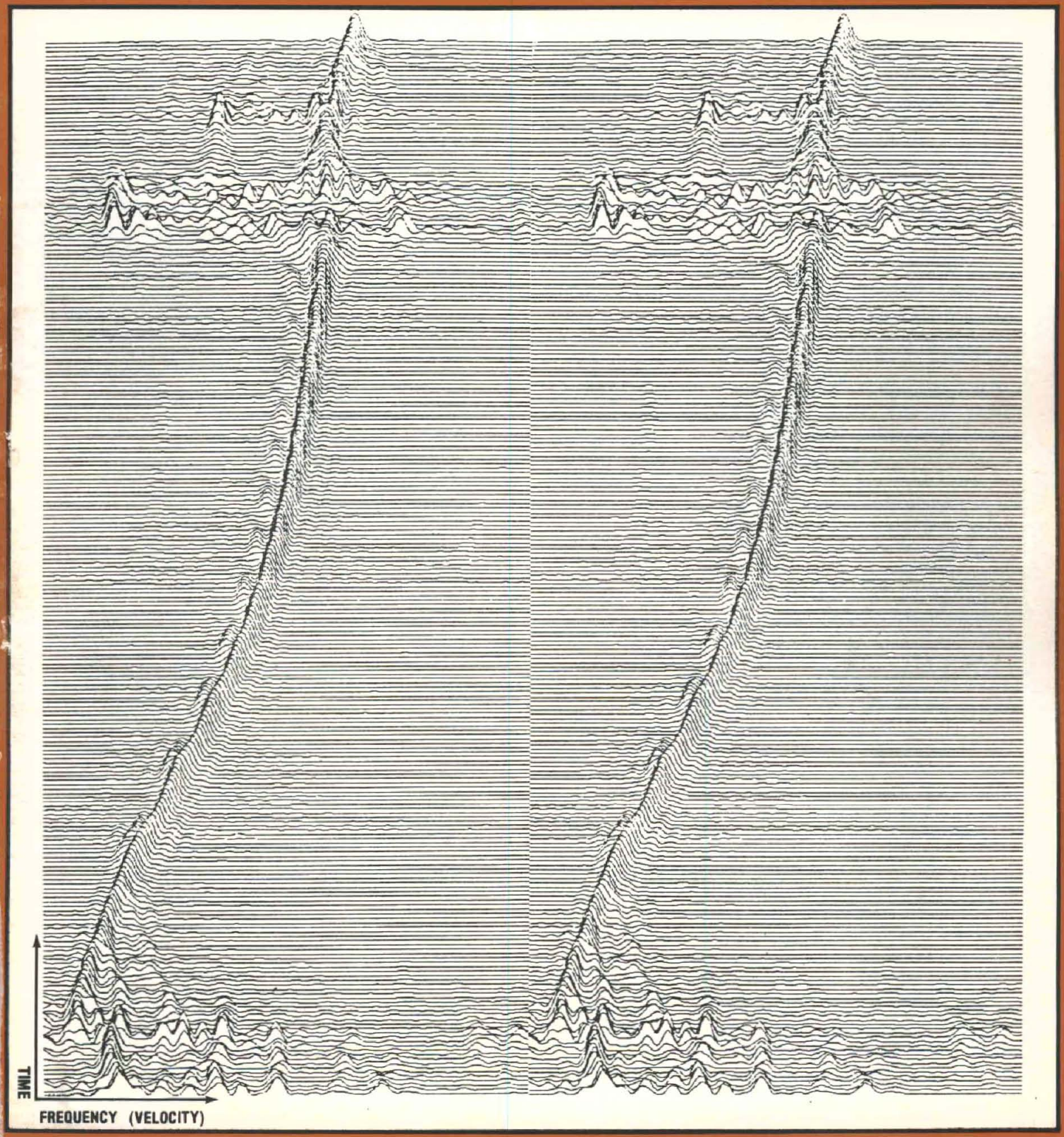
R,D&A ARMY

- RESEARCH
- DEVELOPMENT
- ACQUISITION

SEPTEMBER - OCTOBER 1984



ARMY R,D&A

Vol. 25 No. 5 SEPTEMBER-OCTOBER 1984

OFFICIAL MAGAZINE OF THE RDA COMMUNITY, established 1959

ABOUT THE COVER:

The front and back covers relate to an article on the Army R&D Achievement Awards. Shown on the front is a "waterfall" plot of the radar return from a projectile in the bore of a gun. A photograph of anti-tank ditching tests at Wildflecken Training Area, Germany, is displayed on the back. Cover designed by Patricia Warren, HQ AMC Graphics Section.

FEATURES

DEPARTMENTS

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Purpose: To improve informal communication among all segments of the Army scientific community and other government R,D&A agencies; to further understanding of Army R,D&A progress, problem areas and program planning, to stimulate more closely integrated and coordinated effort among Army R,D&A activities; to express views of leaders, as pertinent to their responsibilities, and to keep personnel informed on matters germane to their welfare and pride of service.

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Bylined Articles: Primary responsibility for opinions of bylined authors rests with them; their views do not necessarily reflect official policy or position of Department of the Army.

Executive's Corner . . .

To keep our readers informed about subjects of concern to RD&A leaders, the Army RD&A Magazine is establishing a new department titled "Executive's Corner" which will be published when needed. As currently envisioned, this section of the magazine will contain information reflecting the thoughts and actions of the Army RD&A leadership. We inaugurate this department with some thoughts from LTG Robert L. Moore, AMC deputy commanding general for RDA.

Over the years we have made continuous progress toward better, more intensive management of weapon systems development and acquisition. Examples of that progress can be found in two management systems which have become an indispensable facet of project management—the DOD Cost/Schedule Control Systems Criteria (C/SCSC) and the Army Program Management Control System (PMCS). Better still, there are a number of new initiatives which point to future progress toward more discipline and control in the acquisition of weapons systems. Two such initiatives are an AMC White Paper which lays out a process that integrates the cost estimating, budgeting, pricing and contracting activities for a weapons system and the recent establishment of the Acquisition Management Office at HQ AMC. This article will briefly discuss the background and accomplishments of C/SCSC and PMCS and then examine the two new initiatives in more detail.

C/SCSC

When contracts are not firm-fixed-price, the government bears some or all of the cost risk. Since 1967 we have used DOD C/SCSC as a set of standards against which we can determine the adequacy of the management control systems used by defense contractors on large acquisition contracts which are not firm-fixed-price. These criteria cover a contractor's system for organizing, planning, budgeting, scheduling, and authorizing the work; accumulating costs; measuring progress objectively, and determining the cost and schedule variances; corrective action required; estimated final cost; and the impact on the contract and program. A contractor's system which is C/SCSC compliant provides the type of valid data for management decision-making needed by the higher levels of contractor management and by the government project manager. These data are also used in reports which go through all levels of DOD to the Congress.

By requiring that contractors meet the criteria, the project manager and his bosses can have some assurance as to the adequacy of the contractor's management control system and some assurance that the cost and schedule data used by government and industry management are dependable. In addition, if we utilize these data to examine trends and apply management initiative to reverse adverse trends, we can improve our cost and schedule control.

PMCS

The initial impulse for PMCS was the significant increase in costs of a number of major weapon systems between FY 79 and 81. It was clear that a more comprehensive management system was necessary. Borrowing from the experience gained by the Air Force Systems Command, a preliminary control system was developed late in 1980. The Cost Discipline Advisory Committee, a group of corporate executives which examined the Army acquisition process, agreed with the thrust of the system and further recommended that the leadership of the Army receive periodic evaluation of program status from the program managers. Both of these concerns were addressed by the revised control system.

PMCS is comprised of four components: a program directive document, an annual execution plan, a cost baseline, and a monthly status report. These components provide clear, coordinated direction to the PM; an execution plan which is tied to the president's budget and gives higher headquarters a clear view of the program for the coming year; a validated cost baseline; and a monthly report from the PM on how his program is going.

The managerial benefits of the system are enormous. It forces us to establish, for every major program, a clear statement of program definition. It also results in a consensus on the acquisition strategy and a traceable change process. In addition, the system requires frequent assessment of program progress and involvement at the highest management level. In other words, the program management control system helps provide the discipline which is necessary for program stability, and program stability is a key element in cost control.

Everyone in the chain of command from the Department of Army to the project manager must be dedicated to the use of PMCS if it is to work. We in AMC solicit your individual and collective understanding and support of this vital management tool.

New Initiatives

We recently published a White Paper which outlines an integrated process that links together the cost estimating, budgeting, pricing and contracting activities for a weapon system. The objective was to define an optimal management model for these complex processes to operate collectively in the most effective manner. The results of this effort are presented in the White Paper to include

the role of the project manager, cost analyst, contracting price analyst, contracting officer, and others in accomplishing the linkages.

The paper traces the continuum of concepts and processes by which AMC performs, updates, and utilizes cost estimates of a weapon system program from initial approval at Milestone I through production contract evaluation and negotiation. Major topics and areas of emphasis are the Baseline Cost Estimate, the Independent Cost Estimate, Design to Unit Production Cost, Contract Cost/Price Analysis, Cost Performance Reports, and the Program Management Control System. (These and other considerations are the subject of an article which will appear in a future issue of this magazine.)

The obvious question is, "what has the White Paper done for Army materiel acquisition management?" We think it has accomplished a lot. It has:

- Combined the efforts of cost estimating and pricing to aid the project manager and his contracting officer in achieving realistic cost projections for our weapon systems.
- Renewed emphasis on Design to Unit Production Cost as a goal in engineering development and as a benchmark on the cost curve as we proceed to production.
- Intensified use of contractor cost data in updating the Baseline Cost Estimate and forecasting future procurements.
- Reduced the number of Should Cost efforts to be performed against any one weapon system procurement.
- Concentrated on the areas of difference between the government and the contractor.
- Decreased the amount of effort that must be devoted to this vital area by better management of the costing resources with the support of the project manager and the procurement community.
- Sharpened our focus on the requirements for automation of PM offices and the command as a whole.

The White Paper is directed toward a synergistic combination of existing functional resources, processes, and skills to enhance our weapon system management capability. Our goal is to better couple these efforts, thereby optimizing the resources applied, and reduce the administrative burden placed on the contractor while improving the results.

Acquisition Management

In addition to integrating the costing and pricing disciplines, we are also working toward integrating information from all of the acquisition management functional areas in order to better assess contractors and programs. We are doing this by creating an integrated data base which consolidates and condenses the data from reports such as those discussed above. To that end, we have established the Office of Acquisition Management at HQ AMC which will gather and assess the existing data from the functional areas. In addition, the office will fill in the gaps in the data base through periodic independent reviews of contractors.

The responsibilities of the office will encompass evaluation of government and contractor performance against our technical, cost and schedule requirements. Assessments will be conducted in a systematic manner using information from contractor reviews and the functional data bases.

"Everyone in the chain of command from the Department of Army to the project manager must be dedicated to the use of PMCS if it is to work. We in AMC solicit your individual and collective understanding and support of this vital management tool."

The procedures to implement this process are straightforward. As the office continuously develops the data base, it will also follow an annual program of assessments of designated contractors, acquisition programs and contracts. Upon the completion of assessments, team directors will report their findings to both the Army and the contractor. The teams will be made up of functional representatives from appropriate government organizations and experts from the contractor who is being assessed. Finally, the Acquisition Management Office will monitor the corrective actions taken by the Army and the contractor.

We think that this initiative will go a long way toward providing the Army and industry leadership with the information needed to more effectively manage our acquisition programs and produce the best equipment for the soldier at the best price.

Army R&D Achievement Awards Recognize 65 In-House Personnel

Army R&D Achievement Awards, consisting of a two-inch cast bronze medallion and a wall plaque, will be presented to 65 Army scientists and engineers in recognition of achievements that have enhanced capabilities of the Army and contributed to the national welfare during 1983.

Winners of the awards include 49 personnel employed at activities of the U.S. Army Materiel Command, seven assigned to the U.S. Army Corps of Engineers, seven attached to elements of the U.S. Army Medical R&D Command, and two employed at the Army Research Institute for the Behavioral and Social Sciences (Office, Deputy Chief of Staff for Personnel).

Army R&D leaders will present the individually engraved plaques and medallions to the winners during the remainder of the year at the activities where the recipients are employed. The winners and brief excerpts of their citations, as well as the major command, subordinate command or installation where they are employed, are as follows.

U.S. Army Materiel Command

• *U.S. Army Electronics R&D Command (ERADCOM):* A four-man team, composed of Dr. Raymond L. Filler, Dr. John R. Vig, Stanley S. Schodowski, and Vincent J. Rosati, all from the Electronics Technology and Devices Laboratory (ETDL), Fort Monmouth, NJ, will receive the Army R&D Achievement Award in recognition of a major contribution to the state-of-the-art of low power clocks.

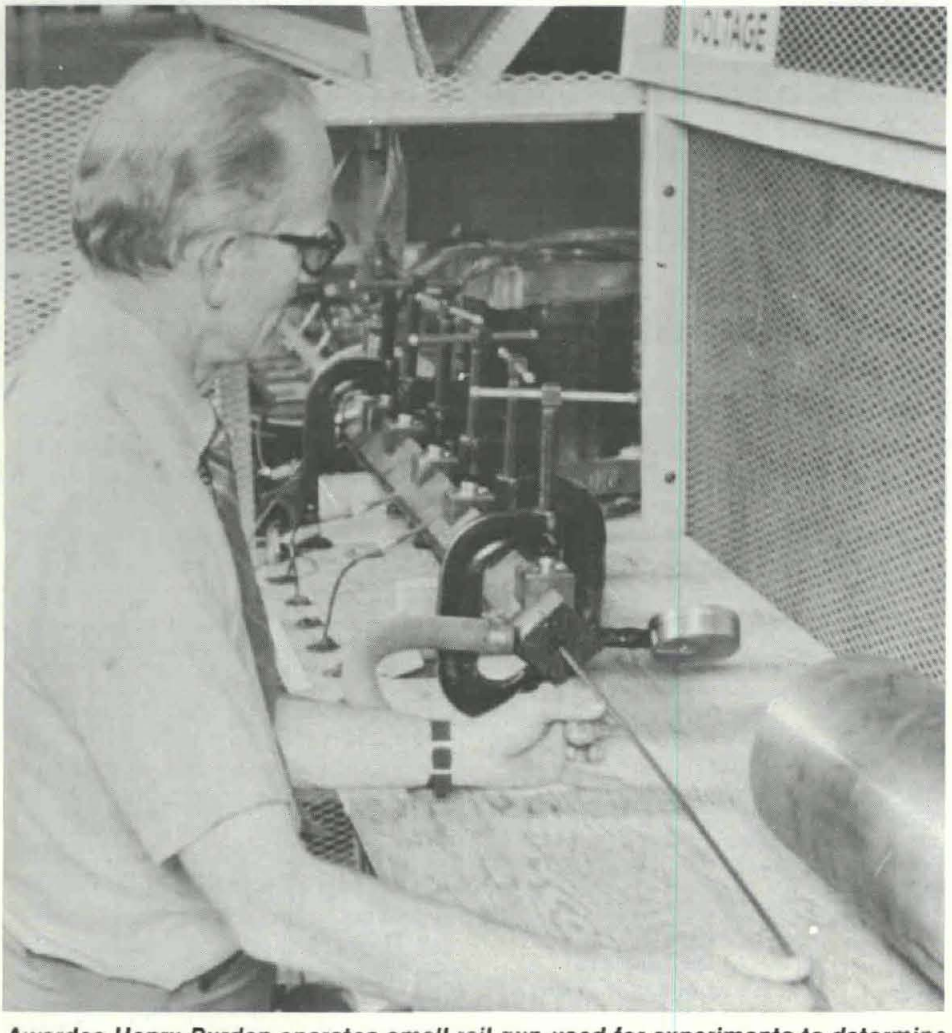
Their research demonstrated the feasibility of achieving four milliseconds clock accuracy with a microcomputer compensated crystal oscillator. Their achievement is expected to greatly improve jamming resistance, security and long battery life related to military communications, identification friend-or-foe, and position location systems.

Dr. Maurice Weiner, Lawrence J. Bovino, Robert J. Youmans, Terence Burke, and Steven Levy, also from the ETDL, have been selected for their development of a novel electronic device for use in microwave and laser transmitters. The new device relies on the illumination of semiconductors with high intensity light signals. According to their citation, "the pioneering efforts of these personnel will lead to revolutionary advances in the capabilities of future target recognition and fire control systems."

