million in testing alone.

Investment Strategy

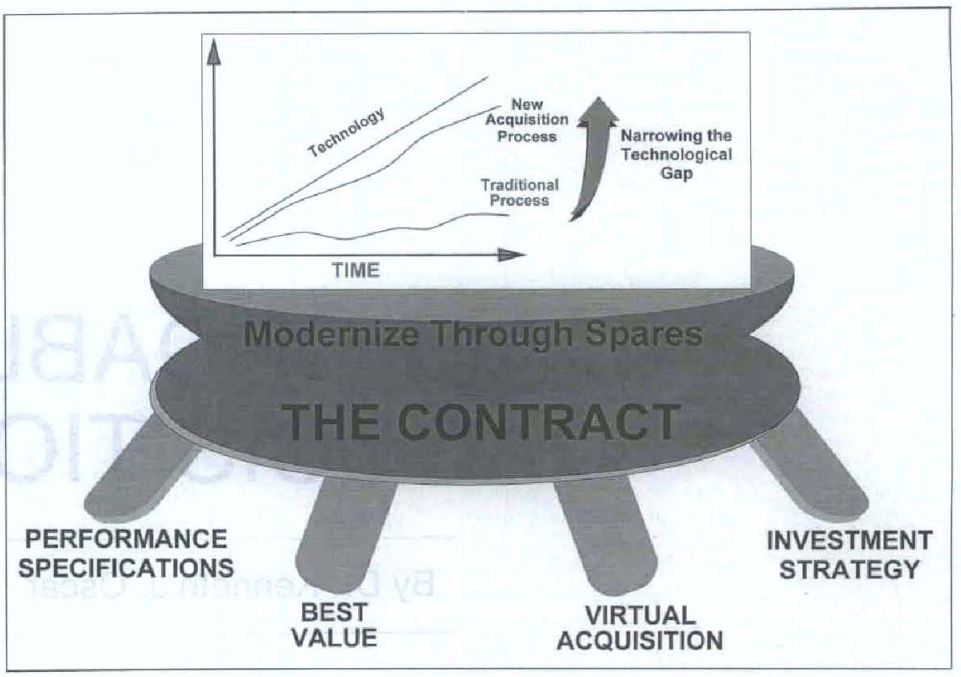
Affordable acquisition requires careful up-front analysis and planning. Investment strategies must be based on thorough market investigations. Development times and life-cycle costs can be reduced in a variety of ways, depending on the nature of the product or service and the suppliers.

For example, the Tank-automotive and Armaments Command (TACOM) groups like items such as tires for different vehicles into one long-term procurement, with a negotiated delivery schedule. This affords TACOM leverage to bring down unit cost and, at the same time, reduce storage and handling costs. Another approach is to award a contract on life cycle cost rather than acquisition cost.

Virtual Acquisition

Modeling and simulation can be used throughout all phases of the acquisition process, and has become an integral part of affordable acquisition. Combat performance modeling is used before Milestone I to experiment with different concepts prior to any physical fabrication. Tradeoff analyses are conducted to ensure that only essential performance characteristics are included in the system design. Virtual prototyping is employed to ensure that the design is "right" the first time the system is built in hardware, thus avoiding the time-consuming and costly "build-test-build" loop that significantly increases cost and development time. Virtual testing can be used to simulate terrain, scenarios, and environmental factors and significantly reduce testing time and costs. Virtual manufacturing can be used to accurately model planned production facilities and processes, ensure producibility, and minimize manufacturing costs and production time.

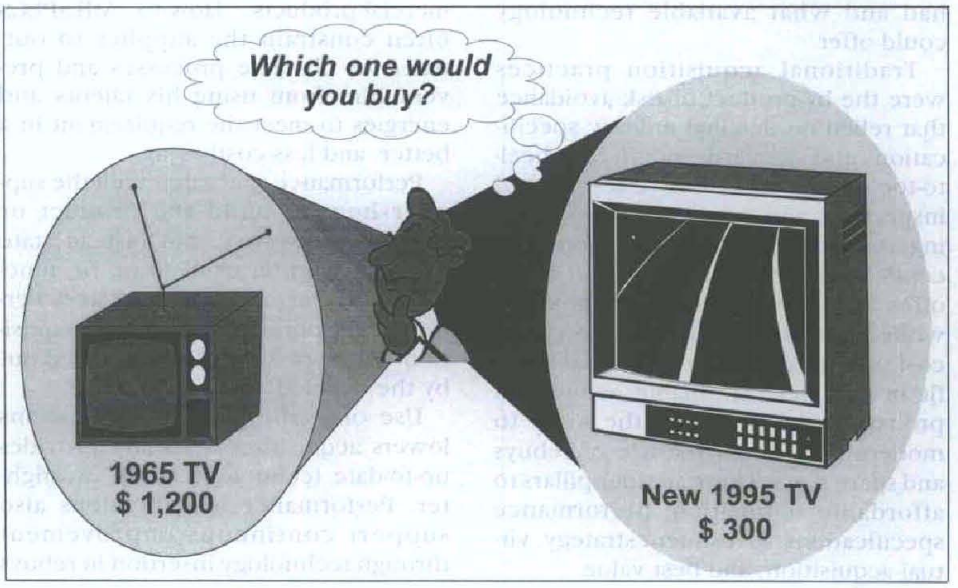
Performance specifications permitted a second source rebuy offering improved technology at lower costs and greater reliability. The $23 million dollar cost savings is significant, but the 5,000-hour operating life of the radio is astonishing!

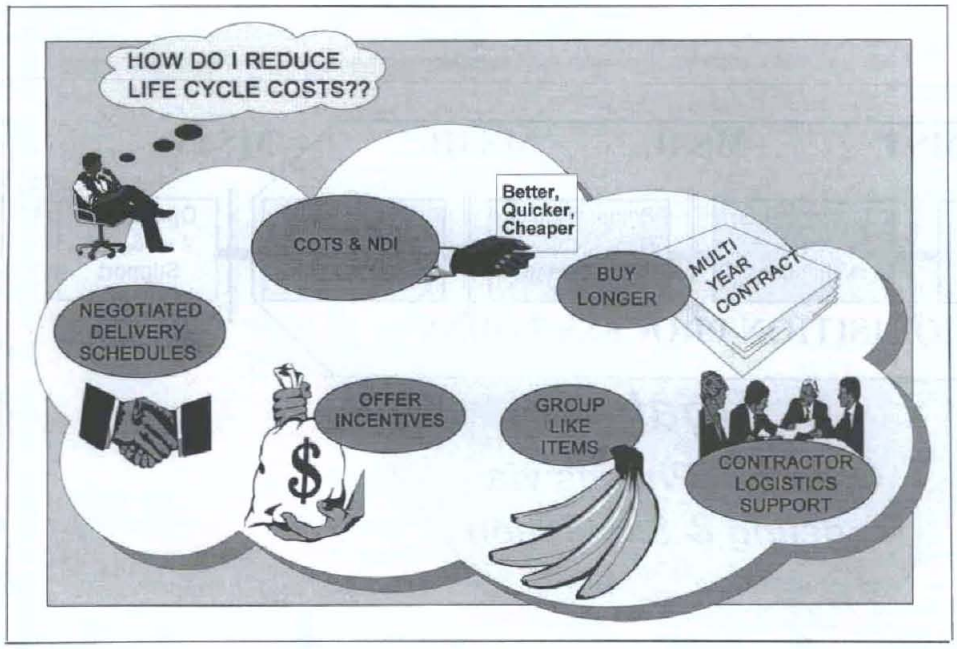


Use of performance specifications lowers acquisition costs and provides up-to-date technology to the warfighter.

Best Value

Looking beyond simply the low bid, to total quality and total cost is the essence of best value source selection. More and more it makes better business sense to seek out quality factors which cannot be determined by price alone. Key non-cost factors include past per-

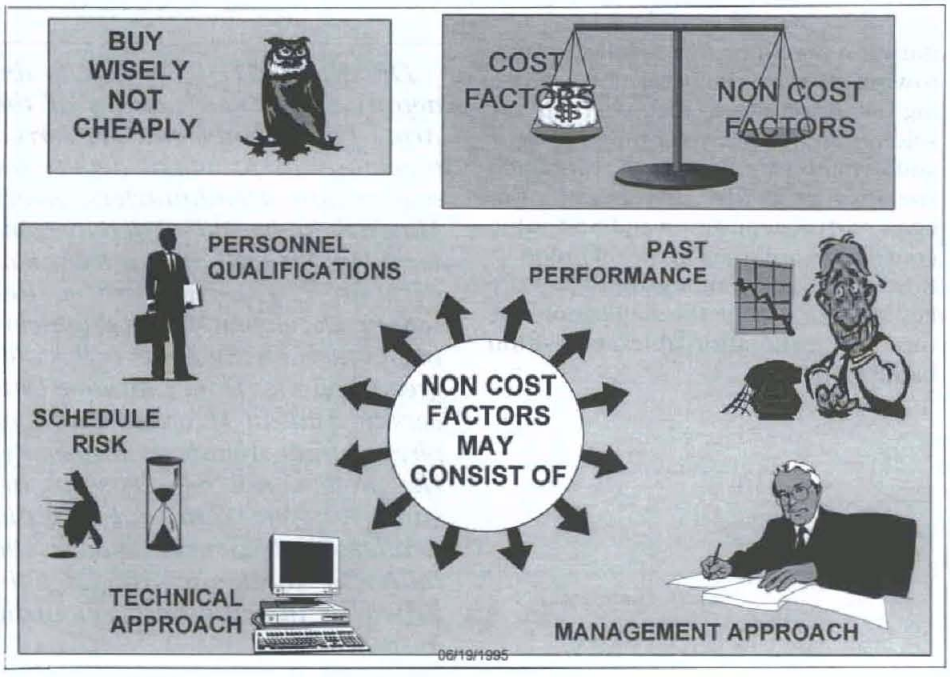




formance, management approach, technical approach, schedule risk, and personnel qualifications to name just a few. Best value is "a process used in competitive negotiated contracting to select the most advantageous offer by evaluating and comparing factors in addition to cost or price." Well thought out source selection evaluation criteria that provide a true means of discriminating among proposals are essential for identifying the best value from the range of acceptable offerors.

Achieving Affordable Acquisition

Two of the key ways we are using to change the acquisition culture and implement affordable acquisition are roadshows and teaming.



Roadshows

Roadshow IV took over from where Roadshows I, II and III left off to address MILSPEC and standards reform, performance specifications, and best value source selection. Roadshow V is underway with emphasis on contract management. Roadshow for Industry enlists the involvement and support of the commercial sectors in streamlining the acquisition process. Roadshow Lite provides direct training for smaller organizations, and Roadshow Export provides comprehensive reference materials for local training.

Teaming

We have learned that operating as a compartmented staff and inspecting our suppliers rather than working with them as team members are inefficient practices. Industry and government working together as a team with common objectives, rather than in the more typical adversarial relationship will improve contract performance and reduce litigations.

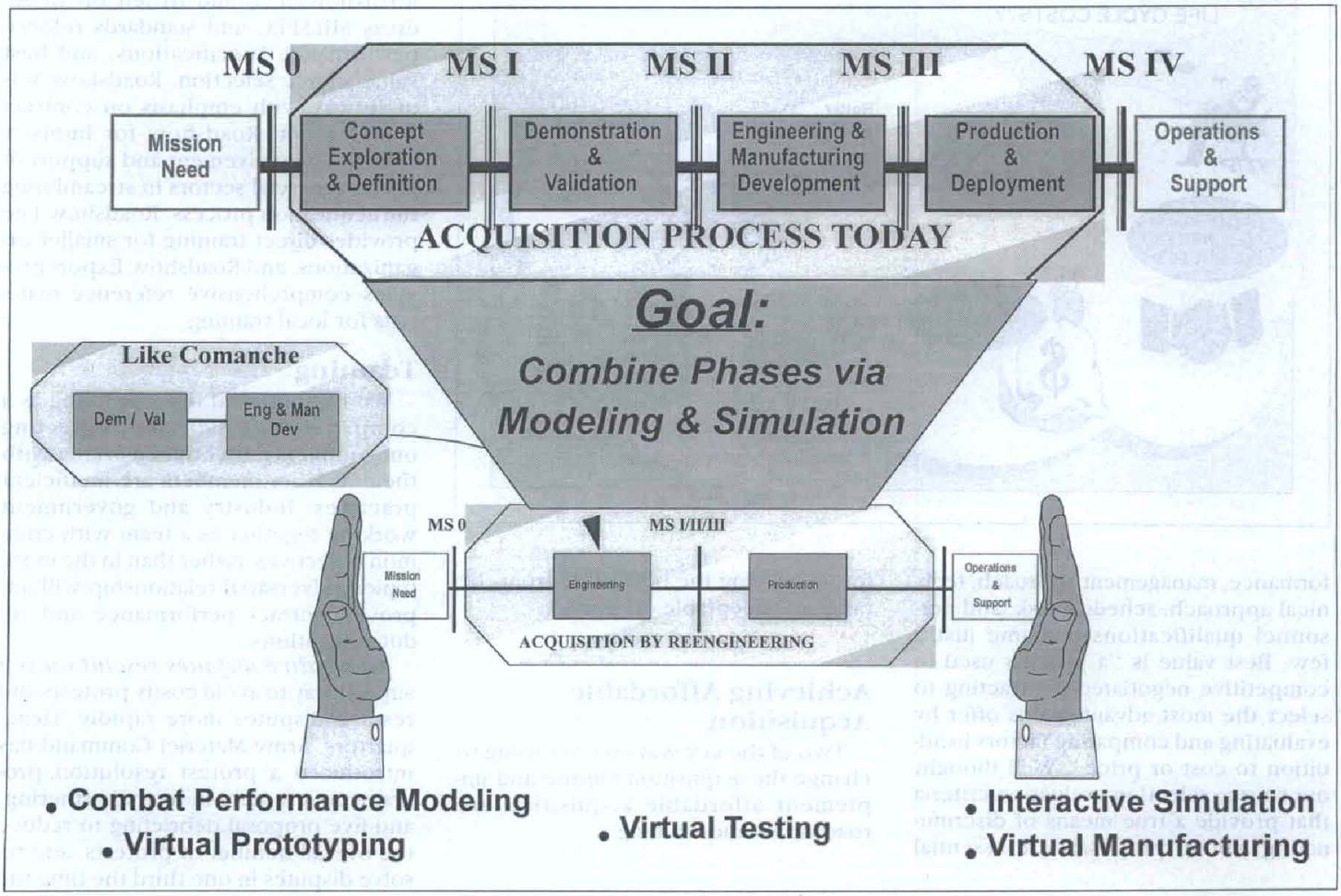
Alternative disputes resolution is a superb way to avoid costly protests and resolve disputes more rapidly. Headquarters, Army Materiel Command has introduced a protest resolution program, government-industry partnering, and live proposal debriefing to reduce the overall number of protests, and resolve disputes in one third the time the Government Accounting Office takes.

Integrated product teams consisting of representatives from all functional disciplines associated with a program are formed early to optimize design, manufacturing and supportability processes. The secretary of Defense directed OSD oversight staffs to shift their emphasis from sequentially checking on a program six months prior to a milestone, to providing continuous assistance as members of the team responsible for program success throughout the acquisition process.

The bottom line is that teamwork builds trust, trust reduces program disruptions which in turn saves time and money.

Summary

We are working hard to deliver smart policy and empower people to get us where we need to go. Affordable ac-



Industry and government working together as a team with common objectives, rather than in the more typical adversarial relationship will improve contract performance and reduce litigations.

quisition practices are essential for narrowing the technology gap and leveraging our resources to make certain our soldiers are properly equipped to fight and win the next war. Performance specifications, wise investment strategies, virtual acquisition and best value contracting are some of the techniques. Roadshows and teaming are two of the key ways to change the acquisition culture and make affordable acquisition happen.

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DIRECTOR DEFENSE RESEARCH AND ENGINEERING GOVERNMENT PERFORMANCE AND RESULTS ACT GUIDELINES FOR LABORATORY CRITERIA

TABLE 1

SECTION I: Laboratory Overview and Management
1. Mission Statement
2. Management and Organization
3. Products
4. Functional Balance
5. Cost Awareness and Control
6. Size and Capability
7. Geographic Dispersion
SECTION II: Laboratory Infrastructure
8. Leadership
9. Facilities and Equipment
10. Information Infrastructure
11. Personnel Systems
12. Communications
13. Management Information Systems
14. Education
15. Safety
SECTION III: Outreach and Quality
16. Outsourcing
17. Intra-mural vs. Extra-mural S&T
18. Independent Research
19. Acquisition Reform
20. Reliance and Executive Service Relationships
21. Technology Transfer and Development Partnerships
22. Federated Laboratories and Model Contracts
23. Shared Resources
24. Intellectual Openness
25. Professional Interactions

INNOVATIONS FOR QUALITY IN THE 21ST CENTURY ARMY LABORATORIES

By Dr. Richard Chait, Dr. Richard G. Rhoades, and Dr. Robert S. Rohde

Introduction

Army laboratories in the 21st century will significantly change from those of the past. These changes are the results of multiple initiatives, both internal and external to the Army. This article will discuss two important external initiatives. The first is the DOD internal laboratory pilot program which will commence in October 1995, in anticipation of the official start in September 1997 of the Government Performance and Results Act (GPRA), Public Law 103-62. The second initiative is the Laboratory Quality Improvement Program which is an outgrowth of the National Performance Review. Finally, three examples of individual Army laboratory innovations in organizational design will be presented.

OSD Laboratory Internal Pilot Program

Under GPRA, all federal agencies are required to develop strategic plans, annual performance plans with goals and measures linked to those strategic plans, and annual assessments of their performance against those goals by September 1997. The Army Research Laboratory (ARL) is the only laboratory participating as an official (OMB-designated) pilot under this law.

The Defense Science Board (DSB) Task Force on Laboratory Management recommended the early implementation of GPRA and, in December 1994, the director, Defense research and engineering (DDR&E), requested the Services to initiate the GPRA on an internal pilot basis at all laboratory activities not later than September 1995. The required documentation for this effort provides an excellent means of assessing and improving lab quality. This early start, therefore, will allow the labs to gain and share experience in the use of R&D metrics prior to the official implementation date. Initial strategic plans will cover FY 1996-2001, with annual performance plans and reviews starting with FY 96.

Since ARL had gained considerable experience due to its involvement as a GPRA pilot, the assistant secretary of the Army offered the DDR&E a tri-Service workshop to acquaint all of the Service labs with ARL's background in this area. This workshop was held at ARL in Adelphi, MD, on April 4, 1995. More than 70 senior participants from the three Services and some federal civilian agencies as well attended. Dr. Craig Dorman, the deputy DDR&E for laboratory management, gave the keynote address and challenged the group to be innovative in this very difficult area of R&D assessment. In particular, he addressed the set of 25 basic DDR&E guidelines for developing measurable criteria. (See Table 1.) These guidelines were originally recommended by the DSB Task Force and will be available to the laboratories for developing measurable criteria. The guidelines contain rationale for importance, dimensions of interest, and a series of questions for the labs to use while developing indicators and metrics for measuring importance. The questions are typical of those expected to be asked by an external visiting committee or review team.

Conformity, even within a military department, of format and content is not expected because of the great differences between the laboratories. Not all of the guidelines will lead to criteria that are of equal significance to all the labs. Other criteria must be developed to fully cover unique mission areas, dis-

ciplinary and life cycle responsibilities. Both common and unique criteria should evolve during the course of the pilot program. Measurement processes, to include internal and customer surveys, peer reviews, and quantification will also vary. An additional factor will be the changing needs of the labs, resulting in criteria and metrics which will vary year to year.

GPRA implementation is coordinated throughout DOD by the Office of the Comptroller, Performance Measures and Results Directorate. The Army is currently planning two additional workshops in the summer and fall for its lab senior management to exchange information and review progress on the internal pilots prior to their start in October. The Navy and Air Force labs have been invited to participate with the Army in these two workshops.

Quality Improvement

The Laboratory Quality Improvement Program is a successor to the Laboratory Demonstration Program, as noted in *Army RD&A Bulletin*, July-August 1992, pages 6-7, and was formally designated as a Defense Reinvention Laboratory in March 1994. This program is a test bed for approaches to improve the processes needed for laboratories to function effectively. Along with the Navy, Air Force, and Defense agency participants, the first Army sites for this Reinvention Laboratory are the Army Research Laboratory, the Missile Research, Development, and Engineering Center, the Waterways Experiment Station, the Army Medical Research and Materiel Command, and the Soldier Systems Command. (The remaining Army laboratories will also be added.)

In 1992, after approximately two years of experience with implementation of the Laboratory Demonstration Program initiatives, the Service Science and Technology (S&T) executives sponsored an ad hoc review to examine results achieved and define future initiatives. They concluded that important successes were being achieved through Service-level initiatives in such areas as improving the authority of the laboratory director over critical support functions and in supply and contracting process improvements. (For example, major reductions in the time required for laboratory equipment purchases, particularly computers and software, had been achieved.) However, some of these gains were threatened by support centralization initiatives. They also noted that further change was needed in key processes to enable the Defense laboratories to continue to improve, and a short list of key initiatives was defined and endorsed as Laboratory Quality Initiatives by the DDDR&E and the deputy secretary of Defense. As noted earlier, since the fundamental intent of this set of initiatives had much in common with the "reinventing government" theme of the National Performance Review, the Laboratory Quality Improvement Program was sponsored by the DDR&E and designated as a Reinvention Laboratory by the director, Defense Performance Review.

These nine initiatives are briefly described and their current status summarized in Table 2. Taken together, these initiatives, if we are successful in demonstrating and implementing them, should provide the "set of tools" needed by the leaders of the Army's laboratories of the next century. Our vision is that with these tools, these leaders will be able to respond with agility to the rapid changes throughout the world in science of technology important to the laboratory's mission; able to size the workforce of the laboratory to respond to market forces; able to compete successfully on the market for the "best and brightest" talent for the laboratory workforce, able to reward, nurture and, if necessary, separate members of that workforce with a flexible and simple personnel system;

LABORATORY QUALITY INITIATIVES

TABLE 2

INITIATIVE	STATUS
■ **RESOLVE CONFLICTS WITH CENTRALIZATION INITIATIVES** Laboratory director determines most efficient and effective source of support services, except where required by statute	Being worked on a base by case basis, with DDR&E as sponsor
■ **INCREASE MINOR MILCON THRESHOLD** Obtain legislative authority for local approval of minor construction up to $1M, etc.	Part of administration proposal for FY 96 Authorization Act
■ **INCREASE SMALL PURCHASE THRESHOLD** Increase the small purchase threshold from $25,000 to $100,000 via legislation	Authorized by Federal Acquisition Streamlining Act - being implemented
■ **EXPEDITE/STREAMLINE R&D CONTRACT PROCESS** Ensure earliest implementation of a test of streamlined research and development procedures approved by the DAR council	Twenty month test in progress; started 1 Oct 94 - covers contracts < $10M
■ **COOPERATIVE AND OTHER AGREEMENTS** Expedite delegation of authority to the services to enter cooperative and other agreements	Aided by FY 94 Authorization Act, authority to enter into cooperative agreements has been provided to services and some labs
■ **MANAGE TO BUDGET** Laboratory director manage laboratory human resources to budgeted workload within overall agency personnel ceilings	While endorsed by NPR, deferred as unrealistic until DoD downsizing completed
■ **OMNIBUS PERSONNEL LEGISLATION** Give laboratories the opportunity to conduct personnel demonstration projects designed to improve quality of workforce	Authority to conduct demonstrations generally similar to China Lake provided by FY 95 Authorization Act. Demonstrations being implemented
■ **DIRECT HIRE AUTHORITY** Obtain authorization for laboratories to direct hire to fill vacancies	Merged with personnel demonstration initiative, being worked
■ **CLASSIFY AND APPOINT SCIENCE AND TECHNOLOGY (ST) POSITIONS** Obtain authorization for laboratories to classify science and technology (ST) positions and to appoint personnel to these positions	Number of STs significantly increased

able to use streamlined procedures to obtain best value in the goods and services needed to accomplish their mission; and able to use a variety of efficient mechanisms to partner with industry and academia to carry out programs of mutual interest.

Laboratory Innovations

This section is devoted to illustrating some of the innovations in organizational design which have been undertaken by individual Army laboratories prior to the initiatives of GPRA or the NPR. They indicate that the Army has been very proactive in responding to its changing environment and has sought ways to improve efficiency and performance given the opportunity and available resources. Examples of these innovations are shown below for laboratories for several Army major commands.

• **U.S. Army Materiel Command Chemical Research, Development and Engineering Center (CRDEC), Edgewood, MD.** In 1992, CRDEC recognized that their organization was structured along traditional product lines with a classic bureaucratic hierarchy which provided little individual empowerment. More work was needed in meeting customers' needs and improving worker morale. In response to these concerns, CRDEC committed to an "all hands" examination of the organization, its people, its customers, and its future. Following what has become a classic approach, CRDEC conducted this examination with a Process Action Team (PAT) representing all segments of the workforce. The PAT looked at all major processes (what worked and what didn't) and developed recommended improvements, including five restructuring options.

The result of this analysis was the choice of a major restructuring of the center's organization to enable broad use of interdisciplinary teams. The center was changed from having four product-oriented directorates with more than a dozen staff support elements to two functionally-aligned directorates (one doing research and technology development, the other doing engineering and acquisition support). The key to the new organization was the establishment of horizontal organizations or directorates, having major responsibilities for the care and nurturing of skilled people to work on teams. CRDEC adapted a matrix-oriented, team-directed workforce approach to accomplish virtually all aspects of the business. This "flattened" the organization and eliminated most vertical approval chains from the completion of tasks. Currently, CRDEC is almost two years into its reengineering effort. The leadership is convinced that the new structure is working, the new visions and values are being reflected in new behaviors, and that its empowered workforce is responding with new enthusiasm.

• **U.S. Army Corps of Engineers Construction Engineering Research Laboratory (CERL).** CERL is an example of a government laboratory in which a comprehensive partnership with a major university (University of Illinois at Urbana-Champaign) was built into CERL's mission as the Army and DOD conceived the organization in 1966. This partnership was based on a model recommended by the National Academy of Sciences, which is a forerunner to the DSB's "Federated Laboratory" concept. The concept was to create a mutually beneficial arrangement to give the Army and DOD access to the personnel, resources, equipment, and facilities of an elite research university while providing value-added as a non-cost asset of the university.

This unique arrangement provides an excellent source for recruitment, with many UIUC Ph.D. and master's theses addressing Army and DOD problems as a result of this relationship. The university is also landlord for CERL, and CERL is an allied agency of UIUC. This status allows access to more than $500M of state-of-the-art facilities and equipment; exchange of consultant and/or teaching privileges (400 UIUC faculty and staff directly support CERL mission R&D and 26 CERL researchers are adjunct professors); student/staff privileges; technical support; professional activity and contacts; and tuition-free courses for CERL employees, and access to the UIUC library—the third largest academic collection in the nation. They also jointly operate more than a dozen research programs and centers. This resource multiplier cannot be found anywhere else within DOD, and its benefits to the Army and DOD are far more extensive than could have been anticipated in the 1960s.

• **U.S. Army Biomedical R&D Laboratory (BRDL).** BRDL has successfully addressed mission accomplishment in the face of reduced manpower and resources by aggressively pursuing the management strategies of leveraging resources, developing win-win partnerships and outsourcing where needed competency is more eminently gained from outside the organization.

The laboratory conducts research for the DOD in the area of environmental toxicology and the development of alternatives to the use of mammals in toxicity testing. Joint research projects in which resources have been pooled have been accomplished with the National Cancer Institute, the National Institute of Environmental Health Sciences, the U.S. Environmental Protection Agency, the U.S. Department of Energy, and the U.S. Department of the Interior. In addition, academic institutions (e.g., University of West Virginia, Johns Hopkins University, University of Maine, and the Pacific Northwest Research Foundation) are currently pursuing research using BRDL's unique facilities in Maryland.

The lab has also reached out to academia via Cooperative R&D Agreements (CRDA) with Colorado State University's Center for Environmental Toxicology and Technology. The current plan for BRDL is to consolidate the DOD activities in the aforementioned research areas within the proposed Armed Forces Medical R&D Agency and continue this highly leveraged program as a Federated Lab.

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DR. ROBERT S. ROHDE is the Night Vision and Electronics Sensors Directorate (NVESD) liaison to the Office of the Deputy Assistant Secretary of the Army for Research and Technology, HQDA, and a physical scientist on the staff of NVESD. He holds a Ph.D. in physics from the Illinois Institute of Technology.

National & Defense R&D Strategy

REINVENTING AN ARMY LABORATORY

By Dr. John W. Lyons

The federated laboratory concept is the centerpiece of a new organizational and management philosophy that responds in a unique way to the many administration, congressional and Defense Science Board efforts to streamline Defense research.

In today's climate, with government downsizing and constrained resources, requirements for the Army research program are growing. This paradoxical situation of having to do more with less actually offered new opportunities for achieving real management efficiencies and whipcord lean programs that can and will meet or surpass the requirements.

To accomplish this strategic vision, it was essential to take advantage of the many new initiatives emanating from the upper levels of the executive branch, from congress and from the Department of Defense.

In today's climate, with government downsizing and constrained resources, requirements for the Army research program are growing.

The federated laboratory, or "FedLab," defines a new way of doing business for the Army research community. FedLab was conceived by the Army Research Laboratory in response to an urgent need to provide the technology base required to "digitize" the battlefield. In other words, it was designed to develop the microelectronic and digital communications technology that provides the capability to move information and intelligence around the battlefield in real time, and to process and distribute it in appropriate formats to commanders at all levels in an immediately useful form.

The FedLab concept came into being just over a year ago. As the concept evolved, it became defined as a new relationship of military scientists and engineers to their counterparts in industry and academia; a close, shared and sharing compact with carefully defined parameters and great freedom within them.

When the Army Research Laboratory was activated about three years ago, there were pieces of digital technology scattered throughout the organization, but the effort was not focused on the digital battlefield. The leadership of ARL realized that, while the Army generally is credited with the first major use of the digital computer, the civilian world has moved ahead in both computers and telecommunications. We decided to combine our efforts with those of industry and academia, thereby enhancing our research for the benefit of soldiers.

Our soldiers, sophisticated in the use of computers from childhood, are ready for the most advanced information systems the Army can develop. Our scientists are ready to leap-frog into ground-breaking research that will be of great and critical benefit to soldiers and a boon for civilian industry as well.

Federated laboratory management was the answer to the resource and downsizing questions. We needed to establish long-term partnerships, close teamwork, with the private sector, industry and academia, where the expertise resided. Equally important, we needed to achieve the critical mass of researchers needed to make the most advanced technology available to the soldier and to develop the strategy of the future course of Army research.

The mechanism chosen to set up the federated laboratory was the cooperative agreement, not to be confused with the cooperative R&D agreement, or CRADA. The cooperative agreement vehicle falls somewhere between the usual R&D contract with its hands-off nature and a grant, also hands-off but for more basic investigations by universities. ARL's cooperative agreements call for consortia to be formed. Each must consist of at least one university, one industry research entity, and one

historically black university or minority institution.

Once the consortia are formed and under cooperative agreements—we anticipate letting the first cooperative agreements to support the digitization initiative this fall—ARL will interact with them aggressively. We intend to support major research programs in the general areas of information and communications sciences and digital technology. We anticipate that as much as 20 percent of our scientists will be on long-term assignments with consortia organizations, and that consortia scientists will be at ARL on equal assignments.

In order to achieve the new focus of ARL and the federated laboratory, several management initiatives have been brought to bear in its support. They include the Government Performance and Results Act (GPRA), with its accent on accountability of government agencies, and the National Performance Review, which allows ARL to seek waivers from certain restraining or encumbering regulations. There are also the Laboratory Quality Improvement Program (LQIP), offering new opportunities for restructuring our personnel system, and Business Process Reengineering (BPR), with its emphasis on streamlining internal processes.

Government Performance and Results Act. With the linkage between performance and outcomes explicit in GPRA, quantifiable, outcome-related goals are set and an annual performance plan with accompanying metrics by which we can demonstrate yearly progress toward the strategic goals is developed. ARL has developed and refined its mission and vision and prepared a strategic plan. We currently publish an annual report that details our achievements of the past year.

GPRA will soon become government-wide, beginning in FY 1998. There are currently more than 80 pilot projects being conducted to provide experience and lessons learned for those agencies that have yet to participate. The Army Research Laboratory is the only research and development organization of the 80 government agencies participating in the GPRA pilot project. We at ARL believe that the spotlight is on us to demonstrate how R&D organizations of the future will plan and evaluate their programs.

National Performance Review. This program has established "reinvention laboratories" to provide a mechanism whereby government agencies may request waivers from certain outdated or unnecessarily burdensome regulations or those that are irrelevant to a specific organization. ARL has requested more than 50 waivers in the areas of resource management, the procurement process, logistics and supply, information systems and facilities management. Some have already been granted, while others are pending. Waivers such as these will allow ARL to operate in a more businesslike manner, with greater efficiency and a much increased ability to react to changing requirements and resources.

Laboratory Quality Improvement Program (LQIP). The Department of Defense provides support for all of its S&T reinvention laboratories, some 12 others in addition to ARL, through LQIP. This program opens new opportunities for seeking waivers to current constraints and, while ARL has several initiatives in the pipeline, by far the most significant is our vision of a new personnel system.

When congress extended to the secretary of Defense the authority to expand the so-called "China Lake" experiment, ARL quickly took advantage of the opportunity. Our Alternative Personnel Management Demonstration will allow us to attract, develop and retain the best and the brightest personnel for FedLab. Our plan has been developed by intensive work of a senior-level executive steering committee with extensive participation by a staff members committee chaired by a bench-level scientist. We have held town meetings throughout the laboratory's many locations and put drafts of the plan on electronic bulletin boards internally. Everyone with access to a computer or fax machine has been encouraged to become part of the process. This employee participation is an essential part of ARL's approach to revamping its personnel system.

Business Process Re-engineering (BPR). An important leg of ARL's revolution in organizational management and culture is BPR. With the goal of providing the technical staff of ARL with the highest level of infrastructure support in the most efficient way, BPR is a clinical look at internal processes, streamlining where possible and eliminating where necessary. This last piece of the mosaic is absolutely essential to achieve a preeminent scientific organization with fewer people. Many gains have already been made in the resource arena and many more are under study.

Our soldiers, sophisticated in the use of computers from childhood, are ready for the most advanced information systems the Army can develop.

With these initiatives, the Army Research Laboratory is moving confidently and with great resolution into its future, while blazing new trails in R&D management for the rest of the federal laboratories to follow. The focus of our research—the soldier—will never change. Our mission is centered around soldiers.

ARL Mission. Execute fundamental and applied research to provide the Army the key technologies and analytical support necessary to assure supremacy in future land warfare.

DR. JOHN W. LYONS is director of the Army Research Laboratory and is a physical chemist with degrees from Harvard College and Washington University in St. Louis. He has published four books and more than 60 papers, and holds a dozen patents.

National & Defense R&D Strategy

THE INCREASING RELEVANCE OF ARMY RESEARCH

By Dr. Gerald J. Iafrate and W. Davis Hein

Introduction

Today, Americans enjoy a lifestyle unequaled anywhere in the world. Indeed, technological "miracles" discovered decades ago are now part of our everyday lives and are taken for granted. For example, medical advancements, such as laser surgery and implantable heart-assist pumps, are increasing life expectancy and improving quality of life. Hospitals are realizing millions of dollars in annual savings, thanks to research resulting in vaccines for infectious diseases.