A three-man team from ERADCOM's Harry Diamond Laboratories, Adelphi, MD, will be honored for their innovative design and implementation of a digital signal processor that significantly enhances the capability of the radar fuze for the PATRIOT missile to operate effectively in a hostile electromagnetic environment several orders of magnitude more severe than previously postulated. Operational implications of this are considered highly significant. The team members are David L. Rodkey, Edward W. Burke, and Kwok F. Tom.

• *U.S. Army Armament, Munitions and Chemical Command (AMCCOM):* A team consisting of Dr. Anthony J. Beardell, Joseph Prezelski, Aaron H. Grabowski, and Stanley Weiner, employed in the Large Caliber Weapon Systems Laboratory (LCWSL), Army Armament R&D Center, Dover, NJ, will be commended for research related to the development of a triple base solventless stick propellant for large caliber applications. This work resulted in a new means for significantly improving the ballistic performance of munitions. Specifically, the potential now exists for making gun propellants which are more energy efficient, and cause less pollution during their manufacture.

Dr. Arthur J. Bracuti and Louis A. Bottei, also from the LCWSL, will receive Army R&D Achievement Awards for their efforts which have led to an inexpensive laboratory method for measuring both secondary muzzle flash and gun barrel erosion, and for the development of a new generation of additives that



Awardee Henry Burden operates small rail gun used for experiments to determine properties of an arc armature. Electro-magnetic guns may be used where very high projectile velocities are required, such as in air defense or outer space applications.

significantly suppress both secondary muzzle flash and gun barrel erosion simultaneously.

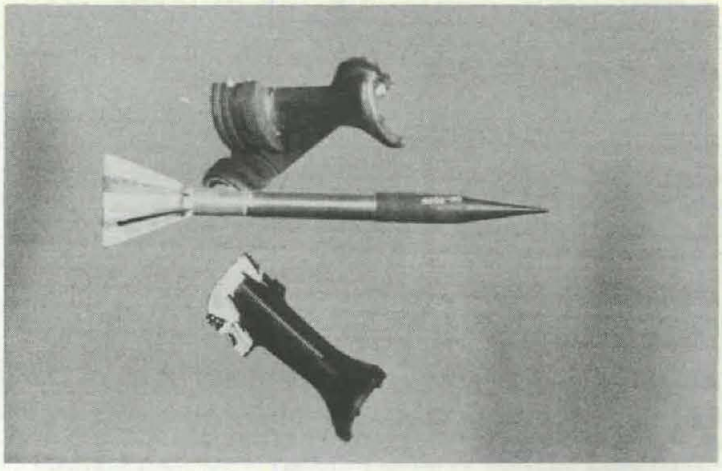
Six groups and four individuals, employed in the Ballistic Research Laboratory (BRL), Aberdeen Proving Ground, MD, have been chosen to receive awards. (BRL became a corporate laboratory of the Army Materiel Command on April 1, 1984.) The BRL recipients are as follows:

Dr. John D. Powell, Dr. Keith A. Jamison and Henry S. Burden are being cited for outstanding contributions to the theoretical modeling and experimental investigation of the properties of arc armatures in electromagnetic railguns. This research has, for the first time, led to a proper description of the properties of the arc and has demonstrated the feasibility of using plasma arcs to drive projectiles in railguns sufficiently large to have military applications.

A BRL team, consisting of Dr. Gerald L. Moss, Ralph F. Benck, Paul H. Netherwood Jr., and John R. Stratton, have been recognized for their R&D of explosively compacted materials. Their results have demonstrated techniques to synthesize new materials with a variety of potential military and commercial applications.

Dr. William S. de Rosset and Alfred B. Merendino (now under contract to BRL from T&E International) will be commended for outstanding technical leadership and research in the area of armor mechanics. Their work, according to the citation, has made a significant contribution to areas that are critically important to the basic understanding needed to defeat future complex anti-armor devices.

Dr. Steven G. Cornelison, Dr. Keith A. Jamison, both from BRL, and Raymond R. Fry Jr., from AMCCOM's Chemical R&D Center, are being recognized for R&D achievements leading to a device that disseminates obscurants. This device represents a significant advance in the capability to prevent targets from being detected by advanced sensor systems.



Sabot separation from high velocity long rod penetrator shortly after launch.

Technical accomplishments which have established the feasibility of greatly increased levels of performance for modern kinetic energy penetrators have resulted in award honors for BRL employees Dr. Calvin T. Candland (now with Honeywell, Inc.), Louis Giglio-Tos, and Randolph S. Coates. Their work has provided the sound technical foundation for kinetic energy ammunition which will ensure that the U.S. has a superior anti-armor capability well into the next century.

Albert W. Horst and Frederick W. Robbins will receive the Army R&D Achievement Award for conceiving and carrying out mathematical modeling and model validation tests to provide the principal sources of anomalous ballistic performance of stick propellant charges. Among their achievements was the discovery that an unprogrammed increase in burning surface in the stick charges resulted from the splitting of unslotted propellant sticks early in the ballistic cycle. Their work is expected to lead to improvements in current large caliber gun systems and provide a basis for more efficient systems of the future.

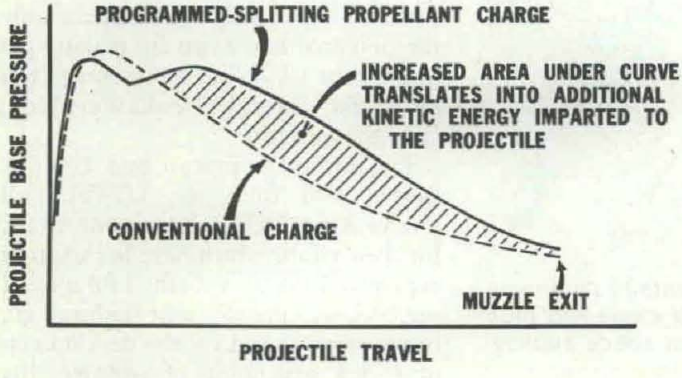
An individual achievement award to BRL employee Dr. James N. Walbert will be presented for his development of techniques for the analysis of radar data from projectiles. His work has led to new insights in the behavior of projectiles in the in-bore and transitional ballistic regions.

Dr. George M. Thompson was selected for his development of a new and useful device to monitor the concentration of medium and high atomic number contaminants in air. In devising this apparatus, he took a state-of-the-art laboratory microanalytical tool, x-ray fluorescence, and adapted it to automatic air sampling to provide a simple, reliable and prompt monitor of potentially hazardous conditions that develop in training areas, workshops, and firing ranges.

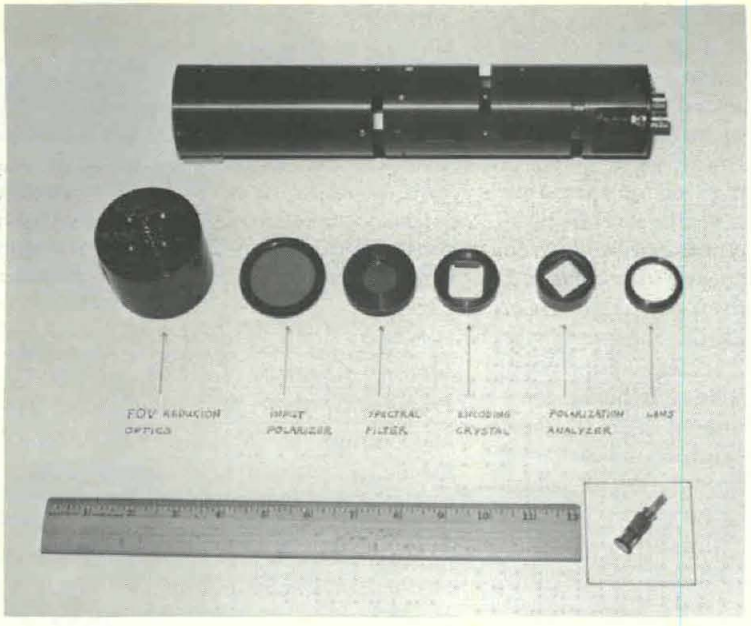
Barbara E. Ringers will receive an Army R&D Achievement Award for her technical accomplishments which have led to the development of a new computational technique for modeling the formation of adiabatic shear bands in armor materials. Her efforts have provided the Army with an important new tool for investigating the interaction of high velocity kinetic energy penetrators with armor and quantifying the role of adiabatic shear bands in plugging failure.

Michael J. Muuss is being commended for his efforts at BRL which resulted in development of a paradigm for modern interactive networked computing facilities. He is specifically cited for his role in the implementation of the DOD standard protocols TCP/IP and for his contributions to the nationwide UNIX community.

A two-person team from AMCCOM's Chemical R&D Center, Aberdeen Prov-



Programmed-splitting propellant provides increased muzzel velocity without an increase in maximum gun pressure.



Demonstrator laser locator. Inset shows mock up miniature version.

develop and test new chemical agent decontamination systems.

• *U.S. Army Missile Command:* Dr. John L. Johnson, U.S. Army Missile Laboratory, Redstone Arsenal, AL, is being recognized for his conception, implementation and demonstration of a compact, low-cost laser locator. His experiments have shown that the laser locator can detect and locate, with high precision, an incident laser beam from any angle within a wide field of view.

• *U.S. Army Troop Support Command:* Thomas H. Tassinari, U.S. Army Natick R&D Center, Natick, MA, is credited with successful development and integration of an air conditioned microclimate cooling system on board the M–1E1 Tank. Microclimate cooling is of critical importance to the military because it allows the crewmen of the Army's most advanced tank to operate safely in hot, CB-contaminated environments for long periods of time. Tassinari's citation notes that all M-1E1 tanks coming off the production line in 1985 will incorporate a crew microclimate cooling system.

ing Ground, MD, will be cited for their research efforts that involved the identification of catalysts for use in the detection of trichothecene nycotoxins and for development of a catalytic spot detection test for T-2 toxin. The team members are Thaddeus J. Novak and Karen A. Quinn.

Six more Army R&D Achievement Awards will also be presented to the following Chemical R&D Center scientists and engineers:

Dr. Peter A. Snyder will be honored for his research in bacterial distinction and concentration determination. His efforts have led to a data base for class differentation and an approximate concentration analysis in the characterization of microorganisms and have provided new insights for improvement of U.S. Army NBC defense systems.

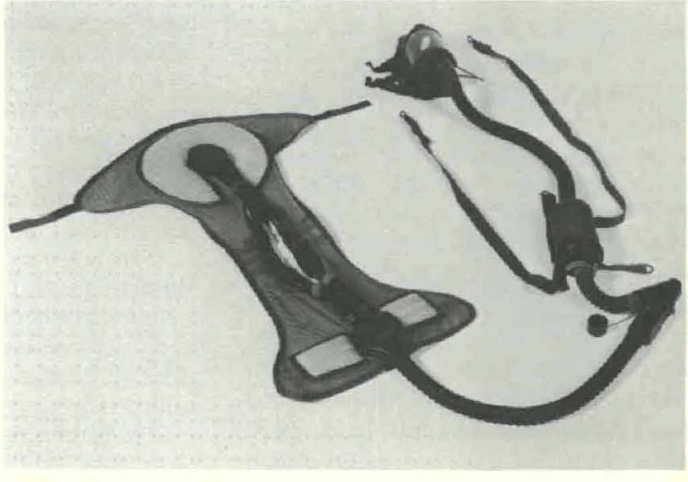
Dr. Shreenath V. Doctor will receive an award for his research that resulted in the discovery of distinct secondary neural mechanisms for anesthetic induced incapacitation, for his finding of H_1-histaminergic involvement in opiate-like analgesia, and for the elimination of side effects with haloperidol, a dopaminergic receptor antogonist.

Dr. Wayne G. Landis was selected for his research which has led to the discovery of a mammalian type enzyme in the ciliate protozoan, *Tetrahymena thermophilia,* capable of hydrolyzing and detoxifying the nerve agent Soman. This work represents a highly significant contribution to the mission of noncorrosive decontaminates, potential detection of organophosphonoflurodates, and detoxification of Soman.

Dr. James J. Valdes is being recognized for his R&D in applying neuroreceptor pharmacology to the function and detection of anticholinesterase materials. This work illustrates the transition of a basic discovery to the application of a new technology.

Dr. F. Prescott Ward was chosen for perceiving tremendous opportunities for major payoffs in chemical and biological defense from biotechnology investigations. He outlined a strategy for exploiting the emerging technology in chemical-biological defense and implemented the program. Much success has been achieved and is the basis for his award.

Joseph W. Hovanec will receive the Army R&D Achievement Award for his technical contributions which have led to a significant advance in the U.S. Army's chemical agent decontamination program. He is credited with producing the first chemical agent simulant to accurately mimic the physical and chemical properties of VX. It will be used by both DOD and civilian defense laboratories to



Air-conditioned micro-climate cooling clothing system defeats heat stress experienced by combat vehicle crewmen wearing complete uniform protection against chemical/ biological threats.

Office, Deputy Chief of Staff for Personnel

• *U.S Army Research Institute for the Behavioral and Social Sciences, Alexandria, VA:* Dr. Stephen L. Goldberg and Ronald E. Kraemer are cited for improving the combat readiness of M–1 Abrams tank units through development of an innovative and highly effective sustainment training program. Their 4-part training package consists of procedures guides to aid M–1 crewmen in performance of procedural tasks, study guides to develop skills in M–1 gunnery tech-

niques, and crew and platoon drills to build teamwork and coordination.

U.S. Army Corps of Engineers

• *U.S. Army Waterways Experiment Station (WES), Vicksburg, MS:* H. Lee Butler developed new and significantly improved methods for numerically simulating hurricane storm surge, tidal circulation, and tsunami inundation. Additionally, he performed a major state frequency hurricane surge investigation for southern Long Island, NY. This work allowed rational development of cost effective protection alternatives in a highly urbanized area where the threat to life and property is substantial.

A second individual award to a WES employee will be presented to Hendrick D. Carleton for his innovative efforts in the development of a technique for the rapid burial, explosive filling, and detonation of very long pipes to create impassable, on-command antitank ditches. Employment of this technique will provide greater Army flexibility in selecting areas to engage armor-heavy attackers in battle. Its use can assist the Army in forward defense operations, and may help avoid the necessity for a tactical nuclear response.

• *U.S. Army Construction Engineering Research Laboratory, Champaign, IL:* Dr. Ashok Kumar, Ellen G. Segan, and John Bukowski will receive Army R&D Achievement Awards for development of the Pipe Quality Monitor, which is a field instrument for evaluating the corrosion status of buried pipe. The monitor is capable of providing field personnel with a remote technique to evaluate the condition of a buried structure. This information is vital in making repair versus replacement decisions and for anticipating maintenance costs.

Drs. Walter E. Fisher and James D. Prendergast will be recognized for their joint efforts in developing innovative technology for the design and construction of below ground storage facilities for special weapons. This concept is considered the first major advancement in munitions storage in more than 100 years. It is currently being used by the Army, Air Force and Navy, both in the U.S. and abroad.

U.S. Army Medical R&D Command

• *Walter Reed Army Institute of Research, Washington, DC:* LTC William P. Wiesmann, MC (Department of Nephrology), and MAJ H. Kyle Webster, MSC (Armed Forces Research Institute of Medical Sciences, Bangkok, Thailand), conducted collaborative studies related to drug-resistant malaria. They used new sophisticated techniques of computer modeling to demonstrate a new metabolic pathway in the malaria parasite involving the enzyme adenosine diaminase which increases several thousand fold in malaria-infected human red blood cells. These studies have opened a whole new approach to the treatment of malaria and the search for new drugs for resistant malarial parasites.

Dr. John W. Holaday is being commended for development of several new therapies for the treatment of a variety of shock states and for prevention of paralysis following spinal trauma. If proven effective and safe in clinical trials, these compounds could radically change the approach to battlefield treatment of shock by reducing the need for bulky fluid replacement systems. His novel treatment of spinal trauma may also serve to prevent handicaps as a result of this common battlefield injury.

Dr. Gloria Jean Kant will be cited for initiating, planning, directing and conducting a study of stress in soldiers wearing chemical protective suits during a sustained operations field exercise at Fort Hunter Liggett, CA. She also carried out a clinical study of the effects of 72 hour sleep deprivation on urinary indices of stress and metabolic activity, under controlled laboratory conditions.

COL Laurence E. Larsen, MC, will receive the Army R&D Achievement Award for his identification of pulse microwave and millimeter energy hazards to the peripheral nerve, ocular lens and cornea. According to his citation, "this research clearly demonstrates the need for a very basic change in the measurement of medical hazards from such radiation and places the Army Medical Department at the forefront of research for the protection of the American soldier from electromagnetic energy."

• *U.S. Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD:* MAJ John H. McDonough Jr., MSC, is being recognized for initiating, conducting, and directing research programs to examine behavioral and performance decrements induced by nerve agents and antidotes. His research contributions will have a major impact on protecting the soldier against chemical warfare agents in an integrated battlefield.

• *U.S. Army Institute of Surgical Research, Fort Sam Houston, TX:* MAJ Robert C. Allen, MC, will receive the achievement award for his development of laboratory methods which permit rapid assessment of infection or patient susceptibility to infection. Infection continues to be a major contributing factor in burn patient morbidity and mortality. MAJ Allen's methods, which are based on chemiluminigenic probes, are inexpensive, can be rapidly performed, do not require use of radioisotopes or rare chemicals, and are adaptable to automation.

Cross-section of anti-tank ditch created with buried plastic pipe at Ft. Polk, LA.

Army Completes Tests on Marine Corps LAV

A light armored vehicle that can swim and fire simultaneously may have been considered a pipe dream just a few years ago. However, today the vehicle is a reality, according to Pete Pritchard, a test director in the Automotive Division at the Combat Systems Test Activity, Aberdeen Proving Ground (APG), MD.

Pritchard, along with a test team composed of civilians and Marine Corps personnel, recently completed an extensive, almost year long, testing program on a Marine Corps version of the light armored vehicle (LAV), equipped with a 25mm gun.

"No vehicle other than the LAV has the proven simultaneous swim and fire capability," Pritchard said. He adds that during the amphibious testing, which was conducted in APG's water area, the LAV demonstrated its ability to rapidly enter the water with less than three minutes preparation required.

The test crew commented that during the firing in the water phase of testing, the LAV was just as stable while firing in the water as on land. Additionally, the LAV's accuracy while being fired from the water appeared to be equal to the excellent hit performance it demonstrated on land, according to Pritchard.

The LAV 25 Marine Corps version travels in excess of 60 mph on land and 6.5 mph in the water. It can enter the water at speeds up to 30 mph and holds a six-man fire team in the rear of the vehicle. Another LAV 25 model, which was previously proposed for the Army, had space for only a three-man crew. The vehicle's remaining space was set aside for storing ammunition.

Upon arrival at the Combat Systems Test Activity, the LAV 25 underwent initial inspection and lubrication servicing. Following that, the test team conducted a battery of extensive tests that ran the gamut from safety to human factors to accuracy and dispersion on the vehicle's 25 and 7.62mm weapons systems.

The vehicle's two-man stabilized turret houses the M242 25mm automatic cannon, a 7.62mm coaxial machine gun, plus two M243 four-barrel grenade launchers. The main gun, the M242 Bushmaster has proven highly reliable during LAV testing, according to Pritchard.

Barrel life is estimated to be approximately 12,000 rounds. Another plus for the Bushmaster is that it fires NATO ammunition, which contributes to and ensures interoperability and logistic commonality on the modern battlefield.

A light armored vehicle (LAV)25 demonstrates its amphibious capability while undergoing testing in a water area of the Proving Ground.

"During the 10-month testing of the vehicle, more than 9,000 7.62 rounds and approximately 14,000 25mm rounds were fired. The test team determined the system accuracy and the hit probabilities with the LAV moving and stationary against both moving and stationary targets. Day and passive night vision is provided for the vehicle's gunner and commander by M36E1 periscopes. The LAV 25 accuracy and dispersion reportedly proved to be far superior than the previously tested LAV.

Test efforts also focused on the stabilization system frequency response. The system response was measured and time-on-target data were obtained as the LAV traversed zig zag, bump and gravel courses. Tracking tests were also conducted to compare the tracking ability of the LAV with the previously tested LAV 25 and the M2 Bradley vehicle.

Commenting on the results of the extensive testing program, Pritchard said that the LAV, a fully mobile system, will enhance the Marine Corps rapid deployment force.

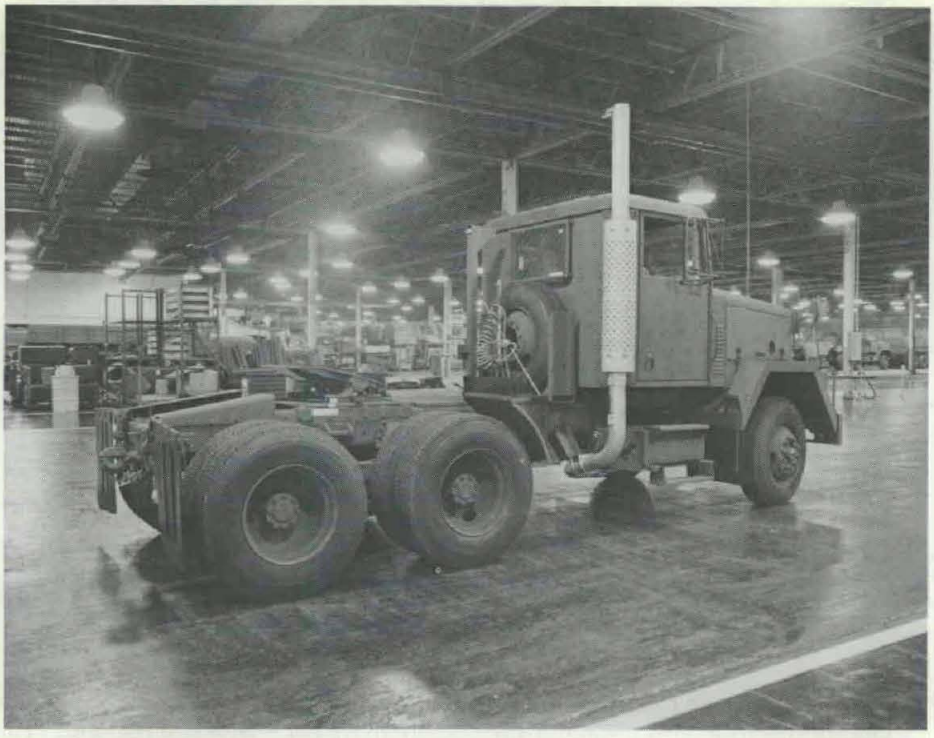
DARCOM Redesignated Army Materiel Command

Redesignation of the U.S. Army Materiel Development and Readiness Command (DARCOM) as the U.S. Army Materiel Command (AMC) was announced Aug. 1 by GEN Richard H. Thompson, AMC commander.

In announcing the change, GEN Thompson stated that "aside from being brief, simple and easily understood by all, the new title is most reflective of the cohesion required among the diverse separate elements which make up our total command. It's my feeling, and I suspect that of many of you, that AMC is a name we have known, understood, and felt most descriptive of our command and its mission." AMC was the name by which the command was known from its establishment in 1962 until 1976 when it became DARCOM.

General Thompson also noted in his announcement, which was made during a ceremony celebrating AMC's 22nd anniversary, that, in addition to the name change, there will also be some restructuring of AMC headquarters during the coming months. These changes, which will not involve employment or grade reductions, will include a significant increase in the comptrollers scope of responsibility; realigning of certain organizations to reduce the number of elements reporting directly to the Command Group; redesignation of "Directors" as Deputy Chiefs of Staff; and combining a number of related organizations and responsibilities.

All changes associated with the announcement are expected to be made at "absolute minimum cost," according to officials. For example, current supplies of letterhead paper, forms, publications and the like will be used until depleted. Replacements will be made with new stocks which reflect the change to Army Materiel Command.



ASA (RDA) Cites M915A1 Quality Standards

Shown at left is the last M915A1 produced at AM General's plant in South Bend, IN.

The following remarks were presented earlier this year by Assistant Secretary of the Army for Research, Development and Acquisition Dr. Jay R. Sculley at the LTV Aerospace and Defense Company's AM General plant in South Bend, IN. The occasion was a "Quality Recognition Day" marking AM General's delivery to the Army of the last M915A1 14-ton truck tractors off the assembly line. The first address was presented during recognition day ceremonies. The second address was given at a luncheon following the ceremony.

Recognition Day Ceremony

First, let me thank you for the opportunity to be here on this significant occasion. The M915A1 program has been significant to the Army for a number of reasons. Most notably, all 2,355 vehicles built under the one-year contract being completed today, were done so under the highest quality standards yet imposed by the Army.

While the Army has always demanded the very best of its contractors, each of you can take pride in the fact that you built and delivered this vehicle on time, within budget, while meeting these tough standards.

"Be All You Can Be" has been an Army recruiting slogan for a number of years. I believe that it has become, as well, a philosophy which reaches through the Army. I see it even here as a creed for all to embrace.

The performance our tactical ground vehicles must provide for U.S. troops around the world can only be met through the kind of quality you have been able to deliver.

There is indeed a new national consciousness towards quality. As never before, Americans are demanding the very best in products and services. The competition is formidable.

"Doing it Right the First Time" is an axiom so trite that it is often overlooked. Each dollar saved in rework and repair, and each moment conserved are valuable assets which can be applied to new opportunities to meet our national defense needs.

All contracts have their problems. Often it's at the launch of a new product. The M915A1 had its share of production problems. What was perhaps unique, however, was the consortium of interests to solve them. The skilled workers on the line, inspectors, corporate management, the project office and government officials collectively pooled their talents and expertise in the early stages of the program to shape processes to achieve the highest production quality. Systems were created for the rapid feedback of discrepancies found during inspection so the appropriate section of the assembly line could make corrections quickly. This improved craftsmanship by making quality checks at each work station. Thus, quality and production became a team.

The subcontractors played a part as well by assuring that parts and components they supplied to AM General met or exceeded quality levels.

Now, the changes made to assure quality on each vehicle are part of your daily routine. The Defense Contract Administration Service acceptance rate, now well above 90 percent, proves this.

In short your quality touch is very apparent. You have fulfilled an important assignment for two important clients, the American taxpayer who pays for the product and U.S. soldiers who use it.

Recognition Day Luncheon

The combination of doing right things, and doing things right the *first* time are the keys to the very basic philosophy of quality. I would like to take just a few minutes to expand on that thought and to talk about what is happening in Army procurement today.

Every dollar spent to find and then correct quality problems in weapons systems, is at least a dollar's worth of capability lost forever. To this real loss, is added the loss of confidence by the Congress, and the public, in the defense in-

Assistant Secretary of the Army (RD&A) Dr. Jay R. Sculley at the wheel of a production prototype Hummer. He is accompanied by James Armour, AM General Quality Assurance Director.

dustry's ability to produce quality products. We all have a mandate to insure that every single defense dollar is a real payoff in combat capability and improved readiness.

Our clients are the men and women of the U.S. Army and the taxpayers of the U.S. who underwrite our defense. We have an obligation to them to provide quality products and the American taxpayers have the right to expect it.

We cannot expect those we charge with national security to defend our ideals with anything less than the best we can provide. The defense industry is responsible for that quality.

Today we are seeing continued and significant interest by the Congress in the quality and cost effectiveness of defense items. The mandate for warranties is a part of that interest.

Warranties for meeting performance requirements are here to stay. They are the law. Now, there may be some changes to that law. But it is doubtful that the warranty requirements will ever be deleted.

In reality, we should not need laws to enforce the best. It is simply good practice to build quality performance into each and every item.

The M915A1 production demonstrates what can be done. Part of that effort is the attack on the myth that 100 percent inspection is the only way to insure quality. You cannot inspect quality into a product. Quality must be built into that product.

This is clearly a reflection of corporate pride and confidence. A performance warranty is nothing more than a manifestation of a corporation's belief in itself.

You are now in the advent of producing and delivering a new generation tactical wheeled vehicle—the HMMWV, or the "Hummer" as you affectionately call it. We are looking to you to produce this successor to the veteran "Jeep" at the highest levels of design, durability, and performance ever demanded in such a vehicle.

The key to producing that superior vehicle we need will again be building the quality into the HMMWV. You have worked hard to design a vehicle correcting deficiencies found in early testing.

Your initial product testing units are scheduled to roll-off in just a couple of weeks. I am confident these will prove successful. I know that you have developed the very special production systems which will insure that these new vehicles will meet all expectations. I know they will.

We have learned today, I believe, that quality is more than a commitment. It's a philosophy which must be deeply shared by all in the manufacturing process. I commend you for your dedication to it and share in your pride today.

The Last M915A1

Special ceremonies marking a milestone in quality production of the Army's M915A1 14-ton truck tractors were held earlier this year at LTV Aerospace and Defense Company's AM General plant in South Bend, IN.

The "Quality Recognition Day," which was attended by about 1,800 personnel—including Department of the Army and DOD representatives and company employees—was held as the last of the M915A1 trucks rolled off the assembly line. The company has manufactured 2,355 of the trucks since May 1983 under what has been termed the highest quality standards ever imposed by the Army.

Army representatives included Assistant Secretary of the Army for Research, Development and Acquisition Dr. Jay R. Sculley and BG William S. Flynn, deputy commanding general for procurement and readiness, U. S. Army Tank-Automotive Command.

Dr. Sculley went through the final inspection line with the last of the 2,355 trucks and also spoke at the recognition day ceremony and luncheon. His remarks appear on this page.

James A. Armour, AM General corporate quality assurance director, said, during the ceremony, that "no commercial vehicle produced in the world today, including hand assembled luxury cars, could meet the Army's present standards for quality." He stated also that more than 10,000 characteristics were inspected on each vehicle and the government allowed a maximum of only 2.65 deficiencies per unit.

AM General President Lawrence H. Hyde noted in his remarks that company employees achieved a "craftsmanship approach to manufacturing" in the production of the truck tractors. "All met or exceeded quality standards, were delivered on time and within budget," he added.

NDI: Benefits of Using Commercial Equipment

By MAJ Thomas A. DeLuca

The DOD is facing a period of ever declining assets. Yearly, there are congressionally mandated cuts in major acquisition programs. Therefore, optimum use must be made of available resources and new ways must be found to cut future expenses.

One area that is a prime candidate for cost cutting is equipment procurement. The present military method is not only time consuming, but extremely inefficient. The military procurement cycle encompasses seven years from concept to fielding of an article. Many items that are designed to be state-of-the-art are obsolete when produced. The acquisition process for the item takes so long that it is no longer current when fielded.

The development process presently used by the federal government has another glaring drawback, *expense*. The design, engineering, validation, and testing processes consume a significant portion of the budget for a new item.

Typically, the eventual user of a new item has significant input to the design and concept phase of the item development. However, due to the lengthy process, the user has too much time in which to change his mind about what he originally wanted. This can result in costly redesign and retesting, resulting in further delay and more expense.

One solution to this problem is to procure commercially designed, readily available equipment, in lieu of costly military designed equipment. These commercial items, suitable for military use, are sometimes called non-developmental items (NDI). Non-developmental items can save both time and money for the military services.

At this point it is appropriate to examine the benefits of procuring commercial "off-the-shelf" equipment for military use. The major advantages of procuring commercially designed equipment are: to shorten schedules, to reduce costs, and to enhance performance and effectiveness.

At first glance, the first premise probably appears obvious; the second, questionable; and the third, unrealistic. Actually, each has subtleties and requires a closer examination.

Schedules

By utilizing equipment which is "off-the-shelf," the DOD can reduce the time it takes to field a new system. Some small amount of R&D may be needed, but the time required should be minimal since equipment is readily available for test and evaluation. Upon completion of this accelerated concept formulation/validation phase, the system can move directly into production without entering the costly and time consuming full-scale engineering development process.

In production as well, a shorter schedule can be expected than that which is experienced with a newly developed system. The production line is generally in operation and the problem reduces to nothing more than the size of the backlog in relation to the production capacity available. In some instances, immediate production delivery may even be available directly from the manufacturer's or the distributor's inventory.

The shortened schedule resulting from commercial equipment application can significantly reduce the opportunity for changing requirements to delay the deployment. In addition, procurement of a small quantity of units for operational test and evaluation can be used to obtain the user's inputs prior to full procurement. This procedure was utilized by the Air Force in a recent procurement of video tape recorders.