The information highway is expanding rapidly, thanks to the development of the microchip and fiber optics. Recent Mount Everest climbers were protected from the cold by a synthetic fibrous insulation layer that surpasses the overall performance of natural down. The Nobel Prize winning discovery of the maser-laser principle by Professor Charles Townes led to the development of a multitude of industrial, medical, and military applications.

Compact disc players, commercial scanners, new surgical techniques and devices, communications system improvements, range finders, and target designators are but a few applications of lasers which benefit the military and society at large. Modern vehicles are becoming more dependable because of progress in turbomachinery and other engine-related fields. Secure communications systems protect corporate secrets, aeroacoustical discoveries allow more efficient and cost-effective cooling of our offices and homes, and companies like AT&T and UNISYS have successfully applied new natural language processing capabilities in the data processing industry. Through the magic of chemically treating metallic surfaces with a corrosive resistant coating, the U.S. Army saves over $1 billion a year, while national corrosion costs of over $30 billion a year have been drastically reduced ... and the list of technical achievements goes on and on.

The accomplishments cited in these illustrative vignettes are a product of basic research programs funded by the Army and the Department of Defense (DOD) over the last several decades. Recent successes in the Desert Storm campaign are owed mainly to the rich legacy of research and development from the post-World War II and Korean War era.

In recognition of the profound legacy of research in driving new technological opportunities for the future, the Army last year placed basic research in its top 10 list of R&D priorities. Without a strong commitment to research in the Army investment portfolio, future military readiness will suffer from the lack of novel and cost-effective approaches for enhancing the lethality, mobility, and survivability capabilities needed to meet the challenges of a modern 21st century power projection Army.

Desert Storm

Desert Storm has often been cited as a technological revolution in warfare; the world watched on live TV and saw the value of technology in military capabilities such as stealth aircraft, global positioning systems, precision-guided munitions and theater missile air defense. As for the future, the technological revolution is predicted to continue. In an essay in *The Scientist*, Dr. Frank Press, former National Academy of Sciences president, expressed the view that science is entering a new age and predicts that "it will be an era in which the boundaries between basic and applied research erode. More than ever, science will drive technology and, in return, technology will drive scientific progress. This new reality will entail an increasingly direct connection between fundamental science and engineering and their commercial applications." This new era will certainly provide opportunities for new and enhanced military capabilities, and it will be the challenge of the DOD and the Army to tailor the research and the resultant emerging technologies to effect the future conduct of land war.

Today, there is no question that the U.S. leads the world in military technologies and weapons capabilities.

Therefore, one might rhetorically ask: why should the United States continue to support research in a race in which we have a clear cut lead? In response, historians cite a long chronology where challengers to dominant military power arise very quickly.

Technological Surprises

Technological surprises can occur at any time as evidenced by the appearance of German jet aircraft and missiles during World War II and the launch of Sputnik in 1957. In today's environment, military technology is so pervasively available through the commercial sector that third world powers and terrorist groups can access cruise missiles, satellite intelligence, and even weapons of mass destruction. Some strategists echo the sentiments of Professor Andrew Krepinevich Jr., director of the Defense budget project, that "the geopolitical and the military-technological revolutions underway indicate that far greater emphasis should be placed on maintaining U.S. military capability in the long run than was the case during the Cold War."

Within the Army, the influence of research on the battlefield of tomorrow is clearly envisioned in Force XXI. Research in a wide range of information technologies, including advanced sensors, interactive displays, distributed simulation, and others, will underpin the digital battlefield. Since many of these technologies will be in wide commercial use, research on countermeasures will no doubt become much more important and systemic.

The world environment is today far less predictable than it was during the bipolar nuclear stand-off cold war era. In the future, low intensity conflicts will be more frequent. Non-lethal weapons for peacekeeping missions and operations other than war will increase in importance. Synthetic environments will be developed to train soldiers far more cost effectively and efficiently than is currently being done.

Clearly, in order for the Army to meet the challenges of the future, military science and technology must evolve with synergy and concurrency to form a continuum; in this way, military strategy and tactics in partnership with technology can work in a push-pull relationship whereby new doctrine drives changing technology, and changing technology drives new doctrine, force structure, and tactics. The Army, more than any other Service, will need research to shape its future.

Harnessing the power of research requires technological stewardship, patience, and tenacity. Research products don't come in a gift-wrapped box; they evolve from science and technology generation, and are then shaped and tailored to meet specific applications.

Professor Nathan Rosenberg of Stanford University, in an address to the National Academy of Sciences, noted that new technologies enter the world in a very primitive condition—this is often the efficacy of a new technology.

At the Army Research Office 40th Anniversary Symposium, Professor Charles Townes, Nobel Laureate, commented about his discovery of the maser: "who ever thought then that I would be making a major contribution to the present day emerging field of magnetic resonance imaging (MRI)."

Marconi thought that the radio had application only for private point-to-point communication, primarily ship-to-shore. Tom Watson Sr., in 1949, thought that the world's need for computers could be satisfied with 10 to 15 computers. History shows us time and time again that the seed corn for basic research drives growth and horizontal integration to applications far beyond the discoverer or entrepreneur's original intent and vision. Often it takes a combination of technologies to threshold an applications advance. For example, the single transistor, when extended to the integrated circuit level, ushered in the era of modern microelectronics to give us the personal computer and much more.

The tendency is to view new technology as an evolutionary supplement to existing system performance, e.g. the telephone was seen merely as an improvement to telegraphy. Yet, imagination and applications entrepreneurialism is just as important as technological innovation. Therefore, it is not always sufficient to invest only in research with a specific application in mind.

Research and emerging technologies should be conceived as building blocks that can be designed and tailored to take various shapes. A diverse research portfolio is essential for priming the technology engine that will be necessary to shape the future of the Army, DOD, and the nation.

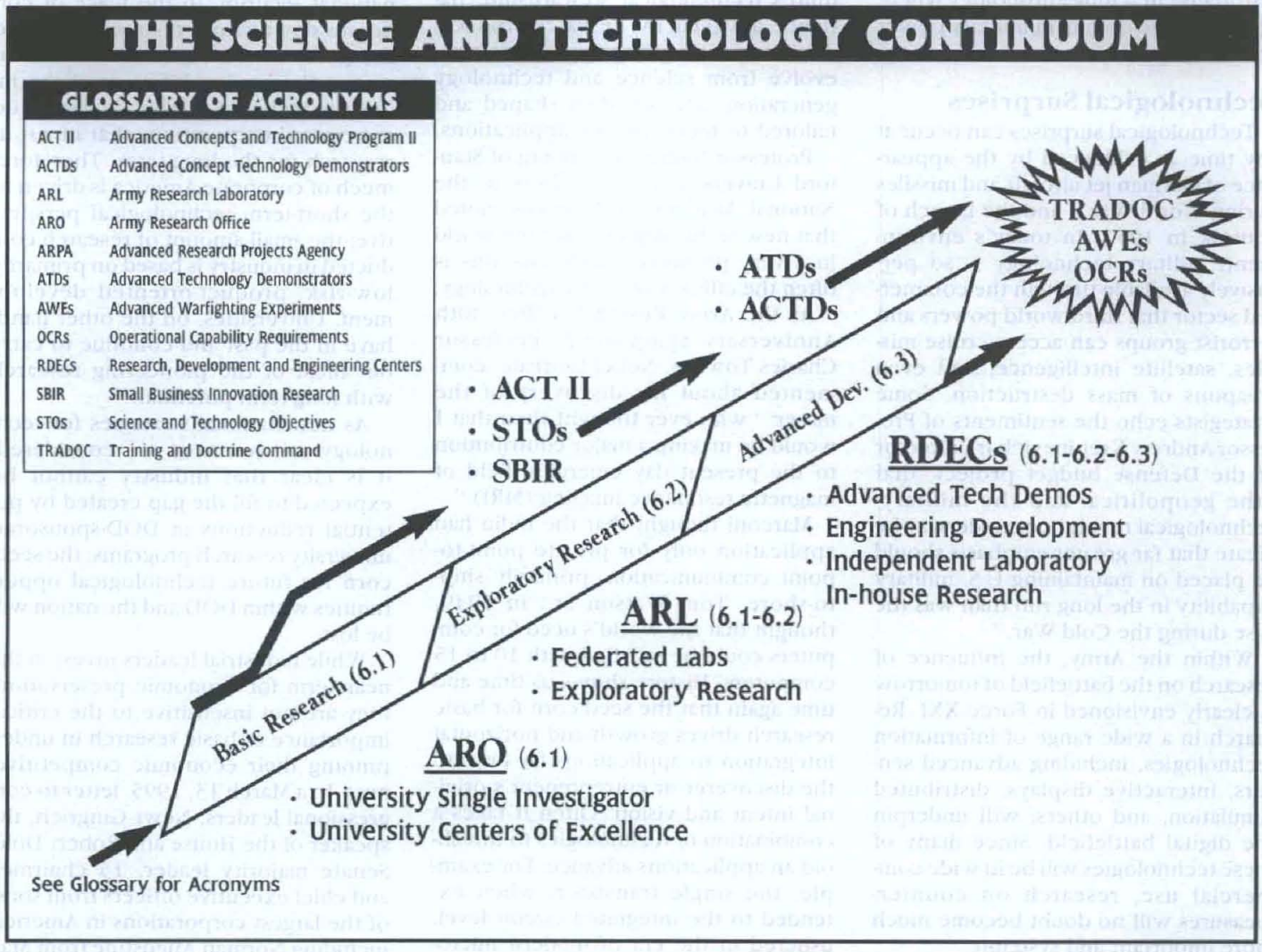
Role of University and Industry Research

University research jointly fuels economic competitiveness and enhances national security. In the wake of corporate downsizing, restructuring, and mergers, basic research has been among the hardest hit areas of the industrial technology base. Investors do not reward corporations that invest in research for the long-term. Therefore, much of corporate America is driven to the short-term technological perspective; the small amount of research conducted in industry is based on primarily low-risk, product-oriented development. Universities, on the other hand, have in the past and continue to carry out most of the pioneering research with long-term potential.

As new national strategies for technology reinvestment are considered, it is clear that industry cannot be expected to fill the gap created by potential reductions in DOD-sponsored university research programs; the seed-corn for future technological opportunities within DOD and the nation will be lost.

While industrial leaders invest in the near term for economic preservation, they are not insensitive to the critical importance of basic research in underpinning their economic competitiveness. In a March 13, 1995, letter to congressional leaders, Newt Gingrich, the speaker of the House and Robert Dole, Senate majority leader, 15 chairmen and chief executive officers from some of the largest corporations in America, including Norman Augustine from Martin Marietta, and John Welch from GE, expressed their concern that the federal government should not reduce its investment in university research; "America's leadership position in a global and competitive economy has been fueled by our technological prowess. Our universities, and the research programs pursued therein, have played a pivotal role in continually advancing our technical knowledge and know-how. The standard of living we enjoy today has, in large part, been made possible by our ingenuity and creativeness and our ability to continually advance and apply technology."

DOD invests in mission-oriented research; therefore, this research is strategic in nature. The accompanying figure illustrates the flow of scientific research results through the Army



science and technology continuum. Research results are horizontally integrated into follow-on exploratory research and advanced development. Universities are central to the research base that enhances our military and economic competitiveness. In many technology areas, DOD provides almost exclusive, albeit mission-oriented, support to the university research community. For example, Defense investments in optoelectronics research today underpin advances in telecommunications and computations.

The backbone of today's information highway, providing message and data communication worldwide, was pioneered by the Advanced Research Projects Agency (ARPA) with the development of the ARPANET, now known as INTERNET. DOD has developed extensive programs in optical interconnections, optical telecommunications, affordability of electro-optical modules, and the like. The DOD research investment in optoelectronics today provides almost 90 percent of the U.S. research investment in this critical technical area, and through this research investment has educated a trained, superior work force in an area vital to both national competitiveness and security.

A major value-added contribution of Defense-sponsored research is the education of future scientists and engineers in technical areas critical to Defense and competitiveness. In 1991, Congress noted that "the science and technology work force of the United States has been declining in recent years and that decline threatens the supply of qualified engineers and scientists for the DOD in the future." As a counter to this trend, DOD annually supports approximately 8,000 science and engineering graduate students as research assistants through university research grants and contracts. In addition, the DOD Services and agencies support thousands of other students through numerous fellowship and post-doctoral programs, youth science activities, and outreach programs for historically black colleges and universities and minority institutions.

Historical Perspective

After World War II, Congress emphasized the importance of research to na-

tional defense by formally establishing the Office of Naval Research in 1946. This was followed by the establishment of the Army Research Office in 1951, the Air Force Office of Scientific Research in 1952, and ARPA in 1958. Today, DOD no longer dominates federal R&D funding, as it did in the years immediately following World War II; in fact, support for basic research peaked in the mid-1960s with the shift in emphasis toward near-term payoffs.

In the mid-1970s, DOD recognized that its basic research program had suffered a 60 percent reduction in purchasing power relative to the mid-1960s due to inflation. Following a 1976 recommendation of the Defense Science Board, research funding increased by about 55 percent in real terms in the 1976-86 timeframe. By 1986, Defense-related spending peaked at 69 percent of the federal R&D budget authority. Since then, federal R&D spending priorities have shifted as a result of increasing budgetary pressures and changing U.S. security concerns.

Just prior to World War II, the Army and Navy departments sponsored almost no research; in fact, the entire Navy R&D budget was less than $9 million. The result was a defense force not well-informed of technical possibilities, nor fully aware of the engineering and scientific opportunities available to it. The massive research programs undertaken to overcome pre-World War II shortcomings eventually resulted in radar, the proximity fuze, nuclear weapons, jet aircraft and missiles. Today, DOD research is mission-oriented; yet, commonly used commercial products ranging from lasers, computers, global positioning satellite navigation, and even suntan lotion have their genesis in DOD-sponsored research.

The Future

When queried about the economics of research, Vannevar Bush wrote in 1945 that "basic research is performed without thought of practical ends ... [it] provides a means of answering a large number of important practical problems." However, the 1970 Mansfield Amendment to the Military Procurement and Research Authorization Bill prohibited DOD from financing "any research project or study unless such project or study has a direct and apparent relationship to a specific military function or operation." (This was later amended by substituting "potential relationship" for "direct and apparent".)

Notwithstanding the Mansfield Amendment, DOD has always targeted strategic research objectives of military importance; and even though strategically targeted, many advances from basic research have often taken unpredictable paths and have led to far different applications than originally intended. Capitalizing on these unpredictable paths as they emerge is the key to true research leverage.

The Committee on Science, Engineering, and Public Policy reported in "Science, Technology and the Federal Government: National Goals for a New Era" that "Leadership in basic research is not a luxury; it affords a comparative advantage for the country that also does a world class job at the other processes by which new scientific insight is turned into societal value." As the examples above illustrate, there is no doubt that Defense research has had a tremendous impact on the civilian sector.

In the past, research was performed independently by government labs, industry or universities. While some mechanisms were in place to transition technology among these performers, there were few instances where these performers actually worked in collaboration. Times are changing! The new research paradigm speaks of consortia involving all three major research performers: government labs, industry and academia. Scientists and engineers from each of these performance sectors will work in an "open door" environment; the intellectual boundaries between disciplines will be more permeable. A good example of this new paradigm is the Army Research Laboratory's (ARL) federated laboratory concept. The federated laboratory concept brings consortia of industrial and university scientists and engineers together with ARL peers to generate and transition information technology critical to Force XXI; the federated laboratory consortia are formed with the industrial partner in the lead to ensure technology transfer.

Conclusion

It is important for the Army, DOD and the nation to build upon the world-class research base that our nation has built and fostered during previous decades; research is the key to success in an idea-driven future. As GEN Sullivan, former Army chief of staff, and Secretary West stated in a joint letter in the Army Science and Technology Master Plan, "Today we are shaping the Army of tomorrow, and it begins with Force XXI. The concept for Force XXI requires an Army capable of winning an Information Age conflict. To succeed tomorrow, we must maintain the capabilities of our Army laboratories and private industries ..."

Through interaction with the Army's user community, represented by the Training and Doctrine Command (TRADOC), Army research has become an increasingly relevant and active partner in the success of the Battle Labs, Louisiana Maneuvers, Force XXI, and joint warfighting initiatives. Research has certainly been relevant in the past; it will be crucial for the future. There is no doubt that research will be critical in shaping the future of the Army, DOD, and America.

DR. GERALD J. IAFRATE is the director of the U.S. Army Research Office (ARO). As director, he is the Army's key senior executive for the execution and conduct of extramural basic research in response to Army requirements. ARO is a separate reporting activity of the Army Materiel Command.

W. DAVIS HEIN is special assistant to the director of ARO and is responsible for developing the ARO plan of execution and managing special fellowship and research assistantship programs sponsored by the director of Defense research and engineering.

ACQUISITION REFORM: TWO YEARS OF CHANGE

By COL Danny L. Abbott and Mario W. Lucchese

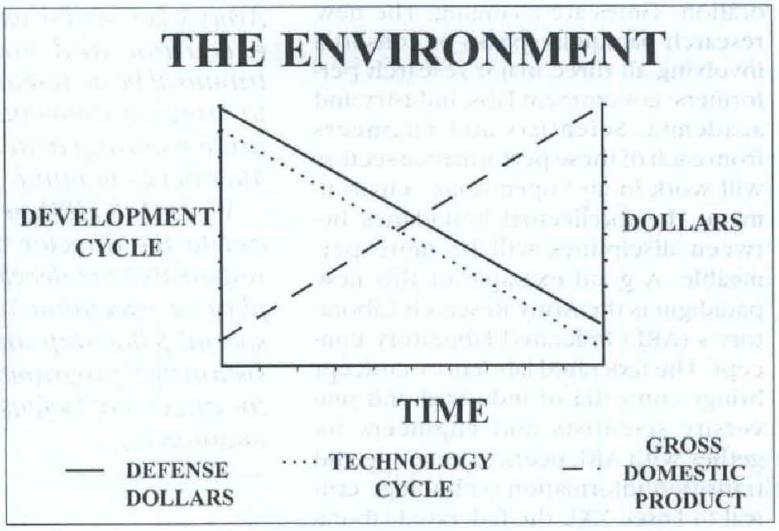
Why Acquisition Reform?