Costs

By utilizing equipment which is "off-the-shelf," either directly or with modifications, the DOD can significantly reduce or eliminate its R&D costs.

The procurement cost should also be substantially lower than if DOD had progressed through the development route. Two major factors contribute to these lower production costs. First, there is usually a large commercial production base upon which we can "piggy-back" our demand. Here DOD can take advantage of more mature learning and larger component discounting than would be available to a smaller military product base. Secondly, there would be no large initial start-up costs for non-recurring items such as tooling and special production equipment. These costs would be prorated on a per unit basis and, therefore, shared by all customers in an equal proportion to their individual demands.

Operating and support costs of military equipment account for well over half of the total life cycle costs and it is here, without a doubt, that the defense systems manager must insure that savings will accrue. It might be argued that his is where the fragile commercial hardware, procured without the benefit of extensive documentation and fielded without months of extensive maintenance training, will have its true day in court.

There is no question that the trial of commercial equipment begins here, but the verdict might catch many by surprise. Commercial product reliability, availability and maintainability (RAM) can, in most cases, match or exceed those

of specifically designed military equipments. (An exception in reliability is where extensive exposure to certain environmental conditions dictate a special design.)

Performance

The current acquisition policies used by the military often result in a nearly obsolete item being fielded. The system is too time consuming. A paradox involved in the system is that every time the item is updated with the state-of-the-art components during development, a further delay in fielding is encountered due to increased requirements for test and evaluation. As development time is lengthened, the opportunity for new technology to be introduced into the system is increased. The developer is in a "vicious circle" and the only way to escape is to freeze the configuration of the item and eventually field an item that is, at least to some degree, outdated.

The marketplace is dominated by competition and cannot afford the delays experienced by the military developer. Rapid changes in state-of-the-art are more rapidly and efficiently responded to by the commercial sector. Manufacturers must produce products containing the most current components if they are to stay competitive. The military will benefit from this competition and receive more modern and better performing equipment by purchasing commercial items.

Commercial Commodity Acquisition Program

The initial impetus for establishing a program to identify and procure commercial equipment for military use came from DOD. The current DOD thrust in the acquisition of commercial equipment is contained in the Commercial Commodity Acquisition Program (CCAP). The program was initiated in a Dec. 30, 1975 letter to the services which announced the establishment of ". . . a formalized program to emphasize the routine consideration of the procurement of commercial materials, parts and end items of equipment to satisfy defense requirements . . ."

On May 24, 1976, the Office of Management and Budget directed the government to emphasize the the acquisition of commercial, "off-the-shelf," products in order to achieve optimal effectiveness in supply support operations.

The initial DOD effort was further refined and instructions issued to the military departments. On Jan. 14, 1977, the CCAP Pilot Program was initiated in order to evaluate various military applications of commercial equipment prior to the issuance of a specific DOD Policy directive. Included in this pilot effort are some 40 different products under procurement by the services. In response to DOD directives, the Army, Navy, and Air Force have instituted programs to identify and procure commercial equipment for military use.

Army Efforts

The most significant Army commercial equipment program is Military Adaptation of Commercial Items (MACI). The objective of MACI is to satisfy military requirements in the shortest time and at the least cost by utilizing an item which is currently available from a commercial source. The MACI program is defined in AR 700–90. MACI funds are available to procure, evaluate, test, type classify, and if necessary, modify commercial equipment.

A specific MACI program which has been extremely successful is the Commercial Construction Equipment Program. This program, started in 1969, has resulted in the procurement of at least 18 types of major construction equipment from commercial sources. It is interesting to note that a rather unique concept has been incorporated in the commercial construction equipment acquisition strategy. In some of the contracts the manufacturers have agreed to buy-back arrangements when the government decides to replace the items. In effect, the government is getting a guaranteed trade-in value for its equipment. This should eliminate the costly disposal process and may make it more cost-effective to replace the equipment at more frequent intervals.

Navy Efforts

The Navy, under its TELCAM (Telecommunications Equipment Low Cost Acquisition Methods) program, is evaluating the capability of commercial electronics equipment to meet shipboard requirements. The results to date confirm that commercial products can perform in the real world military environment, and dramatic cost savings can be achieved through their greater use. In fact, the Navy has found that the ratio of the cost of some militarized equipment to satisfactory commercial equipment has approached 50 to 1. In one application, for example, an $8000 militarized cassette tape recorder was replaced with a $167 commercial unit.

Air Force Efforts

Prior to 1977, the Air Force did not have a specific commercial equipment program. However, the Air Force was extremely responsive to the DOD CCAP effort. Within three months after DOD established the pilot program, the Air Force identified and documented five ongoing efforts for inclusion in the program. Two of the efforts are the Security Police Armored Response/Convoy Vehicle and the Airborne Video Tape Recorder.

There is no question that DOD is beginning to make great strides in stretching our defense dollars through increased acquisition of commercial items. It has, however, only addressed the "tip of the iceburg."

DOD must also work much closer with the commercial equipment industry during its planning phases to insure that they are aware of our future requirements. If DOD anticipates a need for a system which has potential value in the marketplace, it must insure that this is conveyed to the appropriate industry in sufficient time for their long range planning and internal development process.

The potential for cost savings, expedited acquisition, and equipment with superior characteristics exists. The military services must strive harder to realize the full potential of the benefits derived from procurement of commercially designed and produced items to replace selected military equipment.

Conclusions

This discussion has only scraped the surface of an extremely fertile area for stretching the defense dollar. Nevertheless, the following key issues are readily apparent:

- Greater use of commercial equipment can significantly improve the cost, schedule, and performance of a system.
- The overall cost of ownership of these systems can be reduced through better use of warranty service and, as a minimum, contractor repair of subsystem modules.

The availability of established commercial field service will allow the government more options in optimizing its maintenance support concepts and overall acquisition strategy. This includes cost/risk trade-offs in fielding basically similar systems of different manufacture.

The most urgent concern today should

be to increase the awareness of the DOD acquisition community of the advantages of "off-the-shelf" procurements. The Commercial Commodity Acquisition Program should pave the way to a clear and forceful DOD policy in the near future. In particular, commercial equipment consideration should become a routine DSARC/ASARC issue.

Finally, DOD must insure that it doesn't oversell a good concept. The intent is not to force the military services to operate out of a Sears-Roebuck catalogue. There is no question that many materiel needs require the development of a totally new system. However, insuring that this is *not* done when commercial products can handle the job will help insure DOD has the dollars it needs for other necessary tasks.

The seeds have been sown. It is up to DOD to nurture and cultivate them so as to reap the full harvest of cost-savings, more timely acquisition, and a broader base of defense industry from which to fill future needs.

MAJ THOMAS A. DELUCA is an ammunition staff officer in the Office of Deputy Chief of Staff for Research, Development and Acquisition, HQ Department of Army. He holds a BS in psychology/political science from William Carey College, an MBA in logistics management from Florida Institute of Technology, an is a graduate of the Defense Systems Management College and the Armed Forces Staff College.

NDI: Using the Non-Developmental Item Approach

By CPT James W. McDowell

The Army has increasingly moved toward a non-developmental item (NDI) approach to meet the growing requirements generated by the thrust toward the rapid fielding of new cost effective systems.

The NDI technique is not new to government procurement agencies since it has been used for years to purchase commercial items for military use. However, its application to major systems is new, and it is becoming more prevalent as time goes by.

NDI procurement of military vehicles can be divided into three distinct categories. The first is the military purchase of off-the-shelf commercial vehicles for use in meeting general peacetime administrative requirements. Types of vehicles bought for this purpose include: buses, sedans, carryalls, depot and warehouse material handling equipment and various commercial trucks.

Procedures used in the first NDI category are simple but effective. Requirements are identified, quantities established, time frames given, solicitations sent out, bids opened and contracts awarded to the lowest bidders. Since the systems purchased are nothing more than standard commercial cars or vans, the only special requirement is the vehicle color.

The second NDI category includes the acquisition of current military-peculiar systems being produced for sale to foreign governments, but which are slightly modified for use by the Army. A good example of how this method has been applied is the Small Unit Support Vehicle (SUSV), currently being procured for use by units in Alaska.

The SUSV, a 1½ ton cargo carrier, is being fielded to meet the requirement of an infantry platoon operating in northern and mountainous regions. The SUSV will play the major role of effecting supply, resupply and evacuation of injured personnel, carrying supplies, ammunition and subsistence equipment.

The vehicles are now being produced in Sweden for the Swedish army. The U. S. Army's SUSVs will be built on the same production line, but will have diesel engines instead of the gasoline power plants used in the Swedish army version. The diesel engine is in line with the Army's goal of a total fleet capable of operating on middle distillate fuels.

This highly mobile, full-tracked vehicle has an automatic transmission

The Small Unit Support Vehicle (SUSV)

with a payload capacity of at least 3,000 pounds (including the driver), and accomodates standard U.S. military radios and litters.

The SUSV has the capability of floating at gross vehicle weight with a six-inch freeboard. In addition, it can tow the M14A1 sled, 1½-ton trailer, and the M101A1 howitzer. It is also transportable by the Army's CH-47C helicopter.

Once a need has been identified for a system which falls into the second NDI category, the Army conducts a market survey to establish contractors' interest in the proposed vehicle. When the responses have been received, an evaluation is conducted to determine which contractors, if any, have a vehicle in production suitable to meet the needs of the military.

Following the identification of one or more contractors who can fulfill the military's need, the remaining steps are the same as in any other procurement action, i.e., solicitation for bids, evaluation of proposals and award of a contract.

The last non-developmental item category includes the purchase and adaptation of commercially proven vehicles for military application in combat support and combat service support roles. A good example is the Commercial Utility Cargo Vehicle (CUCV) currently being fielded throughout the Army.

The CUCV will fill the need for a modern standard-mobility tactical vehicle for use in rear-line areas. It is replacing about 20 percent of the current M151-series ¼-ton trucks, as well as selectively replacing M561 Gamma Goats and M880-series 1¼-ton vehicles.

The CUCV series is considered as a family of vehicles having commonality of major components. The trucks feature diesel engines, automatic transmissions and power steering. They have a payload capacity ranging from 1,500–3,600 pounds and a cruising range of 250 miles. Additionally, they employ various kits to make them suitable for specific military applications.

The CUCV series includes a ¾-ton utility truck and a 1¼-ton vehicle that is available either as a cargo truck or an ambulance.

In the CUCV procurement process, prior to the decision to buy a commercial vehicle, the Army first bought samples from various contractors. These versions were purchased with heavy-duty civilian options on the vehicles so that a Force Development Test and Evaluation could be conducted to determine if a commercial system could meet the military mission requirements.

After the Army determined that a commercial vehicle could, in fact, meet these requirements, a two-step acquisition approach was initiated for the procurement of the system. Requests for proposals went out and

The Commercial Utility Cargo Vehicle (CUCV) with a AN/TRQ-32 signal warfare shelter.

proposals were received and evaluated by the government. Then bids were requested from those contractors who were considered to be responsive bidders and the contract was awarded.

In the case of the CUCV, the NDI approach permitted the Army to use the existing commercial production base of the automotive industry, while reducing system fielding time and minimizing program and system unit costs.

The use of NDI for non-combat vehicles is able to work because, unlike combat vehicles, they can take advantage of proven commercial components incorporated into their design. Thus, they benefit from a high production volume base that results in reduced overall costs.

As long as there is a need for a reduction in acquisition costs and a need to develop and field new systems for military use in a short time frame, NDI will continue to grow in importance as an alternative acquisition approach.

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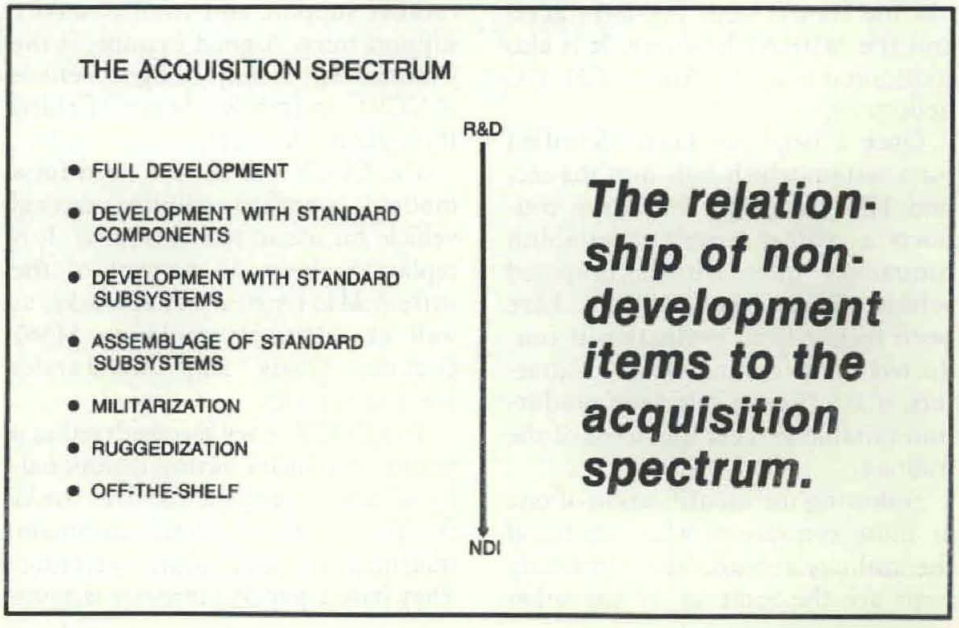

The relationship of non-development items to the acquisition spectrum.

HEL Builds 'Generic' Command Post Vehicle

The U.S. Army Human Engineering Laboratory (HEL), Aberdeen Proving Ground, MD, has designed and built a "generic" command post vehicle that will be used as a test bed to study command, control, and communications operations in nuclear and chemical battlefield environments.

A command post vehicle, equipped with sophisticated computers and radios, serves as a control center for a combat unit on the battlefield. It is part of the HEL soldier-machine interface vehicle test bed program that will ultimately link combat vehicles with the lab's New Thrust Demonstration Research Facility. Researchers will gather data that the Army will use in future large scale field tests.

The command post vehicle, initially outfitted internally for the study of field artillery command, control, and communication is self-sufficient in power requirements. An onboard auxiliary power unit (APU) and an environmental control unit (ECU) provide all the power and air conditioning necessary to maintain the vehicle's extensive computer and electronic equipment.

Initial studies will focus on the nuclear, biological, and chemical (NBC) protection systems which are incorporated in the vehicle for use by individual soldiers. To make the best use of the test bed as a tool in studying crew protective and life support systems, the vehicle is designed so that two modes of operating inside it can be studied.

One mode is operational over a 12–24 hour period with the hatches open to the outside and the soldiers in clothing that protects them in a contaminated environment. The other mode is operational over a 24–72 hour period with the hatches closed but with provision made for the crew to receive clean air as do the crews working in submarines. Approximately 20 U.S. manufacturers provided technologically advanced hardware for the vehicle test bed to make the two modes of operation possible.

Under the 12–24 hour open-hatch mode, the crew wears protective clothing and breathes filtered air through a ventilated face mask. The command post vehicle has a filtered air supply system composed of a gas turbine APU, an ECU, and an NBC filter manifold with air hoses that are attached to each crew member's protective suit.

For crew cooling during warm weather NBC operations, liquid or air-cooled vests are worn by each crew member under the protective suits. The vest-cooling concepts were developed by the Natick Research and Development Center. During these open-hatch operations, the Army's current protective clothing will be evlauated along with a protective suit concept developed by HEL.

The concept protective suit allows the wearer to drink and eat special food developed at the Natick R&D Center and to eliminate body waste while wearing the suit, using items developed under the space program.

The suit also takes advantage of a concept developed at the HEL that allows the wearer to remove the suit and enter a clean, contamination-free area without the possibility of contamination. A special type zipper is being developed which joins the suit to a special air lock and simultaneously allows the soldier to step out of the suit into the clear area in a single, safe operation.

Under the 24–72 hour NBC operation mode, the vehicle hatches are closed to the outside environment. Under these circumstances, the crew can wear standard clothing since the vehicle is sealed. Pressurized filtered air is provided to the crew compartment by the onboard APU/ECU system for breathing, ventilation, and cooling. For the 24–72 hour continuous operations, the crew uses the vehicle's onbaord facilities for food, rest, and personal hygiene.