The Army's commitment to fielding and maintaining a technologically superior force in the face of declining resources and rapid technological change mandates fundamental advancements in the way we develop, acquire and field new capabilities. The secretary of Defense, in the publication, *Mandate for Change,* articulates the need for change and the steps necessary to meet the challenges facing future weapons systems acquisition. Steeply declining Defense budgets and rising commercial industrial output mean that national Defense now enjoys a smaller share of gross domestic product. New technology emerges from the private sector at an ever-accelerating pace even as Defense investment in research and development declines in real and proportional terms. Figure 1 provides a graphic illustration of these phenomena.

Our past practices of long-term investment and multi-year maturation of new technology into weapons systems no longer fits the current business or technical environment. The globalization of technology and production is a reality and new applications of technology spread rapidly to producers around the world. Holding new technology captive for many years is just not possible. Ironically, many of the unique government administrative, business, and technical requirements, developed to avoid risk, limit the number of companies willing and able to do business with us, just when we need them the most.

The challenge is clear. Taking eight, 10, or 12 years to develop and field a weapons system is a luxury we can no longer afford in dollars, time or technological performance. Rules and business practices that limit our access to the entire national industrial base must be altered. Administrative, development and production cycle times must be reduced dramatically, if we are to continue to provide our soldiers with technologically superior equipment.

Figure 1.



Road Map For Change

Historically, America's Army has been on the leading edge of change. We have led cultural change, while preserving the best of tradition, and created revolutionary technologies, which force fundamental changes to warfighting doctrine. It is not surprising, therefore, that the Army was first to begin revolutionary changes in traditional acquisition processes.

Recognizing the forcing function of emerging budget, business, and technology trends, a group of Army acquisition and logistics experts, consulting with our business and academia partners, developed a road map to radically change the "way" the Army develops, fields and supports weapon systems for our soldiers. One of a series of "white papers" written by this group in the early 1990s, titled *Acquisition Improvement Principles,* established the intellectual foundation for change. Many of you who have attended one or more of the Army "Road Show" training sessions recognize Figure 2 as a familiar display of the 15 acquisition improvement principles articulated in the paper. As we discuss the Department of Defense and Army acquisition reform activities of the past two years, you will see that each of the activities relate directly back to one or more of the principles, and in the aggregate, lead to a fundamentally changed process.

Leadership Commitment

There are numerous examples of large organizations successfully re-inventing the way they operate. The single attribute they all share is a continuously engaged leadership, willing to invest their own personal energy and organizational resources to secure the necessary changes. The creation of the position of deputy under secretary of Defense for acquisition reform (DUSD(AR)) sent a clear signal that the Defense Department was dedicated to reforming the acquisition process. The Army leadership, already fully engaged in renovating the acquisition process, enthusiastically supported the DUSD(AR) by providing some of our best and brightest individuals to staff and lead many of the process action teams (PATs), chartered by the DUSD (AR) to re-engineer portions of the acquisition process. Army personnel have been major contributors to all DUSD(AR) initiatives.

The Honorable Gilbert F. Decker, as-

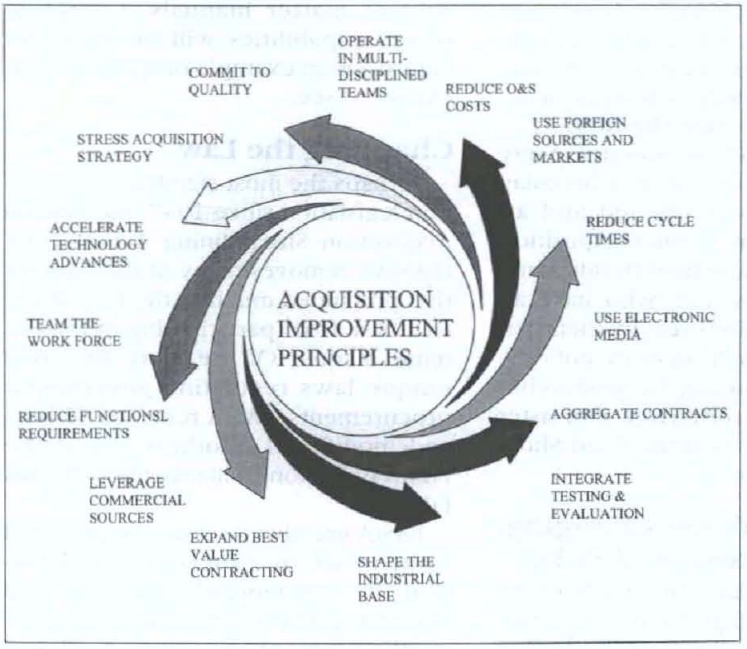


Figure 2.

ACQUISITION IMPROVEMENT INITIATIVES PRIORITIZATION

GROUPINGS / PRIORITY	REQUIREMENTS •Industrial Base •Technical Demonstration •Operational Need •Concept Formulation	COST •BUDGET •PPBES	PROCUREMENT •Solicitations •Contracts •EDI •Eval & Award	ACQ MGMT •Modeling & Simulation •Test & Evaluation •Process Reviews	CONTRACT MGMT	TRAINING
PUSH	**Technology Opportunities-** **Leveraging Technologies/ WRAP**	**Certified Cost and Pricing (Accounting)** **Program $ and Quality Stability**	**Implementation of DOD Report on Specs & Stnds** **Spare Parts Management (JIT/DVD)**	**Acquisition Organization** **Develop Acq Reform Metrics (Ind/Gov't)** **Acquisition Modeling & Simulation Implementation Plan** **Industrial Sector Surveys**	**Partnering**	**Roadshow IV (Best Value/ Specs & Stnds)**
SUPPORT / IMPLEMENT/ MAINTAIN	**CRADA's** **Atlanta Conferences** **ARM's Initiative** **AMC - Industry (CEO) Conferences** **ATD/AWE/STO** **APBI's** **Support of Battle Labs**	**Integrated Baseline Review** **Activity Based Costing**	**RFP Improvements** **Best Value Approach to Source Selection** **RFP Scrubs** **Source Selection** **Functional Support Templates** **Support Procurement Process - OSD PAT** **Nonstandard Clauses** **Debriefing Project** **RFP Metrics (Survey)** **IDEF Procurement Process** **Lessons Learned AMC BCC** **Integrated Product Data Environment** **Blue Ribbon Contracting** **CP2 Program** **AMC ACQ EBBS** **Procurement Automation** **Expert System for SOW** **OMB Past Performance Pilot Program** **Depot Maintenance Competition** **ALT/Plt Reduction**	**Program Stability** **Materiel Release** **Physics of Failure** **Concurrent Engineering** **NDI Advocacy** **DOD Pilot Programs** **Support Acq Management (DAB)Process) OSD PAT** **Materiel Developers Guide for Pollution Prevention** **CMIS** **AIR's** **T&E Infrastructure Reduction** **Software Development** **Acquisition Reshape** **AMR Expansion** **Regulation Reduction** **Strategic Plan to Eliminate Cadmium**	**Protest Program** **Advance Agreement** **Support Contract Administration OSD PAT** **ISO 9000 Quality Standards** **EDMS (PMO/FCG)** **JEDMICS** **DCMC Support (Joint PAT's)** **VECP PAT** **Incentives (Rand Study)**	**Acquisition Corps** **Fiscal Law Course** **DCMC Support (Cross Training)** **RFP Training**

Figure 3.

sistant secretary of the Army for research, development, and acquisition (ASA(RDA)), and Dr. Kenneth Oscar, deputy assistant secretary of the Army for procurement (DASA(P)), have made it clear that they consider reforming the acquisition system their top priority. They are acknowledged leaders of acquisition reform within the DOD.

The enormously successful Army Road Show series of two- and three-day training sessions is opened and attended by the Army's senior acquisition leadership. The more than 10,000 Army and industry personnel who have attended these sessions see, by their participation, that the leaders are not only committed to changing the process but in fact are leading the charge. Our sister Services have adopted the Road Show format and content.

A Busy Two Years: Changing the Law, Process, and Policy

There are literally hundreds of reform initiatives that have been completed and are in the implementation phase. There are many others currently in the works. While it is not possible to discuss all initiatives in this article, they are all important. By the time this article is published you will be able to access a complete list of all Army acquisition reform activities on the World-Wide Web (the address and instructions will be widely published by the DASA(P)). The information will include hyper text capabilities, allowing instant access to all ongoing activities and full text documents such as statutes, implementing rules, policy letters, process action team reports, and subject matter manuals. Complete search capabilities will be available. Figure 3 is an example of what you can expect to see.

Changing the Law

Perhaps the most significant acquisition legislation since 1947, the Federal Acquisition Streamlining Act of 1994 (FAStA), removes many of the barriers that precluded much of the U.S. industrial base from participating in the Defense market. Of the more than 650 unique laws regulating government procurements, FAStA repealed 55 laws and modified 175 others. All of the FAStA provisions will take effect by this fall.

FAStA greatly increases the potential marketplace by expanding the definition of "commercial products" and eliminating many of the unique requirements commonly imposed on sales to the Department of Defense. Federal agencies are encouraged to utilize commercial end-items and components and requires transition to a computer-based procurement system.

As an incentive to move to electronic acquisition, Congress created the Simplified Acquisition Threshold (SAT) of $100,000 and tied its use to procurement activities that are "Certified" to announce and award contracts electronically. Contracts awarded under SAT are exempt from most DOD-unique laws. Last year, the Army awarded over 2.7 million contracts, most of which were under the SAT threshold. This year more than 100 Army sites will be certified to announce and award contracts electronically resulting in significant resource savings, faster delivery to the customer, and expanding the range of suppliers willing and able to sell to the Army.

This year, with the help of Congress, additional legislative proposals promise to continue the government-wide efforts to simplify the acquisition system.

Changing Processes and Policy

One of the primary tools used to identify needed process improvements is the PAT. Each PAT is comprised of members from the Services, OSD staff, DOD agencies and, in some cases, members from other federal agencies. Of the first five PATs chartered by the DUSD(AR), the Army provided leadership for three and senior members for all. The Military Specifications and Standards, Oversight and Review and the Contract Administration PATs were led by Army members. The other two PATs were Electronic Commerce/ Electronic Data Interchange and Procurement. Each Pat developed recommendations that, together, fundamentally change the processes they were tasked to assess. Implementation is through DOD policy memoranda, directives, and instructions. A brief summary of these and other PATs is listed in Figure 4.

There have been and are numerous other OSD and government-wide PATs. Army personnel participating on these PATs are making valuable contributions towards improving the many processes of the acquisition system. More detailed information about all PATs is available on the World-Wide Web.

As mentioned earlier, PAT recommendations are often implemented by policy memoranda. Examples of such policies issued by the Office of the Secretary of Defense are specifications and standards and integrated product and process development. Other standalone OSD policies include waiver authority and international standards organization 9000. The Army's cancellation of more than 40 percent of its

PROCESS ACTION TEAMS

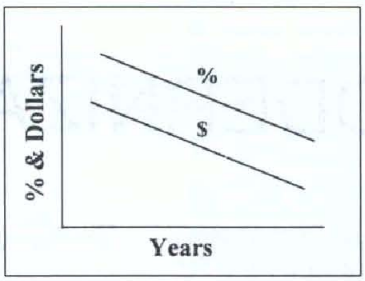
TITLE/SUBJECT	RESULTS/RECOMMENDATIONS
MILITARY SPECIFICATIONS AND STANDARDS	ELIMINATION OF VAST MAJORITY OF MIL SPECS AND STDNS
OVERSITE AND REVIEW	REPLACED PAPERWORK AND REPORTING WITH INTEGRATED PROCESS TEAMS WITH ACTIVE MEMBERSHIP FROM SERVICE AND OSD STAFFS
ACQUISITION REFORM COMMUNICATIONS	NATIONWIDE SATELLITE BROADCASTS AND VIDEOTAPES ON VARIOUS SUBJECTS. EXAMPLE: JUNE 24,1995 FEDERAL ACQUISITION REGULATION CHANGES
ACQUISITION MANAGEMENT AUTOMATION	(ONGOING) GOAL TO DEVELOP AN AUTOMATED SYSTEM FOR MANAGEMENT OF MAJOR DEFENSE PROGRAMS
CONTRACT ADMINISTRATION AND PROCUREMENT PAT's	REFOCUSSED CONTRACT AND PROCUREMENT SERVICES
ELECTRONIC COMMERCE / ELECTRONIC DATA INTERCHANGE	CHANGES THE CURRENT PAPERWORK INTENSIVE SYSTEM TO INFORMATION AGE ELECTRONIC SYSTEM
ARMY SYSTEMS ACQUISITION REVIEW COUNCIL (ASARC) - ASA(RDA) CHARTERED	REPLACED VOLUMES OF REPORTING DOCUMENTATION WITH A SINGLE INTEGRATED PROGRAM SUMMARY DOCUMENTWITH FOUR ATTACHED MEMORANDA, REDUCTION IN NUMBER OF ASARC MEMBERS AND AN IPT TO REPLACE CURRENT AD HOC COMMITTEES

Figure 4.

Contractor Overhead

- **Description:** Compare Percentage of Direct and Indirect Costs for Top Defense Contractors in Total (Average) and Individually Over Time. Compare Total Direct and Total Indirect Costs (Dollars) for Top Defense Contractors in Total (Average and Individually Over Time.
- **Acquisition Reform Significance:**
  - * Indicator of Acquisition Reform Cost Avoidance
  - * Dr. Perry's Goal: Rapidly Acquire Commercial Products & Technology from Reliable Suppliers Who Use the Latest Manufacturing & Management Techniques.
- **Data Set:: Top 30 Contractors**
- **Source:** DCMC. Already Collected
- **Frequency:** Annual

Notional Results



- **Baseline:** FY 95
- **Formula:**

$$\frac{\%\ \text{Indirect}}{\%\ \text{Direct}} \qquad \frac{\$\ \text{Indirect}}{\$\ \text{Direct}}$$

Figure 5.

acquisition regulations, the requirement to use simulation and modeling in system development, and the lifting of previous restrictions such as the use of plastic encapsulated micro-circuits, in conjunction with the changes mentioned previously, collectively change the acquisition process.

Measuring Progress and Compliance

Once the appropriate changes in the processes were identified and policy to implement those changes was issued, a method to provide feedback was needed. Several initiatives were begun to monitor the execution of newly developed policy and the degree to which the acquisition reform goals were being achieved.

A large-scale review of all Acquisition Category (ACAT)-I requests for proposals (RFPs) is conducted by the Army Materiel Command and Army staff personnel. The objective of these reviews, termed RFP scrubs, is to weed out the use of detailed military specifications and standards (use performance and commercial specifications), stove pipe plans and meetings, and excessive data items. Milestone Decision Authorities are also required by the ASA(RDA) to do the same for all other ACAT programs.

Under the auspices of the Defense Standards Improvement Council, an executive-level DOD group chartered to revamp the military specification and standards system, a set of acquisition reform metrics were developed in May of this year. The metrics represented a consensus of the Services, the Defense Logistics Agency and the Defense Contract Management Command and relied on a combination of already collected and other easily accessible "corporate level" data so as not to create an unnecessary collection burden. Measurements are being taken in the areas of cost, acquisition performance, schedule and commercial practices. Data collection was not yet initiated as of the writing of this article, but was imminent. The data would be assessed and the metrics fine tuned for further application. Figure 5 shows a sample of how one of the corporate level metrics would be portrayed.

The Road Ahead

While there is much left to accomplish, over the last two years there have been significant and fundamental improvements in all areas of the acquisition system. The laws governing Defense acquisitions are reduced, internal DOD and Army processes are streamlined, enabling policies are enacted, and acquisition training has increased. Taking full advantage of these changes will result in lower costs and increased quality and performance in the equipment we provide to our soldiers.

The acquisition environment (business, technical, and requirements) will not be static. Acquisition reform will be a way of life. Successful acquisition will take innovative and highly skilled people operating in an adaptive acquisition process.

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National & Defense R&D Strategy

RESOURCING THE MODERNIZATION STRATEGY

By MAJ Robert W. Morris

Treading Water

The U.S. Army, today, faces many challenges as it transitions from a forward deployed force to a force projection Army. This transition is further complicated by the need to downsize the force and the accompanying infrastructure while still maintaining a continuous level of modernization. The Army we sent to Desert Storm was a direct result of the massive modernization efforts and expenditures of the 1980s. That Army's performance could not have been as devastating to our opponent without a large investment of critical national resources in the modernization of the total force.

Current doctrine calls for the Army to fight and win *two* nearly simultaneous major regional contingencies (MRCs). For discussion purposes, an MRC is a Desert Shield/Storm equivalent in both duration and intensity. To maintain that level of domination on the battlefield, we logically must sustain the pace of modernization.

Modernization consists of developing, acquiring and deploying systems which address and overmatch our competition. Each of these tasks is resource-intensive and must take place nearly simultaneously over time to continuously modernize the force at the optimum rate. Given our current levels of funding during this period of downsizing, the optimum rate of modernization simply may not be an achievable course of action. An alternate approach, and one with a greater chance of success, is an economy of force operation focusing on technology insertions or upgrades into existing platforms to solve our near-term and mid-term requirements, while pressing forward with new technologies and systems development as an investment for the future. This approach should keep our expenditures as low as possible, consistent with fielding a credible force.

Protect the Technology Base

As a matter of policy, indeed survival, we must support a robust technology generation effort. Science, technology, and their demonstration, commonly called the technology base, are the critical underpinnings for future modernization of the force. System development is predicated on technology maturation. Technologies are proven through the use of advanced technology demonstrators (ATDs). ATDs permit the demonstration of new technologies without having to go to the expense of a prototype system. This approach also allows us to discretely evaluate individual technologies without waiting for an actual system development. Properly executed, such demonstrations can be applicable to multiple systems or system prototypes as necessary.

Advanced warfighting experiments (AWEs) are an excellent way to introduce technology through ATDs to an operational environment. This method of demonstrating technology to the user community has the advantage of reducing the scope of operational testing. It helps the user and developer determine the "right" capabilities before committing to the cost and schedule of a full development program. These proven technologies are then available for application to developmental or technology insertion programs.

Delicate Balance

We divide the industrial base into sub-groups of companies and capabilities which address a specific military requirement. We call these sub-groups sectors. The defense industrial sectors are limited by their very nature. Using armored vehicles as an example, there is not a great deal of need for 1,500 horsepower high-speed, low-torque engines in the commercial world. Anti-tank munitions and 500-pound bombs are also rather narrow in their application to defense. Much of industry's work in these and similar sectors is dedicated solely to defense use. For many sectors the possibility of dual use is not promising. In addition, due to fiscal reality, an industry segment seldom has more than one program per stage of development at a time. This creates a delicate balance between operating profit and loss in these industry sectors. Although none of these sectors are broken beyond repair, they are all stretched to the breaking point. Hence, *any* reduction in programs seriously affects our modernization capability, whether now or in the future.

Be Creative

By definition, research and development is expensive. Making things which have never been made before is costly. Procurement of sufficient assets to outfit the entire Army will take significant time and money. We must husband these scarce resources through creative management. By ruthlessly prioritizing, we control the items we procure or develop. By demanding strict definition of requirements and adhering to them, we can stretch our procurement dollars. We can do smart, innovative things like using simulation to reduce our expenditures while increasing the return on our investment. Through the use of acquisition reform, we can better control the materiel acquisition process. We can establish a strategy which relies on full modernization for the future, while limiting ourselves to upgrades on our existing systems in the interim period.

Horizontal Technology Integration (HTI)

HTI maximizes the effect of performance enhancements by implementing them across multiple systems. One example of HTI is embedding the capability to share precise target acquisition data, reconnaissance information, and friendly position location data across the maneuver force. Ground forces can acquire the enemy and transfer the information to attack helicopters. Scout helicopters will provide exact enemy locations to ground forces. Synergistic advantage is gained within the system fleet such as the Abrams or Bradley. This capability would significantly decrease the difficulty of battle hand-off, ease the confusion involved in a passage of lines and will reduce the probability of fratricide.

HTI extends to the use of common components, or common internal subcomponents. The easiest and most widely recognized examples are radios and the VINSON family of secure communication equipment. By standardizing the component (black box) or its sub-components, we can control development costs and significantly reduce production costs by buying in larger quantities and gaining the advantages of economy of scale. While the integration hardware to install a black box will vary by individual system, the configuration of the black box can remain constant. Another aspect of this concept is the use of open architectures for computer systems. Software modules can be inserted into this "established" framework, allowing for common "components."

Modeling and Simulation

Increased use of modeling and simulation throughout the acquisition process reduces the schedule and cost by identifying the "best" solution or technology. Use of simulations allows developers to test concepts and refine requirements early; reduce expensive field tests; and help identify trade-offs between technical solutions and cost. The technological advances in computer simulation make possible advanced test methods that reduce cost and schedule, while providing better results than were possible as recently as 10 years ago. Simulation and plans for its use in system development and acquisition are now institutionalized in Army acquisition policy.

Acquisition Reform

Acquisition reform is the Army's best hope to substantially reduce costs while continuing to field state-of-the-art products for our soldiers. A critical initiative in acquisition reform is the removal of unique military specifications and standards from Army solicitations. There are in excess of 33,000 military specifications and standards in use today, many of which direct the use of outdated materials and processes. Our emphasis is to use commercial practices and industry standards wherever and whenever possible.

One of the significant events in acquisition reform is the recently enacted Federal Acquisition Streamlining Act of 1994 (FAStA). FAStA removes many of the barriers that precluded some members of the industrial base from participating in Defense activities. Of the more than 650 unique laws regulating government procurement, FAStA repealed 55 laws and modified 175 others. FAStA greatly increases the potential market by expanding the definition of the "commercial products" and eliminating many unique requirements commonly imposed on sales to the Department of Defense.

Road Shows

Training and education are the keys to improving the acquisition work force. In a series of briefings known as "Road Shows," senior Army acquisition executives travel to installations to communicate the new acquisition philosophy to Army acquisition personnel and to demonstrate the commitment of our senior leadership to process improvement. With four Road Shows at more than 25 locations, acquisition executives have taught the Army's acquisition reform philosophy, principles, and practices to more than 4,500 Army acquisition personnel. Forming cross-functional teams, creating performance-based requirements, and use of best value contracting are only a few of the sweeping fundamental changes presented in the Road Show format.

Resource Trends Must Go Up

The allocation of resources to research, development, and acquisition (RDA) as a component of the Army's budget has been steadily decreasing since fiscal year 1989. Actual buying power diminished by more than 38 percent from fiscal year 1989 to fiscal year 1996. The predictable cycle of reducing the RDA accounts to support near-term readiness, personnel requirements in support of the downsizing, and unscheduled peacekeeping operations will eventually turn full circle. As it does, the RDA accounts must go up. The optimum solution, permitting the desired level of modernization, will require an additional investment of $4 billion to $5 billion yearly across the program objective memorandum (POM). The 85 percent solution, consisting of the majority of development and selected system procurements, is slightly less at an additional $2 billion to $2.5 billion per year across the POM.

For comparison purposes, using an annual Army budget of $62 billion, even the high end of the optimal solution represents only an 8 percent increase in the Army's budget topline. Therefore, by making a small incremental increase in the overall Army budget, the essential modernization activities for the total force can be met. Given the uncertainty of the future, and the reduced size of our standing Army, can we afford not to?

MAJ ROBERT W. MORRIS is a drilling individual mobilization augmentee in the Acquisition and Industrial Base Policy Directorate of the Office of the Assistant Secretary of the Army (RDA). He holds a B.S. degree from the U.S. Military Academy at West Point and two graduate level degrees from the Florida Institute of Technology. He is a member of the Army Acquisition Corps.

ADEQUATE PRICE COMPETITION: A HISTORY OF REGULATORY EVOLUTION

By George A. O'Reilly Jr.

Introduction

The practice in the Department of Defense (DOD), prior to the Competition in Contracting Act (CICA) when competition became the cornerstone of acquisition policy, was to define price competition in terms of an offeror submitting the lowest evaluated price proposal. The belief was that price competition existed only on fixed price contracts and never in cost reimbursement contracts where factors other than cost were considered. There was also a concern that the DOD would not be able to prevent offerors from charging excessive prices for goods and services without the ability to negotiate contract prices. During the latter half of the 1980s, this foundation of acquisition policy underwent an evolutionary change.

Background

The Federal Acquisition Regulation (FAR) (formerly the Armed Services Procurement Regulation (ASPR)) serves as the bible for the acquisition community. The rules and regulations governing pricing techniques and the evaluation of negotiated contracts were addressed in Section 3 of the ASPR. The ASPR stressed that price competition existed if offers were solicited and at least two responsible offerors independently contended for a contract which was eventually awarded to the lowest bidder. Price competition was presumed "adequate" unless the government found the solicitation was made under conditions that unreasonably denied one or more offerors an opportunity to compete, and the low competitor had such a determinative advantage over the other competitors so as to almost provide immunity from competition.

After CICA, when competition became the rule rather than the exception for the majority of acquisitions, the emphasis placed on lowest price raised concerns within the DOD regarding the quality of goods and services obtained. Beginning in the spring of 1987, the regulatory guidance began to shift from an emphasis on lowest price to one of best value.

Evolution

The Pyant Memorandum. The Department of Navy took the initiative in April 1987 in revising interpretation of price competition. The Navy moved away from a reliance on lowest price proposals to an emphasis on competition and market forces as was envisioned by CICA. The honorable Everett Pyant, assistant secretary of the Navy (shipbuilding and logistics), set the stage for price competition to play a larger role in acquisition when he stated, "the competitive marketplace serves as our best pricing mechanism." He recognized that by allowing the marketplace to set the price for goods and services, there would be improved long term incentives for offerors to reduce or limit costs.

Pyant's most important achievement was a recognition that the DOD was failing to distinguish between cost analysis for the purpose of determining cost realism versus cost analysis for the purpose of negotiating a fair and reasonable price. Implicit was the belief that goods and services could be acquired in a more efficient manner by requesting offerors to submit only cost or pricing data required to assess the cost realism of its proposed technical approach. He believed that the DOD was placing an undue reliance on cost analysis for cost analysis sake and the application of the DOD profit policy when the marketplace was in effect setting the price of goods and services. By "over analyzing" offerors' proposals, the DOD was wasting scarce resources.

Believing that the marketplace was the best pricing mechanism, he established the following policy: (1) When the contracting officer has a reasonable expectation that adequate price competition will be achieved, the solicitation shall not require the submission of cost or pricing data; (2) This policy was applicable to all solicitations where price is a substantial evaluation factor even if award may be made to other than the low offeror; and (3) Information requirements should be tailored to fit the acquisition.

The Spector Memorandum. In May of 1987, the deputy assistant secretary of Defense for procurement, the Honorable Eleanor R. Spector, incorporated the Navy's groundbreaking policy in a memorandum which placed the DOD stamp of approval on this revised concept of price competition. In implementing the Navy's price competition policy, the DOD made four significant changes to the way the government previously treated price competition. The most significant of these was that price competition was no longer limited to fixed price contracts. Cost reimbursements contracts were also included for the first time. Second, strong emphasis was placed on not obtaining certified cost or pricing data when price competition was expected to occur with the language "should rarely need."

Not obtaining certified cost or pricing data was a fundamental change in the way DOD did business, which removed the safety net for most contracting officers. It placed renewed importance on designing the solicitation and the source selection evaluation factors, and weights, to provide the requisite information to make a sound selection decision.

Third, the removal of the requirement to obtain a field pricing review and to perform a weighted guidelines analysis was another fundamental change. The contracting officer could no longer rely on the results of a field pricing review to determine the reasonableness of an offeror's proposed price.

Fourth, for the first time, a distinction was made that when price was considered in conjunction with the technical and management approaches proposed by an offeror, that adequate price competition could exist even though it was not a primary consideration. The key elements of the May 1987 memorandum are: the adequate price competition exemption from the requirement to obtain certified cost or pricing data may be applied regardless of contract type; as long as price was a substantial evaluation factor, adequate price competition may result even though price was a secondary factor in the evaluation of proposals; when following source selections procedures where a contract will be awarded to the responsible offeror submitting the lowest evaluated price (considering all evaluation factors), there should rarely be a need to obtain certified cost or pricing data, although some data may be required to determine cost realism or to ensure the offeror adequately understands the scope of work; and when cost or pricing data are not ob-

tained because adequate price competition has been achieved, there is no requirement to obtain a field pricing review or to separately analyze profit using the weighted guidelines method.

The key ingredient affecting a revision in acquisition philosophy regarding price competition was the General Accounting Office comptroller general's decision in the case of Serv-Air Inc., 58 COMP GEN 362 (1979), 79-1 CPD 212. The comptroller general ruled price competition existed regardless of contract type, concluding, "the intent of Congress was to treat all contract types equally for the requirement to submit certified cost or pricing data on all negotiated procurements and exemptions to the requirement." Although the decision was made in 1979, it languished in relative obscurity until CICA was implemented and acquisition streamlining rose to the forefront of acquisition reform. The decision also ruled that "adequate price competition may result, even though price is a secondary factor in the evaluation of proposals, as long as price was a substantial evaluation factor." Substantial was defined as being at least 20 percent of the total proposal evaluation.

Both the Pyant and Spector memoranda based their revised interpretations of existing statuory and regulatory language on the Serv-Air Inc. decision, forming the basis for a fundamental change in acquisition policy and in the way the DOD viewed price competition.

The USD(P&L)P Memorandum. In April 1988, with the resources of the Defense Contract Audit Agency growing scarcer due to manpower shortages and an abundance of pre and post award contract actions, the under secretary of Defense for procurement and logistics policy (USD(P&L)P) issued a memorandum amplifying the direction provided in the Pyant and Spector memoranda. Contracting officers were directed to "not obtain certified cost or pricing data or audit reports on proposals for contracts to be awarded on the basis of adequate price competition." He recognized the concern in the pre-CICA policy of an offeror overcharging for its goods and services and noted that "Some of the most fierce competition typically takes place in the source selection process. The problem in these situations has been obtaining realistic prices and not excessive prices."

Key elements of the April 1988 memorandum are: the contracting officer shall not require submission or certification of cost or pricing data when contract price is based on adequate price competition; and pre-award audits of these contractor proposals should not be requested except in certain limited cases.

Acquisition Policy Reform. Over a one year period from April 1987 to May 1988, the groundwork was laid to effect a fundamental change in the way DOD treated price competition. These memoranda resulted in a change in acquisition philosophy which was implemented as a revision to DFARS subpart 215.804 in March 1989. The revision read "when there is a reasonable expectation that adequate price competition will result on a particular procurement": (1) The contracting officer should rarely need to require the submission or certification of cost or pricing data on acquisitions where adequate price competition is expected (regardless of the type of contract expected); (2) Adequate price competition may exist for any contract, including cost reimbursement contracts, even though price is not a primary factor in the evaluation of proposals, provided that price is a substantial factor in the source selection criteria; (3) An expanded discussion pertaining to cost realism analysis, was included describing or detailing what it is and when it is necessary to be performed.

In May 1992, Spector issued a memorandum on Certified Cost or Pricing Data. It provided additional clarification and reenforced the requirement not to obtain cost or pricing data when price competition was expected. This memorandum was required because the acquisition community had failed to take notice of the change in acquisition philosophy set forth in 1987 and 1988 and continued to treat competitive acquisitions, at least for evaluation purposes, as sole source negotiated procurements.

Certified cost or pricing data and field pricing reviews were still routinely being requested on competitive acquisitions five years after guidance was provided to the field. Three key points were made: (1) It reemphasized that contracting officers shall not require submission or certification of cost or pricing data when the contract price is based on adequate price competition. The applicability of this policy was extended to subcontracts as well as prime contracts; (2) When cost or pricing data are not obtained, contracting officers must perform a price analysis to ensure price reasonableness. If adequate price competition exists, the evaluation of competitive proposals usually satisfies the requirement to perform a price analysis; (3) When data such as cost breakdowns are required to determine the cost realism of competing offerors or to evaluate competing approaches for major acquisitions, they may be obtained. Cost breakdowns for these purposes should not be considered to be cost or pricing data and should not be certified.

With this memorandum, the DOD acquisition community began to more fully implement the guidance set forth in DFARS subpart 215.6 and 215.8 in 1988. Contracting officers designed solicitations with reduced cost or pricing data requirements tailored for a specific acquisition. Routine field pricing reviews were replaced by rate and factor reviews to assess the reasonableness of an offeror's forward pricing rate structure in the context of previous years actuals. In-depth quantitative and qualitative technical evaluations of offerors' proposals became more important in determining the cost realism of an offeror's proposal based on its proposed technical and management approaches. Contracting officers began to no longer require certification of the cost or pricing data submitted. With weighted guidelines analysis no longer a requirement, offerors were able to propose profit or fee rates commensurate with the degree of risk believed inherent in a particular acquisition. However, offerors were prevented from proposing excessive profits or fees by competitors and market forces and proposed profits or fees lower than would have been recommended by weighted guidelines analysis.

Conclusion

The changes initiated by the Department of Navy resulted in a revision in acquisition policy which changed the manner and method in which the DOD treated price competition. With this change in policy, the DOD allowed market forces to play a greater role than ever before and as a result streamlined its source selection process. DOD found its concern over its previously perceived inability to prevent offerors from charging excessive prices was mitigated by the presence of other competitors with products meeting the requirements. Price competition became a more valuable tool available to the contracting officer to accomplish his mission in an era of declining resources. By allowing market forces and competition among offerors to establish the price DOD paid for goods and services, several advantages readily became apparent to both DOD and industry. These advantages are: it allows the marketplace to establish costs and profits; reductions in procurement acquisition lead times; it simplifies source selection evaluation methodology through the elimination of unneeded audits and evaluations; it promotes competitiveness; it reduces proposal preparation costs; it promotes the submission of most favorable prices, technical breakthroughs, or reasoned business decisions; and it conserves scarce government and industry resources.

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CONTINGENCY CONTRACTING OFFICERS AND THE VISA IMPAC CREDIT CARD AT THE NATIONAL TRAINING CENTER

Contingency Contracting And the Credit Card Program

By CPT Nicholas L. Castrinos

On the island of Haiti, there are approximately 15,000 U.S. soldiers implementing our nation's most current contingency operation, Operation Uphold Democracy. As with any operation, these soldiers need large amounts of supplies. They also need civilian contract services and supplies that are not readily available in our supply system. Filling this need is a small group of military acquisition officers called Contingency Contracting Officers (CCO) and the VISA International Merchant Purchases Authorization Care (IMPAC) credit cardholder. The training of these officers and credit cardholders has become very important to the overall success of logistically supplying contingency operations.

Contingency contracting officers and the VISA IMPAC credit card program were developed as a direct result of lessons learned during past operations. Urgent Fury, Just Cause and, to a lesser extent, Desert Shield/Desert Storm are examples of contingency operations where CCOs could have provided improved logistical support to the tactical commander. Every contingency mission since Desert Storm has had CCOs on the ground conducting contracting operations in support of the tactical commander.

The CCO position was added to the Military Acquisition Position List (MAPL) in 1992 as a result of these operations and in recognition that our government would become increasingly more involved in contingency missions throughout the world. In FORSCOM, contingency contracting officers are currently authorized two to a division.

The VISA IMPAC credit card, which has been in the system since the late 80s, has also been incorporated to allow forward deployed combat commanders more flexibility in procuring off-the-shelf items in a forward deployed nation. The commercial credit card procurement program (VISA IMPAC credit cards) is also currently in use to some degree in all FORSCOM units. The FORSCOM commander's goal for credit card use in FY95 is 85 percent of all purchases under $2,500.