With the alternate crew protection and life-supprt system concepts built into the test bed, the command post vehicle—when evaluated in conjunction with HEL's demo research facility—will provide valuable information about command, control, and communication operations under various nuclear and chemical scenarios.

The Army Human Engineering Lab's command post vehicle is part of a test bed program that will enable data to be collected on command, control, and communications operations in nuclear and chemical environments.

AMC P
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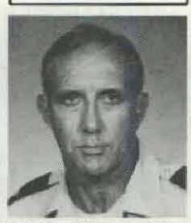
page 19.

AAH	APACHE ATE	AMWS	ADCCS	ASE	AMMOLOG
					
MG Charles F. Drenz	LTC David E. Sullivan	COL Robert T. Walker	COL John S. Ott	COL Curtis J. Herrick	COL Paul L. Greenburg

BLACK HAWK	BFVS	CAWS	CH-47	CHAPARRAL/ FAAR	COBRA	CCE/SMHE
						
COL Ralph H. Lauder	BG Claude B. Donovan	COL John Kronkaitis	COL Norbert I. Patla	COL William S. Chen	COL Donald R. Williamson	COL Leroy W. Paul

JATM	JTACMS	LAV	LHX	M9/ACE	M1	M1E1
						
COL Carl C. Neely, Jr.	COL William J. Fiorentino	COL Billy L. McClain (USMC)	BG Ronald K. Andreson	LTC Robert F. Huttner	COL William R. Rittenhouse	COL Joseph Raffiani, Jr.

9MM	NUC MUN	OPTADS	PATRIOT	PERSHING	PSE	PWS
						
LTC Michael A. Roddy	COL Nicholas Barron	COL Phillip S. Threefoot	BG Donald R. Infante	COL Robert A. Brown	COL Harry V. Daniels	LTC Andrew R. Foster, Jr.

STINGER	RPV	TAC INTEL/EW	TAC VEH	HEAVY TAC VEH	MED TAC VEH	LIGHT TAC VEH
				Photo Not Available		
COL Richard C. Dean	COL Robert S. Fairweather, Jr.	BG James C. Cercy	COL James M. Durham	Mr. Joseph Ochab (Acting)	COL Richard A. Diehl	COL Joseph A. Petrolino, Jr.

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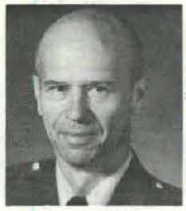
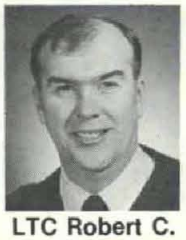
					
COL James D. Howard	LTC Gary L. Uliano	COL William H. Forster	COL James A. Frick	LTC William G. Flynn	LTC James E. Jenks

DCS (ARMY)	DIVAD	FATDS	FIREFINDER/ REMBASS	GFD	HAWK	HELLFIRE/ GLD
						
BG Bruce R. Harris	BG Charles C. Adsit	COL Paul T. Wickliffe	COL Ronald C. Baldwin	LTC John J. Martin, Jr.	COL Samuel N. Liberatore	COL William J. Schumacher

M60	M113	MEP	MPG	MICNS	MLRS	MSCS
				Photo Not Available		
COL William M. Kearney	LTC Thomas V. Abercrombie	COL Charles S. Green, Jr.	COL James B. Welsh	Mr. Frank Carbon (Acting)	COL Malcolm R. O'Neill	COL Joseph P. Fitzgerald

PLRS/TIDS	ROLAND	SATCOM	SANG	SINCGARS	SMOKE	SEMA
						
COL Henry L. Harris	Mr. John A. Robins (Acting)	COL Gene A. Venzke	BG Paul R. Schwartz	COL Edward R. Baldwin	COL Morton S. Brisker	COL William D. Taylor

TADS/PNVS	TANK SYS	TMAS	TMDE	TMOD	TOW	TRADE
						
COL David L. Funk	MG Robert J. Sunell	COL Donald R. Kenney	COL Douglas H. Barclay	LTC Robert C. White	COL James B. Lincoln	COL James W. Ball

An Industry Perspective on Spare Parts

By John W. Stahl, Jr.

Spare parts acquisition is a multifaceted and complex process, a fact usually overlooked by defense critics. It involves initial provisioning, replenishment, parts standardization and breakout, stockage policy and inventory levels, availability of appropriations, funds obligation goals, competition, technical and proprietary data, procurement strategies, and contract pricing.

This article focuses principally on the causes of spare parts pricing problems, as viewed by major defense aerospace contractors, and the scope of industry corrective actions. Although aerospace companies have initiated individual corrective actions, they have also joined together in their national trade association, the Aerospace Industries Association, to collectively resolve these spares problems.

Since mid-1983, activity in the spare parts arena can fairly be described as hectic. The barrage of new attitudes, polices, draft legislation and directives from the DOD, the services, Capitol Hill and elsewhere, has escalated steadily to an atomosphere of near chaos.

The Secretary of Defense's key edicts of 1983 resulted in a number of diverse actions in the OSD, the defense agencies and the military services. These included establishment of service competition advocates, substantial augmentation of service breakout review teams and a number of implementing directives demanding much closer scrutiny of spare parts acquisition.

Certainly, the credibility of the areospace industry—as a major part of the defense industry in general—has been tarnished by adverse media coverage dealing mainly with the relatively few horror cases. This coverage has largely ignored the predominant, and less visible side of the picture—the 96 percent of the total spares dollars which were in higher cost items where many price reductions had, in fact, been made.

Positive actions to repair credibility were obviously needed and it might be useful to take a moment to explain why. The credibility problem transcends the industry's or any single company's "image." Rather, the negative view generated by recent publicity damages the very foundation of the industry—its attractiveness as a place for competent people to work and for Wall Street or individuals to invest their resources. Both are necessary to the maintenance, over time, of the industrial base on which the aerospace industry rests.

Damaged credibility also makes it more difficult for the government to sustain public and congressional support needed to maintain adequate defense budgets.

With this in mind, member companies of our Aerospace Industries Association Spare Parts Committee met with representatives of the DOD, Air Force, and Navy to develop strategy and a plan of action. It was agreed that restoring our credibility was a top priority for both the DOD and industry, and that finger-pointing would be counterproductive.

A public awareness task group was formed to look into what industry itself was already doing to improve the process. Member companies were invited to provide information on their individual corrective actions concerning spare parts. This information was consolidated into 18 industry action initiatives and recommendations.

It should be noted that not every member company has implemented every initiative. Each of these initiatives will have a positive and beneficial impact on improving the spare parts acquisition process, in general, and promoting increased competition and lower spares costs in particular. The 18 industry initiatives are:

- Industry is notifying government procurement agencies of spares that can be procured directly from distributors/suppliers/or true manufacturers, without compromising safety and/or quality.
- Industry is advising the government of production aircraft lot releases so that the government can combine spares requirements with production lot releases, thus obtaining the benefit of economy of scale procurements.
- Industry is recommending and encouraging life-of-type requirements in concert with final production runs of significant items.
- Industry is recommending and encouraging use of equivalent off-the-shelf commercial specification spares in lieu of military specification spares where safety and performance are not compromised.
- Industry is increasing the number of spares listed in spare parts catalogs and including an economic ordering quantity for each item.
- Industry is refusing to accept orders for fewer than the economic ordering quantity without specific instructions from the customer to the contrary.
- Industry is reviewing and evaluating present spares pricing policies to see how and where they can be improved.
- Industry is combining spares quantities with other spares orders for like or similar items and combining spares and production requirements to produce lower overall spares prices.
- All spares quotations submitted to the government by industry are receiving extraordinary high level management review prior to submittal.
- Spare prices used in provisioning data submittals are now more accurate, thereby assisting the government in making budget planning more realistic.
- Make or buy decisions are being reviewed and changed whenever such changes will permit lower overall spares prices.
- Industry is advising the customer when the contractor is adding "no value" to the order, and is advising the procurement agency of the true manufacturers and/or last known procurement sources.
- The "Spare Buck" program provides specialized pricing for certain categories of parts. It allows savings in the costs of spares and in the adminstration of spares acquisition.
- Industry has been, and continues to be, an active participant in various joint industry/government programs aimed at improving the spares acquisition process, increasing competition and lowering the cost of spares.
- "Value analysis" meetings are being conducted with government customers on selected spare parts to increase the customer's awareness of the relative value and reasonableness of spare parts prices.
- Small items that require minimum tooling and planning will be considered for fabrication in special overhaul and repair facilities rather than in production shops.
- Competition advocates are being established within many companies.
- Work force awareness is being heightened by articles in company newspapers. Also, employees are more sensitive to the spares pricing issue as a result of cost savings awards to employees.

These industry initiatives were used as the basis for a series of briefings presented to high level management officials of the DOD, the services, Senate and House committees and subcommittees and their staffs. Congressional response to the initiatives has generally been favorable and has resulted in some modification to objectionable provisions in some bills.

Congressional and DOD concentration on increased competition as a panacea for spare parts procurement problems fails to fully recognize the attendant problems that can be created in meeting flight safety and product liability requirements for our products. We favor increasing effective, qualified competition. However, it must be accomplished under adequate screening and control by industry and the services. Our companies are already well along in reviewing and identifying those parts that can more practically and economically be produced by other than prime sources.

In summary, the Aeronautics Industries Association task group and its Spare Parts Committee will continue to seek improvements in the spare parts acquisition process. The goal is to produce spare parts for our products at fair and reasonable costs and, in turn, improve the operational readiness of our armed forces.

JOHN W. STAHL, JR. is director for product support in the Aerospace Operations Service of the Aerospace Industries Association. He is currently a member of the American Institute of Aeronautics and Astronautics.

Acronym List of AMC Program/Project/Product Managers

(See pages 16 and 17)

AAH . . . . . Advanced Attack Helicopter
APACHE ATE . . Apache Automatic Test Equipment (Provisional)
AMWS . . . . . Advanced Manportable Weapons System (Provisional)
ADCCS . . . . . Air Defense Command & Control System
ASE . . . . . Aircraft Survivability Equipment
AMMOLOG . . . . Ammunition Logistics (Provisional)
AWC . . . . . Amphibians and Watercraft
ARD . . . . . Armor Training Devices
AHIP . . . . . Army Helicopter Improvement Program
ATACS . . . . . Army Tactical Communications System
ATSS . . . . . Automatic Test Support Systems
AVD . . . . . Aviation Training Devices (Provisional)
BFVS . . . . . Bradley Fighting Vehicle System
CAWS . . . . . Cannon Artillery Weapons System
CH-47 . . . . . CH-47 Modernization Program
CCE/SMHE . . . . Commercial Construction Equipment & Selected Material Handling Equipment
DCS (ARMY) . . . Defense Communications Systems (Army)
DIVAD . . . . . Division Air Defense (DIVAD) Gun
FATDS . . . . . Field Artillery Tactical Data System
GFD . . . . . Ground Forces Training Devices (Provisional)
HELLFIRE/GLD . Hellfire/Ground Laser Designators
JATM . . . . . Joint Anti-Tactical Missile System (Provisional)
JTACMS . . . . . Joint Tactical Missile System (Provisional)
LAV . . . . . Light Armored Vehicle
LHX . . . . . Light Helicopter Family (LHX) (Provisional)
M9/ACE . . . . . M9/Armored Combat Earthmover
M1 . . . . . M1 Abrams Tank System
M1E1 . . . . . M1E1 Abrams Tank (Provisional)
M60 . . . . . M60 Tanks
M113 . . . . . M113 Family of Vehicles
MEP . . . . . Mobile Electric Power
MPG . . . . . Mobile Protected Gun System (Provisional)
MICNS . . . . . Modular Integrated Communication & Navigation System
MLRS . . . . . Multiple Launch Rocket System
MSCS . . . . . Multi-Service Communication System
9MM . . . . . 9MM Pistol Program
NUC MUN . . . . . Nuclear Munitions
OPTADS . . . . . Operations Tactical Data Systems
PSE . . . . . Physical Security Equipment
PWS . . . . . Petroleum and Water Systems
PLRS/TIDS . . . . . Position Location Reporting System/Tactical Information Distribution System
SATCOM . . . . . Satellite Communications
SANG . . . . . Saudi Arabian National Guard (SANG) Modernization Program
SINCGARS . . . . Single Channel Ground and Airborne Radio Subsystem
SMOKE . . . . . Smoke/Obscurants
SEMA . . . . . Special Electronic Mission Aircraft
RPV . . . . . Tactical Airborne Remotely Piloted Vehicle/Drone System
TAC INTEL/EW . . Tactical Intelligence/ Electronic Warfare System (Provisional)
TAC VEH . . . . . Tactical Vehicles (Provisional)
HEAVY TAC VEH Heavy Tactical Vehicles (Provisional)
MED TAC VEH . . Medium Tactical Vehicles (Provisional)
LIGHT TAC VEH Light Tactical Vehicles (Provisional)
TADS/PNVS . . . . Target Acquisition Designation System/Pilot Night Vision System
TANK SYS . . . . . Tank Systems (Provisional)
TMAS . . . . . Tank Main Armament System
TMDE . . . . . Test, Measurement & Diagnostic Equipment
TMOD . . . . . TMDE Modernization
TRADE . . . . . Training Devices

Industrial Preparedness Planning . . . A New Role for the Reserve Components

By COL Stanley J. Glod, USAR

As a new word in the vocabulary of the Reserve community, readiness has come to represent a significant change in the way we do business. Not only does it symbolize an adequate military capability but, more importantly, it triggers a series of critical, interdependent elements—readiness, modernization, sustainability and force structure. All of these must function together in order for the system to accomplish its mission.

Within the element of sustainability lies the need for a viable industrial base, which must possess the capacity, technology and materiel to fulfill the surge requirements of mobilization.

In the late 1970s, the Department of Defense developed an Industrial Preparedness Planning Program to ensure that industry can adequately respond to wartime requirements for defense systems. Initially, this program was given low priority and meager funding because, prior to 1978, the "short war" philosophy was advocated in defense planning, with programs primarily designed to improve initial combat capability. The need for such a capability, although vitally important, tended to blunt a more fundamental issue of whether our defense industry is adequately planned and prepared to provide materiel for conflicts of longer duration.

A significant turning point in the DOD perspective occurred with MOBEX 78, (further reinforced by MOBEX 80), which found industrial preparedness planning in poor condition. The issue surfaced again in the 1980 Defense Science Board *Report on Industrial Responsiveness* and the *Report of the Defense Industrial Base Panel,* or the Ichord Hearings, presented to the House Armed Services Committee.

The Pentagon responded to this problem in 1981 with defense guidance which recognized sustainability planning in the context of a "long war" scenario and stressed its importance during a series of follow-on mobilization exercises. Thus, industrial preparedness gained new life and a high priority in defense planning as proponents of a long war theory began to emerge both within government and throughout the private sector.

The AMC Initiative

The DOD program to enhance industrial preparedness planning now has a new found ally in the Reserve components. During a MOBEX briefing in September 1982, GEN Donald R. Keith, former commander of the U.S. Army Materiel Development and Readiness Command, directed an examination of the feasibility of utilizing Mobilization Designees (now called Individual Mobilization Augmentees, IMAs) to assist in finding industry sources for defense materiel during mobilization.

The intent of this program was first, to identify Mobilization Augmentees who are employed by or deal with such a source, and second, to use the augmentees for tasks such as locating where the capability exists to produce military items and components, converting or modifying commercial items to military specifications, or substituting a commercial item for a military one.