The old adage "you train as you fight, and you fight as you train" also holds true for CCOs and the credit card procurement program. Contingency contracting officers generally work for the installation Directorate of Contracting (DOC) on a day-to-day basis, gaining much needed procurement experience. Tactical field training scenarios for CCOs and credit cardholders is limited. The National Training Center (NTC), located at Fort Irwin, CA, was a logical choice for this training. As the CCO for the 2nd Armor Division, Fort Hood, TX, I recently supported rotation 94-11 at Fort Irwin and gathered information on how the NTC will integrate CCOs and credit cardholders into their training scenario. The following is a brief outline of the NTC concept, the advantages of this concept, how Fort Hood units will operate under this new concept and some issues that need to be decided by the rotation unit before they start their rotation.

NTC Concept

Late last year (Rotation 95-1), the NTC, in support of FORSCOM procurement initiatives, began to provide purchasing/contracting support for rotation units on an exception basis only. Routine purchases for $2,500 or less, that qualify for the VISA IMPAC commercial credit card procurement program will be purchased by the unit credit cardholder. Units will be requested to deploy a CCO for all other small purchases.

The VISA IMPAC credit cardholders must have a single purchase limit of up to $2,500 and a monthly limit sufficient to fund all

qualified commercial credit card purchases. The unit CCO should also have a VISA IMPAC credit card. As a procurement official, he would have a single purchase limit of $25,000. Typically, 95 percent of all rotation purchases are below the $2,500 limit with a total average dollar value per rotation of $45,000.

The NTC DOC provides a furnished office in the DOC building with telephones, market assistance and basic administrative support. A Standard Army Automated Contracting System (SAACONS) computer is also available to the CCO. The NTC DOC will continue contracting support to rotation units for procurements that exceed the warrant of the CCO and procurements that exceed the credit cardholders' limits.

The NTC DOC recognizes that not all division CCOs have warrants. In the short term, they will continue to support rotation units for all purchases over $2,500. For purchases under $2,500 the unit must use their VISA IMPAC credit card. Units must have a waiver from FORSCOM before the NTC DOC will provide support for credit card purchases.

About half of the contracting support for rotation units is for leasing of equipment. Units typically lease such things as rental vehicles, light sets, copiers, fax machines, and generators. The NTC DOC is in the process of setting up requirement contracts with vendors against which CCOs may place delivery orders. This will ensure that rotation units will receive the lowest possible price on all of their leases and streamline the claims process for both the vendor and the rotation unit. Until these requirement contracts are in place (late FY95) the NTC DOC will continue to provide contract support for leases to the rotation unit.

Advantages of the New Concept

A big advantage is that rotation CCOs will be provided with mission specific training. Just because a CCO does not have a warrant does not mean he can not receive excellent experience and training. CCOs will train and exercise with a task force deployed in a realistic deployment scenario. Most importantly, the CCO interacts with the units that he will support during actual contingency missions.

The IMPAC credit card cardholders will also have the opportunity to train and exercise in a realistic deployment scenario. It also forces the unit to formulate an SOP on how the credit card will be used during a contingency mission. Using the IMPAC credit card streamlines the funding and procurement process for the rotation unit, saves rotation money and procurement time, and allows the unit to see exactly what it is spending from day to day on local purchases.

How Fort Hood Will Operate

CCOs will become involved in the planning phase of the unit rotation right from the start. They attend every IPR the unit holds, making recommendations, and training credit cardholders for use at the NTC. They also travel to the NTC with the logistical reconnaissance team to coordinate with the NTC DOC and arrange for all identified contracting needs.

The CCO will travel to Fort Irwin four or five days before the Torch Party arrives. The Torch Party consists of six or seven soldiers who conduct initial coordination with the NTC for the advance party. The CCO will finalize all contracts for the torch party, advance party and the main body. One of the CCO's most critical duties during the initial phase of the rotation is to act as a troubleshooter for all contracting problems. This is a very important point, because the unit leadership is very focused on drawing equipment from the installation, and firming up the future tactical situation.

When a contracting problem arises, the unit leaders have to break concentration, and focus on fixing the contracting problem. Very often the leadership doesn't have the expertise or time to resolve a contracting problem. Having the CCO available enables the unit leadership to turn over any contracting problem to the CCO and continue to focus on the important logistical and tactical issues.

During the rotation, the CCOs will spend most of their time as the point of contact for all credit cardholders and field ordering officers (utilizing SF44's). Since using the IMPAC credit card at the NTC is different from using it at home station, modifying the installation credit card SOP is required to enable the rotation unit to better control purchases. This is how Fort Hood rotation units will operate with the IMPAC credit card at the NTC.

All IMPAC credit cardholders will be under the control of the rotation unit approving official. This means that all support units (which are called slice units) going to the NTC in support of a brigade will fall under the brigade's approving official for their credit card purchases at the NTC. The NTC rotation will be bulk funded using the rotation NTC Account Processing Code (APC). This will enable the brigade to control what is being obligated from the NTC budget by slice units.

Credit card bulk funding for the brigade will be for both expendable and leases/services. It is up to the brigade to coordinate with the division comptroller and Corps G-3 to set the funding levels. Leases and services bulk funding should not be more than $3,000. Bulk funding for expendables should not be more than $45,000. Property accountable items can not be purchased at the NTC using the IMPAC credit card. If the brigade has a requirement for an accountable item, either the CCO or the NTC DOC will contract for it.

Additional Issues

How the rotation unit tracks local purchases and CCO contracts is very important. The rotation unit S-4 can run a document register to track these purchases. This will enable the S-4 to quickly review the document register at anytime to see how much money the unit has spent on credit cards, SF44's and CCO contracts. This document register will later assist the unit S-4 in verifying the credit card charges for payment.

Transportation for the cardholders is something that must be considered. How will these cardholders purchase all the types of supplies the unit needs if it has no transportation? If tactical vehicles cannot be used, these cardholders will not be able to travel hundreds of miles a day in search of required items. What the unit needs is either two or three TMP vans or rental vans. This may seem excessive, but the average rotation unit will log approximately 12,000 miles in search of required items. Meals are another problem. The rotation unit should rely on one or two cardholders to do most of their buying. These cardholders should be placed on TDY for meals only, to ensure that they don't miss meals while picking up supplies.

Conclusion

This new initiative supports the FORSCOM commander's vision for training contingency contracting officers and employing the VISA IMPAC credit card in realistic deployment scenarios. The NTC training scenario is tailor-made to employ both the CCO and the credit card. This new initiative will save money for both the rotation unit and the NTC, speed up procurement time and, above all, will further enhance the combat readiness of the rotation unit.

CPT NICHOLAS CASTRINOS is one of two contingency contracting officers assigned to the 2nd Armor Division at Fort Hood, TX. He holds a B.A. degree in business from Evergreen State College, WA, and a master's degree in international relations from Troy State University, AL.

From The AAC Career Manager...

Project Manager, Acquisition Command Selectees

Congratulations to the following Army Acquisition Corps officers selected for project manager and acquisition commands by the FY 96 Colonel Command, TRADOC System Manager, Project Manager and Acquisition Command Board.

Arrol, Lawrence G.	COL	MI	53	Intel Fusion
Cannata, Gregory A.	LTC(P)	OD	97	Contracting Cmd
Cantrell, Alvin D.	COL	FA	53	Contracting Cmd
Cerutti, Edward A.	LTC(P)	FA	51	Contracting Cmd
Deeter, Louis P.	LTC(P)	OD	51	THAAD
Dobeck, Kenneth R.	LTC(P)	EN	51	Family of Medium Tac Vehicles
Dresen, Thomas E.	LTC(P)	OD	51	Mines/Countermine/ Demolitions
Duckworth, Roger L.	COL	AV	51	Joint UAV
Ehly, William E.	LTC(P)	OD	51	RDT&E Cmd
Filbey, Robert C.	COL	OD	51	RDT&E Cmd
Flavin, Mark J.	LTC(P)	QM	97	Contracting Cmd
Hamilton, Philip E.	LTC(P)	IN	51	Soldier
Hammond, Alan R.	COL	AR	51	Combined Arms Tac Trainers
Henderson, Jerry M.	COL	AV	53	Joint Recruiting Info Sys
Holly, John W.	COL	AR	51	Tac Msl Sys-Brilliant AntiArmor Sub
Jeong, John C.	LTC(P)	QM	97	Contracting Cmd
Kee, Stephen G.	LTC(P)	AV	51	Apache Longbow
Knight, William E.	COL	SC	51	RDT&E Cmd
Knox, William D.	COL	AD	51	Javelin
Lane, Howard M. Jr.	COL	IN	51	Contracting Cmd
Mazzucchi, Michael R.	LTC(P)	SC	51	Mil Satellite Comm
McMillen, Leroy B.	LTC(P)	AV	97	Contracting Cmd
Newlin, Donald D.	LTC(P)	AR	51	Armored Sys Integration
O'Keeffe, Edward Jr.	COL	AG	53	Contracting Cmd
Pawlicki, Raymond	COL	OD	51	Tank Main Armament Sys
Petterson, Maurice E.	COL	OD	97	Contracting Cmd
Romancik, David J.	LTC(P)	AD	97	Contracting Cmd
Savage, Richard T.	LTC(P)	AV	51	Air to Ground Msl
Schenk, Donald F.	COL	AR	51	Combat Mobility Sys
Sorenson, Jeffrey A.	LTC(P)	MI	51	Night Vis/Recon Surveil/Target Acq
Toner, Sheila C.	LTC(P)	QM	97	Contracting Cmd
Voorhees, Delloyd Jr.	COL	IN	51	Instrum, Targets and Threat Sim
Walsh, John C. Jr.	LTC(P)	IN	97	Contracting Cmd
Young, James E.	LTC(P)	AV	51	Joint Surveil Target Attack Radar Sys/ Ground Station Module

Product Manager, Lieutenant Colonel Command Selectees

Congratulations to the following Army Acquisition Corps lieutenant colonels selected for product manager or command by the FY 96 Lieutenant Colonel Command/PM Board.

Anderson, Elizabeth A.	MI	51	Ground Based Common Sensor
Ball, Charles R.	MI	53	Joint Collection Mgt Tools
Bennett, David B.	SC	53	Ft Belvoir Info Area Modernization Prog
Birmingham, Robert D.	AV	51	T-800 Engine Prog
Cannon, Samuel M.	AR	51	Heavy Assault Bridge
Conti, Michael S.	TC	97	Contracting Cmd
Davis, Lauren S.	IN	51	Mortars
Grobmeier, John R.	FA	53	Advanced Field Artillery Tact Data Sys
Hamilton, Michael A.	AR	51	Combat Vehicle Signature Mgt Prog
Johnson, William R.	AR	51	M-1 Breacher
Johnson, Joseph E.	QM	97	Contracting Cmd
Jorgenson, Charles H.	OD	97	Contracting Cmd
Leach, Kim C.	QM	97	Contracting Cmd
Lewis, Milton K.	OD	97	Contracting Cmd
Light, Thomas W.	AV	51	Special Proj Office 132
Macklin, Philip D.	AD	51	Extended Air Defense Testbed
Maxwell, Jody A.	AD	51	Longbow Hellfire
McKaig, Tim R.	AD	51	Fwd Area Air Def Ground Based Radar
Menyhert, Carl F.	SC	51	Single Channel Ground Airborne Radio
Miller, Gregory S.	QM	97	Contracting Cmd
Modin, James M.	EN	51	Standard Integrated Cmd Post Sys
Mouras, Theodore P.	MI	51	Def Sys Info Network Sys Integ Proj
Naudain, James C.	FA	51	Bradley Fire Support Vehicle
Newberry, Tommie E.	AD	51	Stinger Block I
Parker, Christopher J.	CM	51	Smoke
Perrins, Michael T.	AD	51	Theater Area Air Def Proj GBR
Petty, Frank S.	AV	97	Contracting Cmd
Reyenga, Robert L.	FA	53	Software Development Cmd
Reynolds, Robert R.	AD	51	Army Tact Msl Sys Block II
Short, Patrick C.	SC	51	Joint Tactical Info Distribution Sys
Sutton, Earl II	AD	51	Improved Target Acq Sys
Tegen, Carl M.	SC	97	Communications Mgt Sys
Thomas, Dwight E.	OD	97	Contracting Cmd
Weinzettle, John P.	AD	51	Enhanced Pos Location Pos Reporting Sys
Weishar, Doyle J.	FI	53	Software Development Cmd

Lieutenant Colonel Promotions

Congratulations to the following Army Acquisition Corps officers selected for promotion to lieutenant colonel by the FY 95 Promotion Board.

Alford, Kenneth L.	AG	53
Anderson, Sara F.	FA	53
Andrews, Kristopher L.	AV	97
Armour, David T.	FA	51
Baker, George R. II	EN	51
Barber, Jesse L.	FA	53
Barner, Franchestee J.	AG	53
Beatty, Robert J.	FA	51
Bianca, Damian P.	FA	51
Bianco, Stephen G.	FA	97
Bornick, Bruce K.	MI	51
Boshears, Steven R.	QM	97
Bowman, Michael	FA	53
Briggs, Ralph W.	AR	51
Brokaw, Nina L.	CM	51
Brown, Ronnie L.	SC	51
Buck, Stephen D.	AR	53
Burke, John D.	SC	53
Byrnes, Ronald B. Jr.	SC	53
Byus, David L.	AV	51
Chin, Ming G.	CM	97
Clark, David A.	FA	97
Clemons, John L. Jr.	EN	97
Cocker, Louis F. III	QM	51
Coleman, Gifford	AD	53
Conley, Joe E.	QM	97
Cotter, Gerald J.	QM	51
Courtney, Edwin L.	IN	51
Crosby, William T.	AV	51
Crump, Leonard A. Jr.	OD	53
Davis, Diana L.	AV	97
Davis, Richard A.	AV	53
DeRobertis, Peter S.	AD	51
Dietrick, Kevin M.	SC	51
Dimitrov, George V.	AV	51
Dowling, Edmund A.	AR	51
Drummond, William T. Jr.	FA	53
Eledui, William E.	AD	51
Forrester, Patrick G.	AV	51
Fox, Steven G.	SC	51
Gault, Clovis G. Jr.	QM	51
Gavora, William M.	AV	51
Groller, Robert L.	AR	51
Grotke, Mark L.	AV	51
Grunwald, Arthur A.	FA	51
Gulac, Charlie C.	AD	51
Gusse, Sherry M.	AG	53
Hamilton, Harry S.	OD	51
Hammell, Robert J. II	SC	53
Hanify, Douglas J.	IN	51
Harchelroad, Joan L.	OD	53
Heckel, Jeffrey J.	AD	51
Heine, Kurt M.	AV	97
Hill, Monte R.	SC	51
Huff, Donald C.	AV	51
Ishmael, Lauren M.	SC	97
Jackson, Bonnie L.	IN	97
Jackson, Michele M.	AD	53
Janker, Peter S.	AR	53
Johnson, Dan A.	FA	51
Johnson, Eric J.	SC	53
Johnson, Michael V.	AR	51
Jones, Paul F.	AR	51
Jones, Donald E.	AR	51
Jones, Charles A. Jr.	AR	51
Jordan, Harold H. Jr.	IN	97
Kallam, Charles T.	IN	97
Kallighan, Martin T.	OD	51
Kastner, Patrick J.	AV	51
Kather, George R.	AR	51
Keller, Brian C.	OD	51
Kilpatrick, Brian R.	OD	97
Krause, Paul J.	OD	51
Larson, Steven W.	AG	53
Lebano, Tito N.	SC	53
Leyva, Gabriel F.	SC	53
Luedtke, Lloyd L.	IN	51
MacAllister, Craig M.	AD	51
Malto, Benson O.	IN	51
Mancuso, August R. III	IN	97
Martin, Edwin H.	FA	97
McBride, Teresa M.	FA	51
McMath, Michael L.	FA	97
McVeigh, Joseph W.	AV	51
Miller, Scott K.	OD	51
Mills, Ainsworth B.	QM	97
Mishkofski, Stephen T.	IN	51
Moran, Jerry L.	SC	53
Noonan, Kevin S.	AV	51
Nyquist, Roy A.	MP	97
Owens, John A. III	EN	51
Padgett, Michael G.	OD	97
Pallotta, Ralph G.	AV	51
Pecoraro, Joseph E.	CM	51
Peele, Loren D.	AV	97
Petrie, Charles R.	SC	53
Pharr, Michael D.	QM	97
Piersante, Michael P.	AV	51
Pierson, James R.	FA	51
Pollard, Richard D.	QM	53
Pope, Robin M.	AR	51
Post, Victoria A.	MP	53
Price, Nancy L.	SC	53
Ptaszynski, Daniel D.	SC	53
Rasmussen, Valerie A.	SC	53
Salesky, Mark E.	MP	51
Schmidt, Rodney H.	QM	97
Schwarz, Charles R. Jr.	AV	97
Skertic, Robert P.	FI	53
Sledge, Nathaniel H. Jr.	AR	51
Smith, Michael	AD	51
Smith, William J. II	IN	51
Snell, Reginald W.	IN	51
Spencer, Timothy G.	QM	97
Spilde, Randy D.	SC	51
Spiller, John M.	SC	51
Starkey, Loretta S.	OD	51
Strick, Donald E.	OD	97
Sutton, Ronald L.	OD	51
Tabler, Anthony D.	SC	51
Tanner, Albert B.	IN	51
Taylor, Vernon Sr.	OD	97
Thorensen, David P.	SC	51
Tiede, Corwyn B.	IN	51
Tudor, Rodney E.	AD	51
Turner, John N.	OD	97
VanHorn, Thurston	FA	51
Vaughn, Mark M.	IN	51
Veney, David W.	AR	51
Waters, Henry J.	EN	51
Webber, Kurt E.	IN	51
Weiland, Peter L. Jr.	EN	51
Whitfield, Charles N.	IN	51
Whittaker, David F.	SC	97
Wiley, Anthony G.	EN	51
Young, Gary R.	OD	51
Young, Daniel D.	OD	51

AAC PROPONENCY BRANCH

Identified below are your Army Acquisition Corps (AAC) proponency POCs. Responsible to the assistant secretary of the Army for research, development and acquisition (ASA) (RDA), they develop Army Acquisition Corps policy and regulations, acquisition career paths, mandatory acquisition training and certification standards (DOD 5000.52-M) and the military and civilian acquisition position lists (MAPL & CAPL). Individual lead areas of responsibility and e-mail addresses are listed below:

LTC Mark Jones
Chief, AAC Proponency

MAJ(P) Bill Gavora
FA 51 Proponency

LTC Earl Rasmussen
FA 53 Proponency

MAJ Vicki Diego-Allard
FA 97 Proponency

Thomas Drinkwater
Civilian Proponency

DoD 5000.52-M	Program Management (A)	Test & Evaluation (T)	Comms-Computers (R) SPRDE (S)	Contracting (C) Acquisition Logistics (L) Manufacturing/ Production (G)	Business, Cost & Finance (K) Quality Assurance (H)
MAPL & CAPL	MAPL Long Range Plan	FA 51 Positions MAPL Review Board	FA 53 Positions Single Functional Area	FA 97 Positions	CAPL
Education & Training	Naval Post Grad School PM Courses	Test & Evaluation Courses	MAM Software Courses	TWI/GRAD Contracting Courses	ACTEDS
MACOMs	PEOs	TRADOC/Battle Labs	ISC, DISC4, ARL	DLA, AMC & FORSCOM	All

E-MAIL ADDRESSES

			PHONE DSN 655/(703) 805
LTC Mark Jones	Chief, AAC Proponency	jonesm@belvoir-aim1.army.mil	Ext 4061
MAJ(P) Bill Gavora	FA 51 Proponency	gavorab@belvoir-aim1.army.mil	Ext 4060
LTC Earl Rasmussen	FA 53 Proponency	rasmusse@belvoir-aim1.army.mil	Ext 4060
MAJ Vicki Diego Allard	FA 97 Proponency	diegoalv@belvoir-aim1.army.mil	Ext 4059
Mr. Thomas Drinkwater	Civilian Proponency	drinkwat@belvoir-aim1.army.mil	Ext 4059
			Fax Ext: 4163

CAREER DEVELOPMENT UPDATE

On the Horizon . . .

• **Fiscal Year (FY) 1997 Military Acquisition Position List (MAPL).** Planning is in progress for the FY 97 MAPL, which began with a "heads up" message to all major commands (MACOMs) in August 1995. This message also addressed shortcomings in the FY 96 MAPL—primarily poorly written position descriptions. We are in the process of automating the MAPL request forms (data will be extracted from the MAPL database) so that the FY 97 MAPL Review Board (February 1996) should be paperless. MACOMs will be required to provide their MAPL input via electronic media. The Army Materiel Command and the Defense Logistics Agency already did this for FY 96.

• **Single Functional Area.** The single functional area concept approved by LTG William H. Forster and LTG Theodore G. Stroup is being internally staffed within Headquarters, Department of the Army. The Military Acquisition Management Branch has already reorganized under this concept. However, Army Regulation 611-101/the U.S. Total Army Personnel Command's (PERSCOM's) Army-wide staffing of this change to the table of distribution and allowances and modified table of organization and equipment positions is a lengthy process targeted for completion late in FY 97.

• **Acquisition Category (ACAT) III PM Course.** The first offering of this two-week course is tentatively scheduled for March 1996. The course is modeled after the Executive PM Course for ACAT I/II PMs/deputy PMs (DPMs), is oriented on "lessons learned," and will be individually tailored to prepare ACAT III PM/DPMs for the specific responsibilities of their upcoming assignments.

• **Advanced PM Course (APMC).** The pilot 14-week APMC (PMT 302) is over! Starting with September 1995, all students attending the PM course at DSMC will go through the 14-week PMT 302. Initial feedback is that PMT 302 was more difficult than the 20-week PMT 301 Course and like any new course of this size, produced numerous recommended changes. As the Army Acquisition Corps proponent, we represent the Army on the DOD Board which sets the requirements for PMT 302 (not to be confused with DSMC's execution role). We would greatly appreciate feedback from any of you lucky PMT 302 pilot graduates.

• **AAC World Wide Web Home Page.** The Office of the Deputy Director, Acquisition Career Management, U.S. Army Acquisition Corps, announces its World Wide Web HomePage. The Office of the Director of Information Systems for Command, Control, Communications and Computers is hosting the page on the same server that the U.S. Army HomePage resides on. To access the AAC HomePage, connect to "http://www.army.mil/aac-pg/aac.htm".

Some of the information available on the new page is as follows:

• **Acquisition positions:** Military Acquisition Position List (MAPL).

• **Career development (military and civilian):** PERSCOM—Military Career Model, Career Fields/Certification; Civilian—Career Model/Career Fields/Certification;

• **Publications:** *Army RD&A*, articles, and professional reading.

• **Education and Training:** conferences and symposia; Training with Industry (TWI); continuing education; Advanced Civil Schooling, including degree codes, curriculum, and research projects; and Defense Acquisition University (DAU), including new courses (From DAU) course catalog (from DAU) software acquisition management; and the Information Resources Management College (IRMC).

• **AAC Updates:** highlights of ongoing and future AAC proponency actions with the Office of the Assistant Secretary of the Army (Research, Development and Acquisition).

More information will be added over time. Please direct your questions, comments, and suggestions to LTC Earl Rasmussen at "rasmusse@belvoir-aim1.army.mil".

For technical help/assistance, contact the U.S. Army HomePage Webmaster at "webmaster@pentagon-1dms2.army.mil".

A special note of thanks goes to CDT Matt Iram, West Point Class of 1996, for his efforts in the design and development of the AAC HomePage. The results speak for themselves! The AAC page looks great . . .

For comments and/or further information on any of the above subjects, contact the appropriate AAC proponency officer within the Office of the Assistant Secretary of the Army (Research, Development and Acquisition).

Army Acquisition Workforce/Corps and Reserve Component Integration

The first increment of U.S. Army Reserve (USAR) officers was integrated into the Army Acquisition Workforce/Corps (AAW/AAC) in May 1995. Approximately 400 USAR officers received their letters and certificates of acceptance from LTG William H. Forster, then director of the Army Acquisition Corps (now retired), on May 18, 1995.

Although the total AAW/AAC personnel requirements are currently being identified, it is estimated that approximately 1,100 USAR officer positions exist within the total USAR force structure. These officer positions include the functional areas of 51 (research, development and acquisition); 53 (systems automation), and 97 (contracting and industrial management).

Moreover, both AAW and AAC positions exist on official authorization documents within the USAR and include a variety of categories, i.e., troop program units (drilling reservists), individual mobilization augmentees, and active guard/reserve programs.

A three-member review panel was assembled at the U.S. Army Reserve Personnel Center (ARPERCEN) in St. Louis, MO, on March 28, 1995. The members were selected from the Office of the Deputy Director for Acquisition Career Management. Follow-on panels to review and certify USAR officers are currently planned for the third quarter of each subsequent fiscal year.

USAR officers interested in applying for consideration in the AAW/AAC should contact MAJ Neils Zussblatt at DSN 892-2139 or commercial (314) 538-2139.

FA 53 Article

The second part of LTC Earl Rasmussen's article on Functional Area 53 will be published in the November-December 1995 issue of *Army RD&A*. The first part appears in the July-August 1995 issue.

NOTICE FOR ARMY ACQUISITION CORPS CIVILIANS

If you are a member of the Army Acquisition Corps and now receive *Army RD&A* at your home address, you *must* notify the Total Army Personnel Command if you change your address. Address changes may be mailed to Joe Kunze at Commander, U.S. Total Army Personnel Command, ATTN: TAPC-OPB-B (Joe Kunze) 200 Stovall Street, Alexandria, VA 22332-0411. Address changes may also be faxed to Joe Kunze at DSN 221-8111 or commercial (703) 325-8111. Or, E-mail your address changes to (TAPCOPBB@Hoffman-emh1.army.mil).

37 Graduate From MAM

On May 19, 1995, 37 students graduated from the Materiel Acquisition Management (MAM) Course at the U.S. Army Logistics Management College (ALMC), Fort Lee, VA. Keith Charles, deputy assistant secretary for plans, programs, and policy, Office of the Assistant Secretary of the Army (RDA), Washington, DC, gave the graduation address and presented diplomas. The Distinguished Graduate award was presented to CPT Steven Kihara, U.S. Army Airworthiness Qualification Test Directorate, Edwards AFB, CA.

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 placed on developing mid-level managers so that they can effectively participate in the management of the acquisition process.

Army Research Lab Staffers Get Research Fellowships

Leo DiDomenico, Physical Sciences Directorate, Ft. Monmouth, NJ, and Dr. David Rosen, Battlefield Environment Directorate, White Sands Missile Range, NM, both of the Army Research Laboratory (ARL), are recipients of Army Research and Study Fellowships.

The Army funds five fellowships annually. They are intended to support study and research on selected projects relevant to the Army's mission; develop and increase the use of the best talents among Army career civilians; and support creativity of selected individuals.

Recipients will devote 6-12 months to full-time study or research in connection with a specific project they have proposed. The project must have high potential value to the Army and must provide a research opportunity that could not be accomplished on the job or financed by other means with Department of the Army. Projects are accomplished through study in residence at a college or university or in other comparable educational or research settings.

DiDomenico, an electronics engineer, has been with the Physical Sciences Directorate for four years. He will perform research on monolithic circuits that control electro-magnetic fields with active devices and electrically small apertures. The research has the potential to support digital communications, conformal radar and munitions sensors.

Other potential Army applications include combat identification, RF identification tagging of valuable resources and remote sensing of enemy assets. Potential commercial applications support high frequency electromagnetic control technology for vehicle radar systems in the commercial automotive industry. DiDomenico will be attending the University of Michigan.

Rosen, a physicist, has been with the Battlefield Environment Directorate for more than five years. He will perform optical research (phase modulated fluorescence spectroscopy) to detect and identify potentially harmful airborne biological materials and to measure fluorescence lifetimes. This research will contribute to ARL programs in point detection of chemical-biological agents, pollution compliance and prevention and medicine. He will attend Duke University.

PERSCOM Notes . . .

The military board schedule for fiscal year (FY) 1995 is as follows (some dates are tentative and are for planning purposes only):

CGSC, Army	Aug 1 - Sep 1, 1995
COLONEL, AR	Aug 15 - Sep 9, 1995

The board schedule for FY 96 is as follows (all dates are tentative and for planning purposes only):

Army Acquisition Accession	Oct 16 - 20, 1995
LTC Army	Oct 31 - Nov 24, 1995
Product Manager and AAC Command	Dec 5 - 15, 1995
Project Manager and AAC Command	Jan 3 - 12, 1996
MAJ Army	Mar 26 - Apr 26, 1996
SSC Army	Apr 16 - May 10, 1996

Assignment officers have received many questions regarding how awards are posted to an officer's fiche. The following serves to answer this perplexing question:

Army Achievement Medal (AAM) through Meritorious Service Medal (MSM) are all done on DA Form 638, which replaces the 638-1. This form is only filed on the service fiche in the general administration section when the award is downgraded or disapproved. Therefore, if an AAM through MSM is not downgraded or disapproved, *ONLY* the certificate will be filed in the official military personnel file C&D (complimentary and disciplinary) section. For Legion of Merit and above, both the permanent orders and certificate are filed.

PERSCOM On-Line

Personnel can now access general PERSCOM information via the world wide web (provided you have 'browser' software). This is provided as a tool which will give its users useful, timely and up-to-date information relative to their branch. Anyone interested in using this service should use the following address: http://www-perscom.army.mil.

Acquisition Mandatory Training Update

The Director of Acquisition Career Management (DACM) has approved the transfer of operational support of the DAU Mandatory Acquisition Training Program effective with fiscal year 1996. The support will be transferred from the U.S. Total Army Personnel Command (PERSCOM) to the U.S. Army Research, Development, and Acquisition Information Systems Activity (RDAISA).

On or about July 17, 1995, RDAISA began approving applications in the Army Training Requirements and Resources System (ATRRS) for FY96. Current processes, except those listed below, will remain the same; only the operational support area will change. New points of contact will be entered in ATRRS by the ATRRS program manager. RDAISA POCs are as follows:

Helen Matthews, DSN 931-9557, Commercial (540) 731-3557
Larry Higginbotham, DSN 931-9587, Commercial (540) 731-3587
E-mail: aacts@radford-emh1.army.mil
URL: http://www.ado.army.mil/sarda (after Sept. 1, 1995)

The requirement to submit multiple DD Form 1556s for a course on different dates is not required beginning in FY96. We do ask, that on the application, alternate dates be provided. Every effort will be made to schedule classes as requested. If alternate dates are not provided and the requested class date is not available, the applicant will be placed in the next available class.

Please enter your applications in ATRRs as soon as possible; but, not later than 60 days prior to class start date. RDAISA will approve and provide DAU travel and per diem funds.

Organizations with approved on-sites have been notified and were required to submit applications into ATRRs by August 15th. The applications will be approved as soon as possible. Once the application is in ATRRs, an individual will not be allowed to attend a like resident course.

Please refer questions to Carolyn Hinson, DSN: 655-4162; commercial (703) 805-4162, or e-mail HINSONC@BELVOIR-AIM1.ARMY.MIL

LOGPARS Windows Software Available

The Army's Logistics Planning and Requirements System (LOGPARS) has been released as a Windows application. The LOGPARS is a software expert system tool designed to assist in the preparation of Integrated Logistic Support (ILS) documentation and program management. The latest version of LOGPARS includes the following modules: Acquisition Strategy Advisor; ILS Statement of Work (SOW); Integrated Logistic Support Plan; Materiel Fielding Plan; and Transportability Report/Plan.

In conjunction with the release of LOGPARS Windows, you can access the LOGPARS World Wide Web (WWW) site. A reference library is available which contains numerous Army regulations and other guidance documents dealing with acquisition logistics. If you have an Internet connection, use a World Wide Web browser (mosaic, Netscape, etc.) to go to the LOGPARS WWW home page at hhtp://136.205.107.40

Tri-Service implementation with Service-specific tailored versions of LOGPARS have been developed for the Navy (NAVAIR, NAVSEA, SPAWAR) and Air Force. A copy of the LOGPARS software can be obtained by calling the LOGPARS team members at DSN 645-9885 or commercial (205) 955-9885. The LOGPARS software is currently restricted for government use and will not be provided to contractors unless they are on a valid contract.

Army-NASA Sponsor Tech Transfer Meeting

The Army Research Laboratory's Vehicle Structures Directorate recently sponsored its third Technology Transfer meeting with NASA Langley Research Center and the Aviation Troop Command's Joint Research Program Office.

This meeting is held every three years and attracts senior-level industry management as well as recognized experts in the field. More than 50 presentations were made during the three-day meeting to a total of 58 attendees. Participants included representatives of U.S. military helicopter manufacturers, the Army Research Office, the Army Tank-automotive and Armaments Command, the Navy, the Army Missile Command, the Army-sponsored rotorcraft Centers of Excellence, and several universities.

The purpose of the meeting was to encourage cooperative research and brief the attendees on completed, current, and planned research work at Langley in structural mechanics, vehicle loads and dynamics and rotorcraft aeromechanics.

The Army and NASA have a special working arrangement which encourages integration, teamwork, mutual respect, and shared expertise. The availability of industry managers and chief scientists offered a rich opportunity for exchange. They were especially receptive to the use of Cooperative Research and Development Agreements (CRDAs) to maintain and extend productive research through the 90s. The Vehicle Structures Directorate hopes to forge an additional half dozen or more CRDAs as a result of the meeting.

CAN YOU HELP?

The 2d Battalion, 29th Infantry Regiment, in conjunction with the Army Research Institute (ARI), has begun a study to determine if the M16A2 zeroing procedures outlined in FM 23-9 are in need of revision. Preliminary results indicate that a M16A2 rifle, when zeroed at 25 meters IAW FM 23-9, will shoot high at a 300 meter target when aimed center of mass. The 2-29th would appreciate any information *Army RD&A* readers may have on this subject. Specific topics are:

- Information about why the 25 meter zero standard was adapted for the M16A2.
- Any modifications to FM 23-9 zeroing procedures being used in the field to address the tendency of a properly zeroed M16A2 to shoot high at the 300 meter target when aimed center of mass.
- Studies concerning the trajectory of the M16A2.
- Studies concerning the most common engagement ranges in recent U.S. Combat Operations.
- Problems with the M16A2 rear sight.
- Comparisons between U.S. Army and USMC M16A2 zeroing procedures.

Anyone with information which may be of value to this study is invited to contact the 2-29th at DSN 784-6922 or commercial (706) 544-6922. Points of contact are MAJ Dougherty and MSG Sump.

Book Reviews

If you have read a book which you feel may be of special interest to the RD&A community, please contact us. The editorial staff welcomes your literary recommendations. Book reviews should be no longer than two double-spaced typed pages. In addition, please note the complete title of the book, the author's name, and your name, address and commercial and DSN phone numbers. Submit book reviews to:

DEPARTMENT OF THE ARMY
ARMY RDA
9900 BELVOIR RD SUITE 101
FORT BELVOIR VA 22060-5567
Phone: (703) 805-4215; DSN 655-4215
Fax: (703) 805-4218; DSN 655-4215.

Technology Exchange: A Guide to Successful Cooperative Research and Development Partnerships

Battelle Press, 1995, edited by John Lesko and Michael Irish

Reviewed by CPT Audie Hittle, chief of the Technology Transfer Branch at the U.S. Air Force Electronic Systems Center, Hanscom AfB, MA.

Immediate research and development cost savings, technology investment leveraging and exclusive commercial exploitation opportunities are key reasons visionary leaders and innovative managers in government and industry will read this book. *Technology Exchange* reflects the practical and intellectually stimulating aspects of cooperative research and development (R&D) between the U.S. federal laboratories, the public sector, and private industrial organizations. Advice, guidance and insight are offered for those daring enough to explore the promise of tapping into billions of dollars worth of federally funded research. *Technology Exchange* alerts the reader to opportunities for increasing return-on-investment (ROI), sharing R&D costs, and gaining access to unique facilities, equipment and human resources.