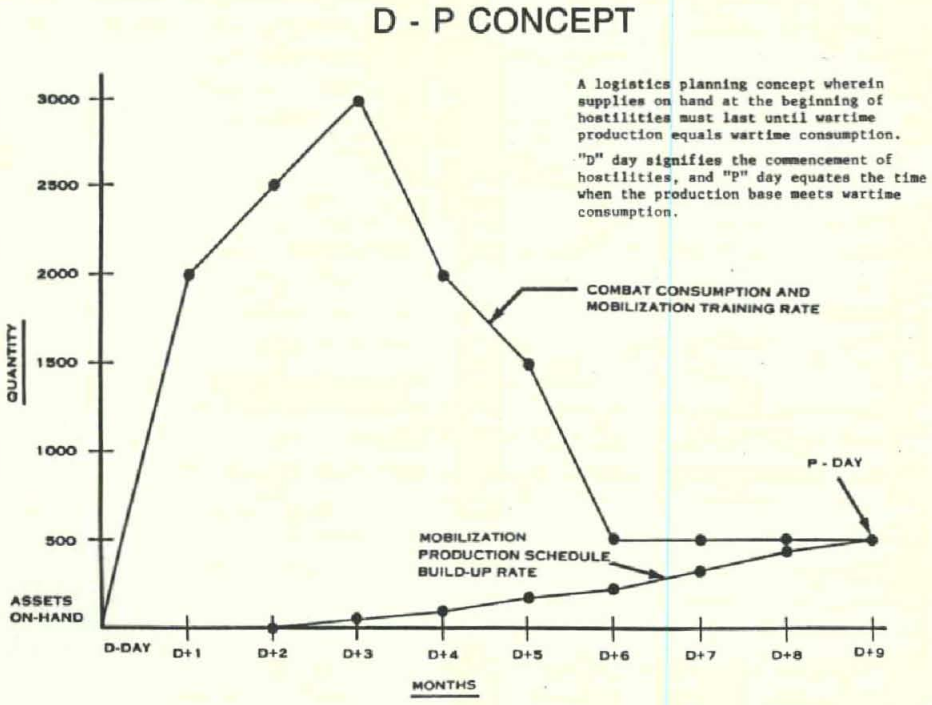
The two-fold purpose of the initiative was to improve the industrial preparedness effort prior to mobilization and, upon mobilization, to enhance the execution of those plans by utilizing IMA personnel. The initiative calls for IMA officers to participate during a two-week training cycle, or in a series of fragmented short tours, in the industrial preparedness planning process, and then, upon mobilization, to redirect their efforts to the execution of the plans which they themselves helped prepare.

In 1983, a small task force of Reserve component officers with industrial backgrounds and military or civilian RDA experience was convened. The task force participants addressed three basic objectives:

- Review of the current utilization of Army Reserve personnel in industrial preparedness planning.
- Identification of opportunities for industry associated Army Reserve personnel to make a contribution to preparedness planning.
- Identification of enhanced training opportunities for Army Reserve personnel to enable them to better serve the industrial preparedness planning effort and improve their mobilization capability.

Following an assessment of current IMA utilization and familiarization with the industrial preparedness planning process, the workshop, or Task Force One, as it came to be called, addressed a series of selected issues gleaned from several coordinating visits with DOD, DA, AMC and private industry officials. The overall purpose was to identify an approach which would provide a framework for the development of a detailed plan and to launch the program within AMC's major subordinate commands.

It was a consensus of the task force



that Army Reserve personnel can make a substantial contribution to the industrial planning effort at AMC. At the same time, such IMA utilization would create a "synergistic" result in upgrading the overall IMA Program.

AMC, on the other hand, has the responsibility to identify work requirements of preparedness planning and to match them with the skills of industry-associated IMA officers. In this regard, the files maintained by the U.S. Army Reserve Personnel Center in St. Louis, MO, were found to be neither adequate nor accurate in meeting the skill match-up requirement. Therefore, the Army Reserve Personnel Center needs to develop a more efficient indicator of the civilian employment history or skills of its membership, including those in the Individual Ready Reserve and Troop Program Units.

Industrial Preparedness Planning

In 1982, a research team from the Industrial College of the Armed Forces produced a study entitled, *Industrial Preparedness Planning, Legislation and Policy,* in which this author participated. The purpose was to develop a dialogue with industry representatives and identify potential legislation, policy and planning initiatives that could contribute to the national industrial mobilization capability.

More than 400 senior industry executives were surveyed, and their responses were compared to numerous studies previously conducted by government agencies and private industry. Prevailing attitudes on industrial mobilization and preparedness existing in industry and labor today range from skepticism to apathy, interspersed with small amounts of guarded optimism.

Many major sectors of industry and labor believe that their concerns and ideas for industrial mobilization have been ignored or buried in government reports, resulting in no action and a continuing deterioration of the industrial base.

Among those organizations familiar with the history of the planning for industrial preparedness, the predominant opinions reflect a "quit studying the problem and get on with solving it" attitude. In their opinion, for a national program of industrial preparedness to be viable there is an absolute necessity to have working lines of communication among government, industry and labor.

The present condition of the U.S. industrial base raises some very grave doubts over the ability of the nation to respond to a severe emergency. Productivity in defense and non-defense industries is directly affected by government procurement and budget policies as well as non-uniform enforcement of regulatory policies.

Further, the U.S. dependence upon foreign sources of supply for strategic and critical material will continue to increase because of government disincentives toward domestic companies and the continuing pattern of subsidized foreign competition.

Skilled manpower requirements in many basic industries such as mining, merchant marine, machine tool and electronics, are becoming more critical because of the trend toward a service type economy, and existing deficiencies inherent in the basic educational structure.

National Policy

Although executives from industry were generally quite willing to cooperate in industrial preparedness planning, there was a consensus that national policy must be better communicated to government, the public, and industry.

In 1982, the president established the Emergency Mobilization Preparedness Board and directed it to draft a presidential statement of national policy and a plan to accomplish it. To emphasize his commitment to industrial preparedness, the president stated:

> "One of the most compelling tasks still facing us is the development of a credible and effective capability to harness the mobilization potential of America in support of the armed forces, while meeting the needs of the national economy and other civil emergency preparedness requirements."

Executives from industry stressed that both government and industry

must know precisely who is in charge of industrial preparedness planning and that person must have the stature, authority and backing to discharge his responsibilities. National preparedness and mobilization requirements must be defined and industry must be apprised of government's expectations.

The ICAF study concluded that industry must become a partner with government if realistic planning is to occur and plans are to be supportable by industry. In fact, industry would be expected to produce at least 90 percent of these plans. This process could be considerably enhanced by appointing a senior person of stature from industry into an active high level industrial preparedness planning role.

Another suggested means of furthering partnership was to establish regular and well-defined communications between government and industry to dissipate the present perception that preparedness planning policy implementation is at best fragmented and *ad hoc*.

Although many study groups have identified numerous steps which can be taken to improve the planning process, including legislation and executive action, these cannot be brought to fruition until the broader administrative structure for industrial planning is strengthened, integrated with representation from industry, and adequately financed. To start this process, the following recommendations were made by the ICAF study:

- National industrial planning policy and objectives must be better articulated to receive acceptance and active support from executive agencies, the Congress, industry and the public.
- The assistant to the president for national security affairs, as chairman of the Emergency Mobilization Preparedness Board, must be vested with responsibility, resources, authority, and a mandate for comprehensive action.
- To create the desired partnership between industry and government, a prominent industrial leader should be appointed to a high level position to work directly under the chairman of the Emergency Mobilization Preparedness Board. In addition, a recognized national organized labor leader should be appointed to the board.
- The government must comprehensively define its requirements for industrial preparedness planning and national emergencies, including war.
- The national industrial base should be subdivided into critical sectors to support the defined industrial planning requirements and clear lines of communication established between the government's planning structure and the management and labor sectors of industry. Requirements should be developed through industry/government interaction. In most cases, the actual plans could be developed by industry.
- To increase the understanding of the "people" dimension of mobilization and preparedness, the research team found a need for a national military-industrial plan which:
  - —Creates Reserve component units or detachments within major industries that would provide an interface between the military and industry. In peacetime, members could get the technical training from their daily jobs and assist in industrial preparedness planning efforts
  - —Assigns military leaders and planners to industry upon the start of a build-up so that they can be relieved of government constraints and work faster to implement plans and actions within their industries.

Overall, the survey of industry stressed that timely preparedness planning action must begin now. Many studies, conferences and seminars have been conducted in recent years bearing almost identical findings.

There now appears to be adequate knowledge available regarding what steps must be taken by both government and industry. Now is the time to act decisively if the nation is to preserve its shrinking industrial base, improve its economy, increase production capacity, and realistically prepare for the future.

The Industrial Preparedness Planning-Individual Mobilization Augmentee Program presents a unique opportunity for the Reserve components to participate and contribute in a vital area of national security planning.

The Industrial College of the Armed Forces study underscores the need to broaden the scope of participation by the citizen-soldier in industrial preparedness planning. Most of all, it not only lends real-world flavor to total force effectiveness, but also enhances a greater private sector understanding of mobilization and preparedness planning.

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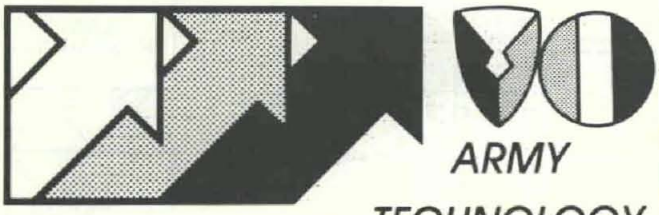
NEW THRUSTS

The Army's New Thrust Initiative . . .



A New Way of Doing Business

By James D. Lindberg

One of the greatest assets the United States has is the combination of the world's most advanced high technology base and corresponding manufacturing capability. World War II clearly demonstrated the power of a responsive manufacturing base.

Today, because of the explosion of high technology in the commercial sector, our manufacturing base is capable of producing sophisticated weapon systems. We have depended upon this asset for years to counterbalance the huge numerical superiority of the Warsaw pact forces in Europe. It is an advantage that the Soviet Union cannot wrest from us despite their best efforts, because it has its roots in the free enterprise nature of our economic system.

This advantage is not a real one however, unless it results in delivery of mass produced quantities of technologically superior weapons to our front line troops. We must field these weapons well before our adversaries acquire a similar capability.

In recent years, there has been a great deal of concern that our lengthy weapons acquisition process is preventing us from exploiting this advantage. If the Soviets can buy or otherwise acquire similar technology and field it nearly as fast as we can, then we have lost the advantage of this asset.

New Thrust Initiative

The Army's new thrust initiative provides a way of shortening the acquisition process in order to get high technology from the laboratory and the commercial sector onto the battlefield in time to be of real value to the combat Army. The new thrust initiative is a new way of doing business, one designed to meet the requirements of AirLand Battle now and beyond the year 2000.

The Army Science Board 1981 Summer Review included an assessment of the TRADOC AirLand Battle 2000 concept, which is now Army 21. One of their conclusions was that in order to make AirLand Battle 2000 a reality, we must concentrate on using technologies in which we have a strong lead. They also concluded that we must be systematic and deliberate in quickly delivering these technologies to the front line soldier. Three additional conclusions were as follows:

- If technological advancements are going to work to our advantage in future wars, they must be in areas that are readily producible by our industrial base.
- Technology must be applied as a force multiplier. It must permit fewer weapons to achieve decisive results, and permit fewer soldiers to accomplish more on the battlefield.
- Both doctrine and materiel developments must be considered together in terms of the whole military system when technological changes are introduced. A combat force can no longer be a mere aggregation of separately developed systems.

Technology Thrusts

As a result of these and other recommendations by the Army Science Board, the Army has chosen five technology thrust areas for priority funding. The new thrust initiative was then developed to focus budget prioritization and our technological base program on these five thrusts.

The first of the five new technology thrusts is Very Intelligent Surveillance and Target Acquisition systems (VISTA). The important concept here involves the netting together of various ground and airborne target acquisition systems as well as battlefield environment sensors such as meteorological data acquisition systems and nuclear, biological, and chemical (NBC) agent alarm devices.

Some examples of systems currently being developed or already fielded that fall into the VISTA category are a Mobile Elevated Target Acquisition System, a Tactical Weather Intelligence System, the AN/TPQ-37 Firefinder radar, and Scout helicopters.

The VISTA concept embodies three main features: on board processing of sensor information to reduce the load on communication links; combining data from many sensors to develop an intelligent picture of any facet of the progressing battle; and distributing real time data that will get the right information to the right battle element at the right time. State-of-the-art technology will be used to net target information and environmental condition sensors into a combat information work station. Here, processors will handle sensor and other communications interfaces and perform multisensor data processing tasks.

The second new thrust is Distributed Command, Control, Communications, and Intelligence, or DC^{3}I. This area includes battlefield com-

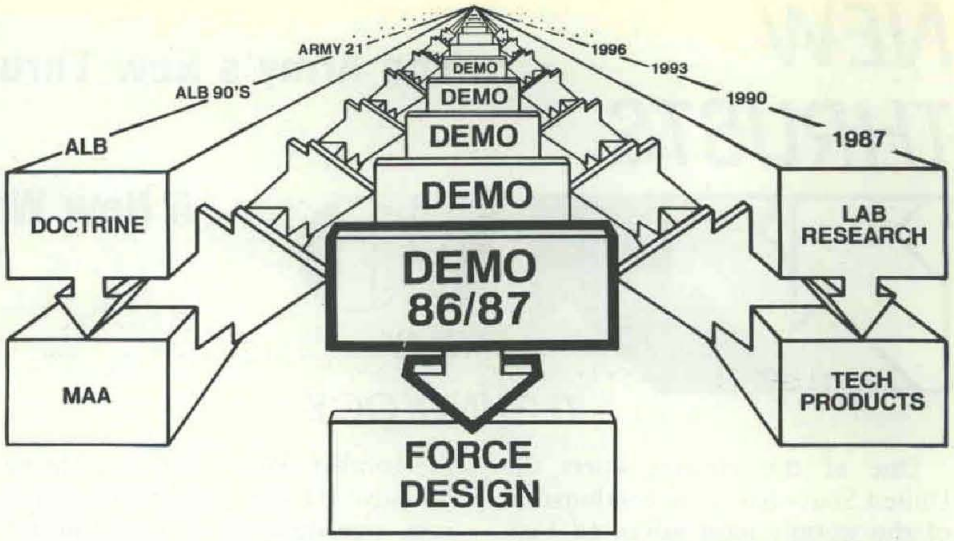
munications networks such as radio, fiber optic and millimeter wave systems, and intelligent work stations for battlefield data base management. Central to the DC³I concept is the dispersal of command post cells for improved survivability. We intend to take advantage of the rapidly developing electronic information processing, data transfer and communications technology that exists in our commercial sector.

VISTA and DC³I capabilities will be a big step toward meeting Army 21 requirements. We will then need highly responsive fire support systems that can engage and destroy targets as they appear and in synchronization with the scheme of maneuver. The third thrust area, Self Contained Munitions, will provide an efficient means for attacking stationary or moving point targets in what will be a target rich environment. The Army buys munitions in great quantities, of course, but what we need now are smart munitions that can discriminate on the basis of target value.

In the past, smart munitions have been too expensive to be affordable in the quantities that we need. Therefore, the challenge is to develop munitions that are both smart *and* affordable in sufficient quantities.

A fourth thrust is the Solider Machine Interface. It is focused on technologies such as automation and robotics to enhance the capability of the individual soldier and to improve on his training.

The shrinking size and educational quality of the Army's primary recruiting pool and the increasing technical complexity of equipment make the soldier machine interface area extremely important. The number of qualified recruits will be decreasing at a time when the sophistication of weapon systems is increasing. Improving the efficiency of the interaction between the soldier and the equipment he operates is becoming an increasingly important force multiplier on the battlefield. This will require that we consider human engineering and training throughout the materiel acquisition process to a much larger degree than we have done in the past.



The repetitive demonstration process. Combined arms field exercises will bring technical products from the laboratory and demonstrate them together in realistic brigade level scenarios defined by mission area analysis and emerging Army 21 doctrine.

A fifth technology area in the new thrust initiative is Biotechnology. It includes new biological techniques for detection and warning systems as well as for prevention and treatment of diseases, injuries, and the effects of enemy NBC actions. Biotechnology offers us another major force multiplier by minimizing the period of time an individual soldier is incapacitated on the battlefield.

New Thrust Demonstration

So far, we have seen that the new thrust initiative will single out five technological areas for priority attention in the equipment acquisition process. But what is really new about the Army's new way of doing business? The answer is the new thrust demonstration process which begins with DEMO 86/87 in the last quarter of CY 1986. The heart of the demonstration process is the combining of both new technologies and new operational concepts in a combined arms experiment. These experiments will be held every few years.