The book is a thoughtful compendium of the "best practices" and "lessons learned" representing the profound insights collected from top technology management and transfer professionals nationwide. *Technology Exchange* explores the fundamental changes taking place in the area of U.S. government-industry interaction as a result of the dynamic global economic competitiveness issues. With an emphasis on the present environment for technology partnerships—which are negotiated at an ever increasing rate internationally—the book surveys the perspectives of the key participants involved. Barriers to effective communications are identified. Cross-cultural considerations and imperatives are discussed. Finally, recommendations are made for overcoming the barriers through good communications and greater understanding of the participants' perspectives.

Recognizing the distinctive needs of the various cooperative R&D partners, *Technology Exchange* examines the question of whether government-industry cooperative R&D is right for your organization. The book highlights a revolutionary new mechanism, known as a Cooperative Research and Development Agreement or CRDA, as the focus of the technology exchange process. The CRDA is depicted as the most simple, flexible and yet powerful mechanism which has ever existed for stimulating technology exchange and innovation through government-industry interaction. *Technology Exchange* addresses the critical issues associated with pursuing CRDA efforts as a one-time opportunity or corporate strategy.

A third of the book is devoted to understanding and using personal interfaces, networking and the CRDA process. A model CRDA is provided, as an attachment, which is instrumental in helping the reader understand the simplicity and intricacies of negotiating the technical work plan and navigating the coordination path within their own organizations and with their external partner(s).

Technology Exchange concludes with an insightful chapter on how to achieve success. Individual and organizational motivation, incentives and metrics are considered in a linked-system analysis of a successful cooperative R&D program. The role and responsibilities of leadership are discussed and important observations dealing with joint strategic planning, vision and integrated investment strategies are cited.

Technology Exchange is a concise summary of keen observations and essential insights gleaned by a team of diligent researchers and analysts at both the Economic Strategy Institute and the Battelle Memorial Institute. For technology managers, technology transfer practitioners, or those just embarking on the cooperative R&D adventure, the book will prove to be an interesting read and a valuable reference.

Peacekeeper

By MG Lewis MacKenzie Harper Collins Publishers Ltd.

Reviewed by Joe Sites, vice president and director of defense systems, BRTRC, Fairfax, VA.

The May-June 1995 issue of *Army RD&A* included my article "Peacekeeping ... An Additional Army Mission." As that issue was being put to bed, I completed reviewing an outstanding book on peacekeeping, *Peacekeeper* by MG Lewis MacKenzie of Canada. Although I felt that I found support for my article in MG MacKenzie's book, he made several specific points which deserve close consideration by the U.S. military.

It would be difficult to identify a soldier with more experience in peacekeeping. MacKenzie began his peacekeeping activities as a 23-year-old lieutenant in Gaza in 1963 and, in 1992, he completed his last peacekeeping assignment as chief of staff, United Nations Protection Force in the former Yugoslavia. The peacekeeping wisdom which was gained by MacKenzie during his career should be considered by all of our authorities whenever they are planning or even contemplating peacekeeping

BOOKS

operations. In his very last chapter titled "Message to America—'Stay Off the Front Lines of Peacekeeping'," he provides, in his most direct way, some very valuable advice. MacKenzie emphasizes that there is a distinct difference in United Nations operations undertaken under Chapter 7 of the charter (enforcement operations), and Chapter 6 (peacekeeping). This distinction often does not appear to be clear in the media and most likely it is not clear in the planning of some operations. The author praises the initial actions in Somalia which were taken by the United States under Chapter 7, however, he points out that the transition to peacekeeping operations under Chapter 6 was a major failure. The author felt that the blame, in large part, was an inadequate U.N. force which had to resort to requesting the retention of some U.S. forces.

MacKenzie feels that the use of U.S. forces on the front line of Chapter 6 operations (peacekeeping) is a mistake because each contending side will do whatever it can to bring the United States into active support of its side. In a short summary, MacKenzie stated: "The problem is that every country wants America on its side these days, and the best way to do that is to convince Americans that the other side harbours the 'bad guys'." Because of this condition, MacKenzie feels that "It is thus unfair to send U.S. soldiers into Chapter 6 peacekeeping missions since they face a higher degree of risk than any other army. However, in Chapter 7 intervention, or enforcement operations, this concern is unnecessary. With their hands untied and adequate or abundant resources to do the job, the highly trained U.S. Army and its partners in the Navy, Air Force and Marines are well suited to take on such missions."

Despite his warning to stay off the front lines of peacekeeping, the author does emphasize however that in peacekeeping operations, the United States can provide valuable assistance in the fields of intelligence and logistics and through persuasion of other countries to do their share. MacKenzie concludes that: "It is not the United States' responsibility to police the world for the U.N. when the going gets rough. But, regrettably, it could become America's destiny by default if the U.N. does not adapt to its new and challenging role."

In addition to sage advice, *Peacekeeper* provides a clear insight into what it takes to run a peacekeeping operation, valuable detail on the problems in the former Yugoslavia, and an appreciation for the dedication to peace of a true citizen of the world, MG Lewis MacKenzie.

PERSONNEL

Tilelli Becomes FORSCOM Commander

GEN John H. Tilelli Jr., former vice chief of staff, U.S. Army, has assumed command of the U.S. Army Forces Command, Fort McPherson, GA, succeeding GEN Dennis J. Reimer, who is the new Army chief of staff.

With more than 32 years of active military service, Tilelli served previously as: Army deputy chief of staff for operations and plans; Army assistant deputy chief of staff for operations and plans; commanding general, 1st Cavalry Division, Fort Hood, TX; commanding general 1st Cavalry Division, Desert Storm; commanding general, Seventh Army Training Command, U.S. Army Europe, Germany; and chief of staff, VII Corps, U.S. Army Europe, Germany.

Tilelli holds a B.S. degree in economics from Pennsylvania Military College, and an M.A. degree in administration from Lehigh University. His military education includes The Armor School Basic and Advanced Courses, the U.S. Marine Corps Command and Staff College, and the U.S. Army War College.

Tilelli's military honors include the Distinguished Service Medal with two Oak Leaf Clusters (OLC), the Legion of Merit, the Bronze Star Medal with "V" Device and two OLC, the Meritorious Service Medal with three OLC, and the Army Commendation Medal with two OLC.

Griffith Succeeds Tilelli As Army Vice Chief of Staff

GEN Ronald H. Griffith, former Army inspector general, became U.S. Army vice chief of staff in early June, succeeding GEN John J. Tilelli Jr., who is now commander of the U.S. Army Forces Command, Fort McPherson, GA.

Griffith, who has more than 34 years of active military service, has served previously as: commanding general, 1st Armored Division, U.S. Army Europe and Seventh Army, Germany; commanding general, 1st Armored Division, Desert Storm, Saudi Arabia; special assistant to the commander-in-chief, U.S. Army Europe and Seventh Army, Germany; assistant division commander, 1st Cavalry Division, Fort Hood, TX; and deputy director for operations, readiness and mobilization, Office of the Deputy Chief of Staff for Operations and Plans, U.S. Army, Washington, DC.

Griffith holds a B.S. degree in physical education from the University of Georgia, and an M.S. degree in public administration from Shippensburg State College. His military education includes the Medical Service Corps Officer Basic Course at the Medical Field Service School, the Advanced Course at the Armor School, the U.S. Army Command and General Staff College, and the U.S. Army War College.

Griffith's military honors include the Distinguished Service Medal, the Legion of Merit with two Oak Leaf Clusters (OLC), the Bronze Star Medal with "V" Device and five OLC, the Purple Heart, the Meritorious Service Medal with OLC.

Milton Takes Over as Research and Technology Deputy

Dr. A. Fenner Milton, former director for technology in the Office of the Assistant Secretary of the Army for Research, Development and Acquisition (OASARDA), is the new deputy assistant secretary of the Army for research and technology, OASARDA, and chief scientist of the Army. He succeeds George T. Singley who is now the deputy director of Defense research and engineering.

PERSONNEL

Prior to joining federal service in 1990, Milton served for five years as manager of the Electro-Optics Laboratory at the General Electric Company in Syracuse, NY. From 1984-85, he was vice president for policy and operations with the Roosevelt Center for American Policy Studies. Previous to 1984, Milton was branch head of the Electro-Optics Technology Branch of the Optical Science Division at the Naval Research Laboratory, also in Washington, DC.

A graduate of Harvard University with a Ph.D. in applied physics, Milton serves as chairman of the Infrared Information Symposium and has published extensively on integrated optics and focal plane arrays. Additionally, he is principal author of *Making Space Defense Work; Must The Superpowers Cooperate*—a technical and policy analysis of strategic defense.

Hadley Succeeds Hanna as Reserve Director

COL Peter A. Hadley has succeeded COL William F. Hanna as the director of reserve affairs, Office of the Assistant Secretary of the Army (Research, Development and Acquisition) (OASA(RDA)). Hadley transferred from the Office of the Assistant Secretary of Defense for Reserve Affairs, where he was the assistant director of manpower programs for the deputy secretary for manpower and personnel. Hadley also served earlier tours as chief, Investigations and Assistance Branch, National Guard Bureau Inspector General; emergency preparedness staff officer, OASA(RDA); and various command and staff assignments in the California National Guard. Hanna will leave active duty Sept. 30, 1995.

CONFERENCES

Applied Statistics Conference

The Army Conference on Applied Statistics will be held Oct. 18-20, 1995, at the Army Research Laboratory Headquarters in Adelphi, MD. Sponsored by the Army Research Laboratory, the conference provides a forum for technical exchange of information on statistical applications. Attendees include DOD personnel and their university and industry associates. A special-topic tutorial will precede the conference on Oct. 16-17. For more information, contact Barry Bodt at U.S. Army Research Laboratory, ATTN: AMSRC-SC-S, APG, MD 21005-5068, or call (410) 278-6659, or send e-mail messages to babodt@arl.army.mil.

Battery Waste Management Seminar

The Seventh International Seminar on Battery Waste Management, sponsored by Dr. Sumner P. Wolsky, Ansum Enterprises Inc., will be held Nov. 6-8, 1995 in Deerfield Beach, FL. This seminar will continue the discussion of issues related to the management of battery wastes. The discussion will cover manufacturing and user wastes of the important primary and secondary battery systems with the focus on lead acid, nickel cadmium, metal hydride, alkaline manganese, lithium and lithium ion and others such as sodium, sulfur and polymers, potentially important to use in electric vehicles.

The seminar will bring together management, engineers, marketing and other individuals from battery manufacturers, material suppliers, users, waste handlers, recyclers, equipment companies, government regulatory agencies, private environmental organizations, attorneys and others from around the world in a unique forum designed to educate interested groups and to facilitate the discussion of this important subject. This seminar can also serve as a training program for newcomers to the field. Space is available for exhibitors.

For the seminar brochure, contact Florida Educational Seminars Inc., 1900 Glades Road, Suite 358, Boca Raton, FL 33431; (407) 338-8727; fax (407) 338-6887. For technical and program details, contact Dr. Sumner P. Wolsky, 1900 Cocoanut Road, Boca Raton, FL 33432; (407) 391-3544; fax (407) 750-1367.

Operations Research Symposium Scheduled for October

The 34th Army Operations Research Symposium (AORS XXXIV) will be held Oct. 10-12, 1995, at the U.S. Army Logistics Management College (ALMC), Fort Lee, VA. The theme of the symposium is "Force XXI: Changing the Way We Change."

The symposium provides a forum for the exchange of information among the U.S. Army's analysts. AORS XXXIV departs from the previous format by emphasizing more participative working groups and fostering discussions on what types of analyses should be retained, modified, or replaced to best support the decisions to be made in shaping Force XXI. Abstracts are invited for either papers or other forms of presentations (such as case histories or briefings).

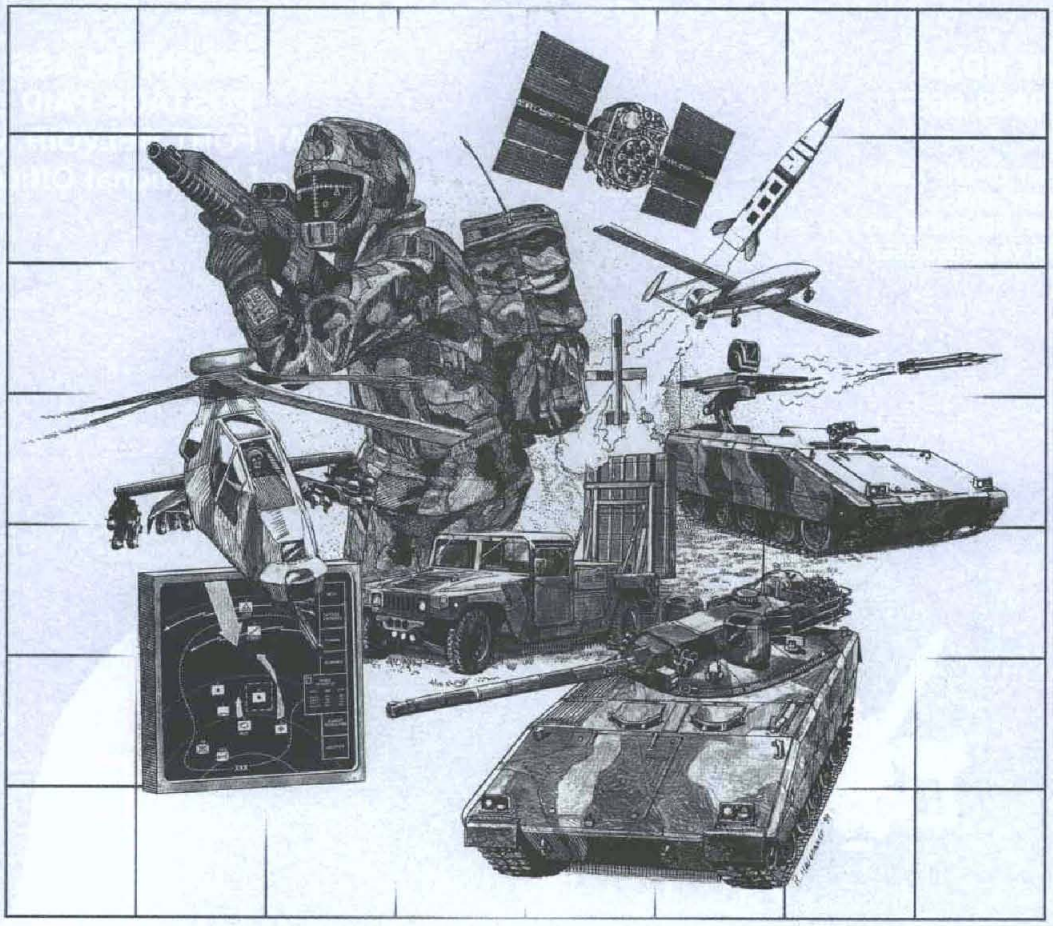
The Operational Test and Evaluation Command is sponsoring this symposium, which will be chaired by Dr. Henry Dubin, the command's technical director. The U.S. Army Combined Arms Support Command and Fort Lee, and ALMC will serve as co-hosts.

Attendance is limited to 300 invitees. For additional information, contact the symposium coordinator at: Commander, U.S. Army Operational Test and Evaluation command, ATTN: CSTE-MP, Park Center IV, 4501 Ford Avenue, Alexandria, VA 22302-1458 or call Fred McCoy at commercial (703) 756-0854, or DSN 289-1818.

Multispectral Missile Seekers Conference

The Research, Development and Engineering Center (RDEC) at the U.S. Army Missile Command (MICOM), in cooperation with the U.S. Army Space and Strategic Defense Command, the Army Materiel Command's U.S. Army Research Office, the U.S. Army Communications-Electronics Command, the U.S. Air Force Wright Laboratories, and the U.S. Naval Weapons Center, will sponsor a conference on "Multispectral Missile Seekers" Nov. 1-2, 1995 at the Redstone Arsenal Sparkman Center Auditorium, Huntsville, AL.

The objectives of this conference are to provide a forum for the Department of Defense guidance and control community to identify the issues and research opportunities in the development and acquisition of multispectral missile seekers, and to establish the foundation for additional cooperative efforts between the military Services and industry. The multispectral seeker is one of the key business areas of the MICOM RDEC, and is included in a cooperative program with Japan. The participation of government, academia, and industry leaders at the conference is expected to make a significant contribution to the MICOM RDEC Strategic Plan. For more information, contact Ginger Demirjian at (205) 895-6343 extension 277, or fax (205) 895-6089.



20th Army Science Conference Call For Papers

A call for summaries of papers proposed for presentation at the 20th Army Science Conference, June 25-27, 1996, has been issued by the deputy assistant secretary of the Army for research and technology. Department of the Army civilian and military scientists and engineers are invited to submit, by Nov. 1, 1995, *unclassified,* two-page summaries that describe the relevance and content of their proposed paper.

The conference, which will be held in Norfolk, VA, is sponsored by the assistant secretary of the Army (research, development and acquisition). The theme is "Science and Technology for Force XXI."

Papers must represent original work performed by Army civilian or military scientists or engineers. Army authors may submit papers in collaboration with colleagues in other agencies, academia or industry; however, only Army personnel may make presentations.

Summaries should be prepared in accordance with the following format:

- Use plain white paper (8½" by 11") with 10 point type.
- Type the title in capital letters, approximately one inch from top of page, followed by the author(s) and their affiliation. Each line in the heading is centered.
- Double space between the heading and summary.
- Single space the summary.

Submit summaries to: 20th Army Science Conference, 16441 Benns Church Boulevard, Smithfield, VA 23430; fax (804) 357-5108.

Additional questions regarding summaries and papers should be directed to Catherine Kominos, OASARDA, telephone (703) 697-3558, DSN 227-3558; fax (703) 695-3600, DSN 225-3600.

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