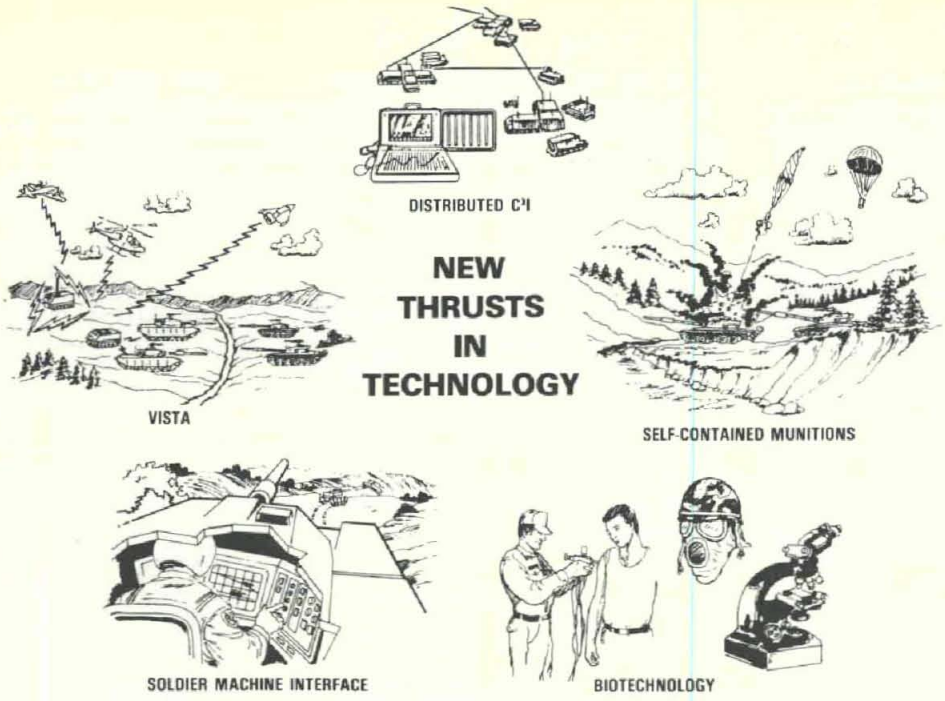
It is important to recognize that each demonstration is an AMC-TRADOC effort with FORSCOM support. TRADOC participation will insure that the experiment incorporates military operations and concepts that are consistent with progress toward AirLand Battle and emerging Army 21 doctrine. The AMC role will be to field systems from the new thrust technologies that represent the current state-of-the-art in those areas.

Conduct of the demonstration will require several months. The results are expected to provide a definitive statement about which technological advancements are actually ready for use, and how they can contribute to the total brigade and division effort. The demonstration process is expected to permit the Army to make choices about prototype systems that are to go into full scale development or production.

It is at the conclusion of a successful demonstration that our new way of doing business will significantly shorten the materiel acquisition process. It will do this by skipping parts of the advanced development or engineering development phases that have been so time consuming in the past.

Systems that are successful in the demonstrations, and that are sufficiently mature technologically to be manufactured *in sufficient quantity at an affordable cost,* will be selected to go directly into full-scale development or directly into production.

A significant "funding wedge" is being built into our budget process, beginning in FY 1987. It will cover full-scale development and produc-



Five technology thrust areas chosen by the Army for priority funding.

tion costs for successfully demonstrated systems.

As we modify both materiel and doctrine to move toward AirLand Battle or Army 21 concepts, we find that many significant changes are occurring at the brigade level. Because of this, and because any larger effort would be almost unmanageable, the first demonstration, the DEMO 86/87 experiment, will be at the brigade level. It will incorporate enough of a brigade size structure to allow us to experiment with and evaluate the impact of our new concepts and technologies.

The actual elements that will be fielded represent what we call a "brigade slice," those parts of a brigade that are needed to demonstrate its surveillance, target acquisition, intelligence, command, control, fire support, and maneuver functions in the operational context of AirLand Battle.

This new approach to business will require that system decisions be considered in terms of their effects on the Army as a whole. We can no longer simply look at the evaluation of one weapon system separate from others. Each system that is evaluated in the demonstration process must be examined in the context of its relationship to the principles of *agility, commander initiative, depth of combat,* and *synchronization of forces,*— the principles of AirLand Battle and Army 21.

Successful conduct of the materiel development and acquisition process, along with the development of AirLand Battle and Army 21 doctrine, will require a much greater degree of coordination between TRADOC, AMC and the defense industry and a greater sense of discipline as well. We in the Army RDA community must learn to expedite state-of-the-art technologies as demonstrated by the new thrust demonstration process. We must also bring successful developments into production quickly. We must not be too distracted by super technologies that seem to remain forever just over the horizon, or that stay too expensive for use in production quantities. At the same time, industry, partly through judicious application of its IR&D funds, must insure that systems that are candidates in the demonstration process can actually be manufactured in quantity, and at a cost the Army can afford.

LTG Robert L. Moore, the HQ AMC deputy commanding general for research, development and acquisition, has chartered the newly formed Thrusts/Demonstration Office with the mission of "planning, managing, executing and documenting the thrusts demonstrations undertaken as part of the RDTE program." One of its tasks is to prepare a plan to accelerate the development and acquisition of those new materiel items which are successful in the demonstrations. Dr. Harry Gieske is heading this office as the new thrusts DEMO manager.

Our nation has a powerful lead in many areas of technology, and in particular, in the electronics industry, as evidenced by the spectacular growth of computer and communications related products. This lead, coupled with our manufacturing capabilities, is an advantage that is uniquely ours, and one that our adversaries have not come close to matching.

For too long the Army's materiel acquisition process has been too slow to take real advantage of this powerful asset. The new thrust initiative will go a long way toward rectifying this situation. We need to make this initiative emerge as a real partnership between AMC, TRADOC, and industry at the beginning of the materiel acquisition process. We also need to make each demonstration in turn bring us closer to meeting the evolving requirements of modern Army doctrine.

JAMES D. LINDBERG is a research physicist with the U. S. Army Atomospheric Sciences Laboratory, White Sands Missile Range, NM. He is currently working on a development training assignment in the HQ AMC Thrust/Demonstration Office. He holds a BS degree in physics from Washington State University and an MS degree in physics from the University of Texas.

Domestic Technology Transfer

The expression "technology transfer," which has been used in industry and academia for the past two decades, has generally meant the *domestic* transfer of technology. However, during the past five years there has been a significant increase in the use of the term and a significant change in its meaning. Technology transfer is now often interpreted as the transfer of technology to other nations.

This mixture of meanings has caused some confusion and has had a negative impact on the pursuit of domestic technology transfer. For example, technology transfer is said to be in the "public interest," is claimed to be a taxpayer's right, and is praised because it optimizes defense spending by providing "spinoff" benefits to the civilian community. On the other hand, technology transfer to other nations is criticized for "giving away the store." The truth is that both types of technology transfer are important and we must do both with equal formality. Recent issues of *Army RD&A Magazine* have addressed the foreign aspects of technology transfer. This article addresses the importance of the Army's role in domestic technology transfer.

In 1974 the Army recognized the importance of sharing its technology with the civilian community. In fact, this concept was considered so important that Army Regulation 70–57 was issued in 1974. It addressed the concept of an active program to transfer Army developed technologies to state and local governments.

The Army further extended the concept of positive exchange of technology by co-sponsoring a NATO conference on technology transfer in Estoril, Portugal in 1976. The three services began expanding their activities during 1977–79. This increased activity attracted the attention of Congress and provided a firm "base of knowledge" from which the Congress drafted the Stevenson Wydler Act of 1980 (PL 96–480).

Because this act, in essence, simply formalized the ongoing government domestic technology transfer activity, there was little change necessary for the Army to fulfill its provisions. The Army has, however, stepped up its activity and now performs many functions with a positive approach, rather than the previous "collateral-duty" approach.

Army Regulation 70–57 was rewritten in 1982 to further emphasize the provisions of Public Law 96–480. The proponency for this regulation is the Office of the Deputy Chief of Staff for Research, Development and Acquisition, DA.

AMC is the executive agent for fulfilling the provisions of Public Law 96–480, for coordinating the Army-wide activity in domestic technology transfer, and for managing funds to support this function. Formal procedures for domestic technology transfer began in 1981 with the following activities:

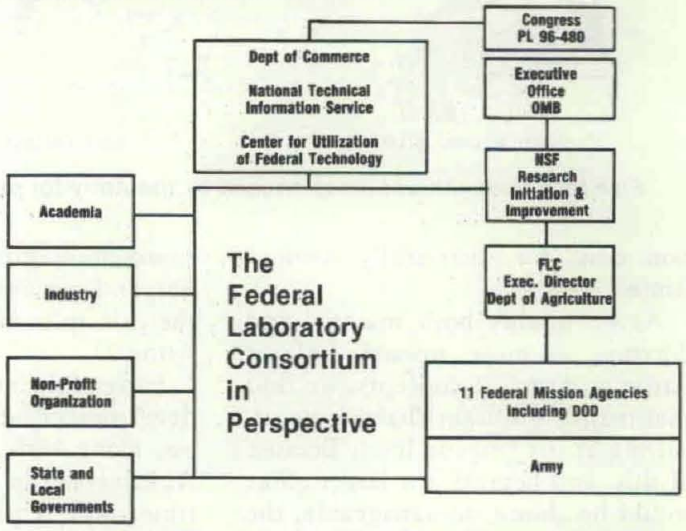
- A budgeted item was identified to support the Army portion of the Federal Laboratory Consortium activities.
- A budgeted item was identified to provide seed money for the Army labs that need some support for technology transfer projects.
- A list was compiled of points of contact responsible for domestic technology transfer activites in each lab.
- An Army-wide meeting of representatives from each laboratory was called in Washington to "set the stage" for coordination of Army domestic technology transfer activities.
- A plan was established to hold semiannual Army meetings as an add-on to the Federal Laboratory Consortium meetings to optimize the Army coordination.

The Federal Laboratory Consortium for domestic technology transfer was established in 1974 by voluntary participation of several government representatives. Its objectives are to actively pursue projects to inform the public of government developed technology, and to aid in locating government developed technology that will fulfill public needs.

Many applications of these technologies are completely unrelated to the government mission for which they were developed. For example, explosives technology (controlled positive confined pressure) is being transferred to the medical field to enable the pulverizing of kidney stones without surgery. Another application uses meterological wind pattern information to form a basis for disaster warnings when hazardous materials are accidently spilled.

The consortium maintains a network of technology "agents" who are dispersed by geographic regions. They express "solutions looking for problems." The objective is to make maximum prompt use of the results of research and development of the mission agencies.

Public Law 96–480 requires preparation of a biennial report for Congress describing the domestic technology transfer accomplishments of each government department. The Army labs submit narratives of their transfer activities to AMC where they are combined into an overall Army report of activities and forwarded to DOD.



The individual service reports are merged at DOD into a single report which is forwarded to the Department of Commerce. All reports sent to the Commerce Department are then merged into a government-wide report which is forwarded to Congress.

The Public Law requires this report every other year. However, the Army requires a yearly report to assure that a regularly paced effort is continuing in the laboratories.

Some labs have asked how much effort to devote to the domestic technology transfer program. It is likely that the technologies of some laboratories are more appropriate to transfer to the civilian sector than those of other labs. This is expected and is acceptable.

On the question of what is reportable, it is recommended that a small local laboratory committee review their in-house work, outreach work, research paper presentation, state and local government interaction, and in-house expertise.

The laboratory domestic technology transfer representative should look at all on-going work within the lab and prepare an assessment of each effort which has application potential in the civilian sector. These assessments are published by the Commerce Department for government-wide distribution.

Any Army laboratory interested in additional information on domestic technology transfer should contact: Jack Kolb, U.S. Army Materiel Command, ATTN: DRAMC, 5001 Eisenhower Avenue, Alexandria, VA 22333-0001, AUTOVON 284-8671, commercial (202) 274-8671.

The preceding article was authored by Jack Kolb, principal Army technical information officer, Office of the DCS for Technology, Planning and Management, HQ AMC.

SWL Accepts First AN/TRQ-32(V)1 Improved Units

The U.S. Army Electronics R&D Command's Signals Warfare Laboratory (SWL) has accepted the first production units of a product improved AN/TRQ-32(V)1 Radio Receiving Set.

This set, which is on schedule and within budget, is a mobile multi-station, ground-based, direction finding and intercept system that supports the Army in the tactical environment.

A competitive contract to build multiple product improved systems was awarded in June 1982 to the Magnavox Government and Industrial Electronics Co. of Fort Wayne, IN. The first production systems were accepted by the government in May 1984, just 23 months later.

The AN/TRQ-32(V)1, in addition to now being current with sate-of-the-art technology, is mounted upon the new M-1028A1 (CUCV) 1¼-ton truck. The previous version of this system was fielded in the late 1970s and required a trailor-mounted power generator which was towed behind the system prime mover.

In addition, environmental control in the previous version was somewhat bulky and, being mounted inside the shelter, produced excessive noise. The improved version uses a hydraulic generator/air conditioner mounted on the front of the shelter over the cab of the truck. This shelter-mounted unit is driven by a hydraulic pump connected to the power-take-off from the M-1028A1 transfer case.

As a result of this product improvement program, the U. S. Army now has a completely self-contained, truly mobile system. Since it is readily transportable by military cargo airlift and can be deployed and operated within minutes after arrival, it is ideally suited for use by today's highly mobile forces.

"This is a very significant PIP," said project leader Tom Robertson of SWL, "in that a considerable amount of redesign was necessary." That makes the 23-month span it took to accomplish the PIP all the more remarkable, he suggested.

"We took very few short cuts. The system has met all performance requirements and is fully supportable. A program of this nature requires a lot of sacrifice—a lot of long nights from a lot of people," said Robertson.

The AN/TRQ-32 (V-1) mounted on a 1¼-ton truck.

Belvoir Studying High Temperature Antifreeze

The Belvoir Research and Development Center, Fort Belvoir, VA, is developing a high temperature antifreeze that will help Army engineers design a small, high efficiency engine and cooling system for combat vehicles.

The fluid will be effective at temperatures up to 300 F, compared to the Army's present ethylene glycol—water concentration which operates at temperatures of 190–200 F.

"The antifreeze should have a high boiling point, low freezing point and be able to protect the various metals of the cooling system against corrosion," says Marjan Kolobielski, a Belvoir R&D Center scientist responsible for the project.

Based on a survey of various fluids, aqueous military antifreezes containing high percentages of ethylene glycol were determined to be the best high-temperature fluids in the closed cooling system, allowing the coolant and engine to operate at a higher temperature.

The specific product selected for testing was the present Military antifreeze concentrate MIL–A–46153, composed of ethylene glycol and inhibitors. In current military practice, MIL–A–46153 is admixed with water to provide effective heat transfer and protection against freezing above −55 F ambient temperature. The resultant concentration of MIL–A–46153 antifreeze in the mixture will vary from 33 to 59 vol percent depending upon prevailing ambient air temperature.

For testing, several solutions diluting the antifreeze concentrate (MIL–A–46153) with distilled water were prepared. These solutions were separately enriched with an additional 3 percent amount of the recently-developed antifreeze extender described under Military Specification MIL–A–53009.

The diluted antifreeze mixtures were then evaluated for their corrosion inhibition by a severe laboratory method—the Simulated Service Test. In this method, bundles of different metals were exposed to hot (i.e., 250 F) circulating antifreeze mixtures containing additional corrosive salts. The Simulated Service Test is normally conducted at a test temperature of 190 F. A cast iron pump was used in most experiments. The test was run for about seven weeks, a period of time which, considering the coolant flow rate, corresponds to about 60,000 miles of vehicle field service.

Based on the corrosion test results, there are several potential antifreeze mixtures which lend themselves to high temperature applications. These are antifreeze mixtures containing 60 weight percent of MIL–A–46153 without the antifreeze extender (MIL–A–53009) and antifreeze mixtures with the antifreeze extender containing 50, 60, or 80 weight percent of MIL–A–46153.

In future applications, the selection of the appropriate antifreeze mixture will depend on its anticorrosive characteristics and the expected operating temperature. Only two antifreeze mixtures were tested with an aluminum pump and both provided protection against corrosion of aluminum. Both contained the antifreeze extender (MIL–A–53009) in mixtures containing 50 or 60 weight percent of MIL–A–46153. These promising results are to be confirmed by engine dynamometer testing or, possibly, in-vehicle tests.

MICOM Developing New Warhead

The Spike hypervelocity rocket, an in-house MICOM technology demonstrator that has speed and accuracy almost like a rifle bullet, is being fitted with a new warhead that will give it the effect of a shotgun blast.

Spike is different from other Army rockets in that its warhead doesn't contain explosives. Instead, a one-pound tungsten rod traveling 5,000 feet per second hits so hard that its kinetic energy liquefies armor plate, allowing the warhead to penetrate.

Spike originally was intended for use against heavily armored targets but its small size, speed, accuracy and inexpensiveness prompted researchers at the U.S. Army Missile Command, Redstone Arsenal, AL, to try a different type warhead that would make the rocket more useful against lightly armored ground targets and aircraft.

They are now developing a warhead for lightly armored targets containing "hypervelocity penetrators" of tungsten that resemble large nails with fins on the ends. Eighteen such penetrators will be released in a single shotgun swarm.

This multiple penetrator warhead for Spike is being developed in anticipation of putting the rocket on helicopters and also on the new "Humvee" utility vehicle. In the latter application, the rockets would be paired with Stinger guided missiles and high technology sensors in a light air defense system being developed for roof-mounting on the Humvee.

"The beauty of this rocket is that it can be mounted on almost any Army aircraft and on a variety of different types of ground vehicles," said Jim Burt, Army Missile Laboratory's lead engineer on the Spike project. "The two prime carrier vehicles, as it appears right now, are helicopter-borne systems and Humvee-borne systems," he added.

Able to travel almost a kilometer a second, Spike prevents the target from having time to react to the launcher vehicle. "It gives an opportunity to kill targets quickly and cheaply. The cost is extremely low compared to a guided rocket that can do the same job," Burt said.

Engineers calculate Spike rockets would cost less than $500 each with multiple penetrator warheads. Another potential advantage of Spike is that it could give the Army a different kind of kill mechanism against enemy armored vehicles. Burt notes that armored vehicles are primarily designed to defeat chemical warheads. If they have to design to defeat both chemical and kinetic energy (hypervelocity) warheads, it makes their design problem a lot more complicated.

Spike is a new development, but its concept—a small, inexpensive yet accurate and effective hypervelocity rocket—goes back a long time, at least until the early 1960s when the Army Missile Laboratory built a small experimental rocket which was fast but not accurate. In the late '60s, another hypervelocity weapon was built, this one a big, 2-stage rocket that worked but was never produced.

A decade later, Army Missile Laboratory Director Dr. William C. McCorkle asked his Aerodynamics Branch in the Systems Simulation Directorate to take another look at the concept.

"We started in 1977 at a low level, not much funding and not much interest among potential users," recalls Burt, who joined the laboratory in 1960 as a part-time student worker.

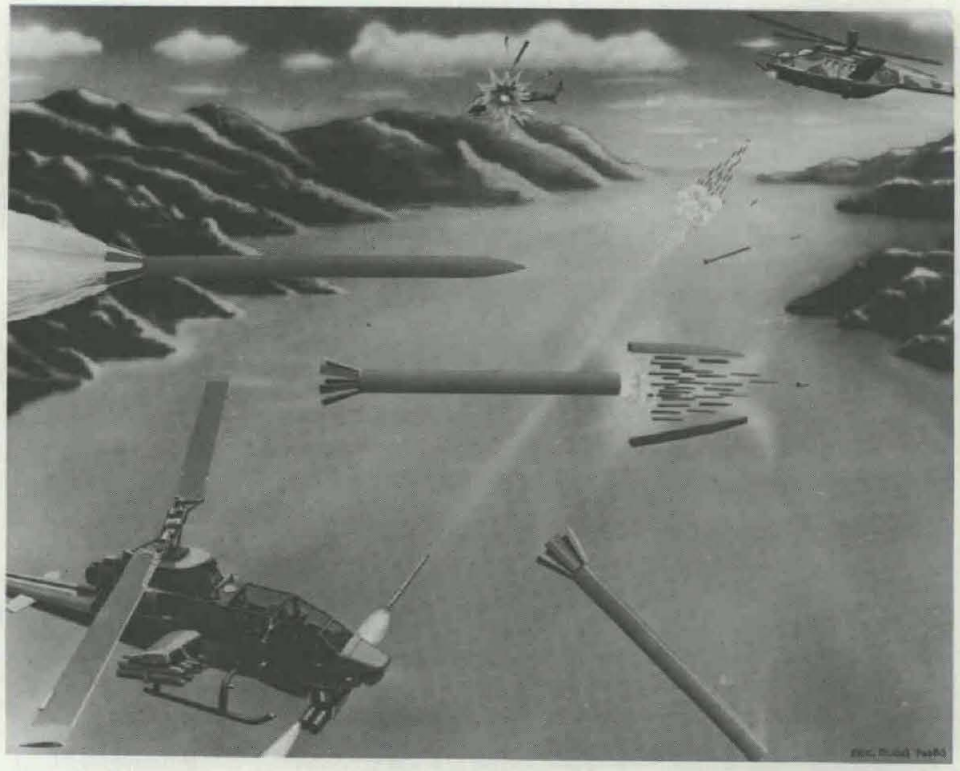
The first Spikes weren't too promising. They were costly, they blew up in the launch tube and weren't sufficiently accurate. All three problems stemmed mainly from the metal motor case. It was expensive to make, tended to burst from internal pressure, and accuracy was impaired by misalignment of the motor case and rocket nozzle which were built separately and bonded together.

These problems were solved, however, with a new motor case which uses a metal mandrel wrapped with graphite fiber and then overwrapped with kevlar. This inexpensive composite-material case can withstand the intense internal pressure and also solves the misalignment problem since the motor case and rocket nozzle are all one piece.

In flight tests, Spike has demonstrated the best accuracy ever achieved with a rocket whose motor burns outside the launch tube. A 130-round test program was completed last fall that included shots which demonstrated the rocket could be fired from a helicopter accurately and without damaging the aircraft.

Spike uses a launcher that, like all other aspects of the rocket, originated in the Army Missile Laboratory. The launcher is a 6-round throwaway clip developed by the Structures Directorate.

In battle, Spike would likely be employed in multirocket barrages. "The concept is not to have a high probability of killing a target with one rocket. The chances of hitting a small target at 1.2 kilometers (Spikes's effective range) with a single rocket, even one as good as this is, are small. But if you use, say, nine rockets, the probability goes way up," explained Burt. Spike is unusual in that it has been built virtually in its entirety inside the missile laboratory.



Artists drawing shows Spike with multiple penetrator warhead being fired from a helicopter.

From The Field ...

82nd Airborne Gets New M249 Machine Gun

The Army's new M249 Squad Automatic Weapon (SAW) Machine Gun has been handed-off to the 82nd Airborne Division, the first Army unit to receive the weapons. Presiding at the hand-off ceremony was BG Robert W. Pointer, Jr, commander of the U.S. Army Armament Research and Development Center—the developer of the new weapon.

The M249 Machine Gun is designed to fill the need of an automatic weapon in the infantry squad. It replaces two M16A1 Rifles (used as automatic rifles) in the Army infantry squad and three in the Marine Corps infantry squad.

The new machine gun has twice the effective range and six times the sustained fire rate of the rifle that it replaces. The M249 fires 5.56mm, heavy bullets, M855 ball and M856 tracer ammunition assembled in a 4 ball/1 tracer ratio. Disintegrating link belts feed ammunition from a 200-round plastic container attached to the weapon. Ammunition can also be fed from 20-round or 30-round M-16 rifle magazines. The normal rate of fire is 700–850 rounds per minute.

The Squad Automatic Weapon has an overall length of 39.5 inches with an 18.5-inch barrel. It weighs 15.5 pounds empty, with sling, bipod and cleaning equipment. The weight is 220 pounds with a loaded ammunition carrier with 200 linked rounds. The gunner will normally carry 600 rounds with him (three 200 round containers).

The M855 ball round is based on the SS109 ball cartridge manufactured by Fabrique Nationale (FN), Herstal, Belguim. It incorporates a steel penetrator in the nose of the bullet and can penetrate a U.S. helmet at almost three times the distance of an M193 ball round.

The M856 tracer is also based on a Belgian (FN) round, the L110. It has a daylight trace visibility of almost twice the distance of the standard M196 tracer round. SAW M855/856 rounds conform fully to the new NATO Second Caliber Standardization Agreement (STANAG 4172), to insure interoperability among 5.56mm weapons manufactured by various NATO members.

Deployment of the M249 SAW will greatly improve the firepower and survivability of the infantry squad on the modern battlefield.

2 Hotlines Established at Belvoir Center

Two hotlines set up by the Army's Belvoir Research and Development Center, Fort Belvoir, VA, are helping soldiers with their questions about camouflage and fuels and lubricants.

The Camouflage Action Line, operated by the Belvoir Center's Combined Arms Support Laboratory, handles inquiries about camouflage colors, patterns and painting requirements. Center scientists average three to four calls a day from all over the world.

Soldiers with questions about fuels and lubricants can call the Fuels and Lubricants Hotline operated by the Materials, Fuels and Lubricants Laboratory. This hotline receives about 20 calls a month from units with problems like clogged fuel lines or soldiers with questions about new specifications for lubricants. Sometimes a laboratory representative will visit a site to study a particular problem.

Both hotlines operate 24 hours a day, seven days a week. During working hours someone from the laboratory will assist the caller. After hours, an automatic answering machine will record the caller's message for action the next working day.

Soldiers with questions about camouflage can call (703) 664-2654 or AUTOVON 354-2654. Fuels and lubricants questions can be answered by calling (703)664-3576/4594 or AUTOVON 354-3576/4594.

Army Tests New Mine Scattering System

Army field commanders may soon have the ability to emplace mine fields when and where they desire at various patterns and densities in relatively short periods of time using the Ground Emplaced Mine Scattering System (GEMSS).

The system is currently undergoing testing and evaluation at the Combat Systems Test Activity, (formerly the Materiel Testing Directorate) Aberdeen Proving Ground, MD, according to Gary Leadore, a test director in the Special Ordnance and Air Defense Division.

Operational testing at APG is being conducted by the Military Support Directorate with maintenance being conducted by both civilian and military personnel. Military combat engineer crews assigned to testing the Ground Emplaced Mine Scattering System say it will greatly enhance the mine laying capability and mission in the field.

"The system consists of an M74 anti-personnel mine, an M75 anti-tank mine, the M79 practice mine and the M128 ground vehicle mine dispenser," Leadore said.

Leadore notes that the system's prime movers are the M113 family of tracked vehicles and the M800 series five-ton trucks. The M128 is capable of dispensing mines while traversing any terrain which is negotiable by the prime mover. The emplaced minefield may be all anti-tank, all anti-personnel or mixed mines at predetermined ratios, according to Leadore.

The mine scattering system was developed to provide the Army with a capability compatible with the tactical concepts of the 1980s. The concepts include the ability to selectively and rapidly disperse anti-tank and anti-personnel mines under all climatic conditions.

The GEMSS currently undergoing testing at the Combat Systems Test Activity is the third generation of the family of

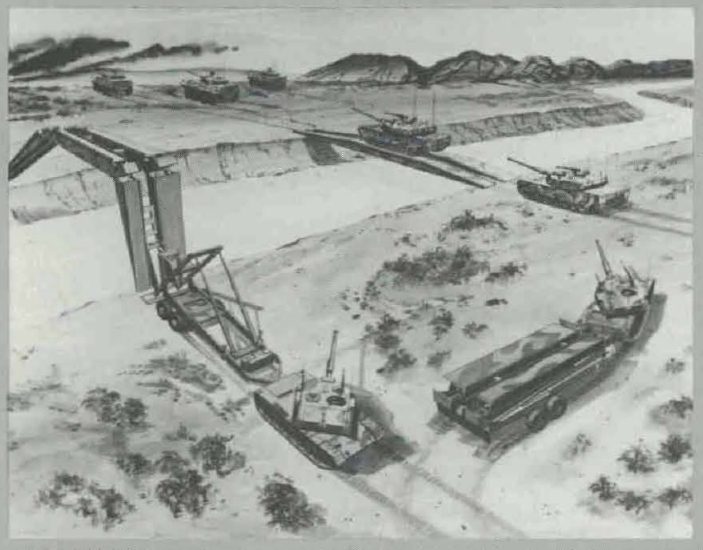
The Ground Emplaced Mine Scattering System

scatterable mines. The system was type classified standard in the early part of 1980, but the Department of the Army required that changes be made prior to release of the M128 dispenser to the field.

DA requirements included modifications to the system for braking with tracked vehicles, modifications to prevent inadvertent mine launch, and verification of the new technical manuals for operation and maintenance.

During the test, serveral critical issues will be addressed, including assessing the performance characteristics of the production hardware to meet stated Army requirements. Test efforts will also determine if the human factors, environmental and safety aspects of the system are acceptable and if the integrated logistics support elements are adequate to support the system in the field.

Contract Calls for 2 Prototype Bridges



This MLC70 trailer-launched bridge under development by the Army's Belvoir R&D Center is designed for air transport to improve the rapid deployment of the U.S. Marine Corps.

The Army's Belvoir Research and Development Center, Fort Belvoir, VA, has awarded a $3.6 million contract to Israel Military Industries for the design and fabrication of two prototype trailer-launched bridges for the Marine Corps.

Specifications call for the bridges to be 24-meter structures capable of supporting 70 tons. In operation, they will be mounted on a trailer/launcher which can be towed by a tank. The entire unit will be air-transportable by a C–130 aircraft. Under terms of the multiyear contract, the first prototype will be delivered in June 1986 with the second unit following about six months later.

Belvoir Developing Safer Hydraulic Fluid

A fire-resistant hydraulic fluid that will reduce the chances of crew-compartment fires in the Army's combat vehicles is currently under development at the Belvoir Research and Development Center's Materials, Fuels and Lubricants Laboratory.

The need for a hydraulic fluid with increased fire protection was uncovered in an Ordanance School post-battlefield analysis of the 1973 Middle East War where hydraulic fluid fires in armored vehicles were clearly identified as contributing to the loss of life and equipment. These fires usually occurred where hydraulic systems lines and components were exposed.

Subsequently, the Army replaced its petroleum-based hydraulic fluid (MIL–H–6083) in 1974 with an Air Force/Army developed, synthetic hydrocarbon based substance (MIL–H–46170) that featured improved fire-resistant properties.

However, since the improvement in fire-resistance was marginal, the adoption of MIL–H–46170 was considered an interim solution. To develop a truly nonflammable hydraulic fluid, a completely halogenated material is being used. Tests show that this fluid can be diluted with up to 20 percent of currently-used hydraulic fluid without losing its fire-resistant traits.

Presently, efforts are directed toward developing a fully formulated, non-flammable hydraulic fluid that can be used in existing systems. Factors that may affect the eventual fielding of this fluid include the high specific gravity and volatility of the base fluid.

AMC Publishes New Statistics Handbook

Availability of a new publication in the Engineering Design Handbook Series—DARCOM–P 706–103, *Selected Topics in Experimental Statistics With Army Applications*—has been announced by the U.S. Army Materiel Command. This handbook upgrades the 20-year-old existing set of five handbooks on statistics.

Practicing statisticians should find the new handbook to be a valuable tool in solving statistical problems related to Army materiel. Specific topics include precision and accuracy of measurement procedures, sample size determination, sensitivity analysis, and common statistical tests of significance. The handbook contains 542 pages, including 19 illustrations and 100 tables.

Department of the Army activities may obtain the handbook by submitting DA Form 17 to Commander, Letterkenny Army Depot, ATTN: SDSLE-SAAD, Chambersburg, PA 17201.

Handbook Provides Producibility Guidance

Publication of Military Handbook 727, *Design Guidance for Producibility*, has been announced by the U.S. Army Materiel Command. It replaces AMCP 706–100 (same title).

Prepared under the guidance and direction of AMC's Office of the DCS for Manufacturing Technology, the handbook provides assistance to design and producibility engineers to ensure that producibility receives prime consideration in the design of an item. Specific topics include basic concepts of producibility; producibility engineering; and common producibility consideration for metal components, plastic components, mechanical assemblies, composite compounds, and electronics.

The new publication was produced as part of the AMC Engineering Design Handbook Program and contains 524 pages, including 299 illustrations and 183 tables. Requests for the handbook should be submitted on DD Form 1425 to: Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, PA 19120.

Career Programs...

Visiting Professors Supplement USMA Faculty

The United States Military Academy (USMA) at West Point, NY, offers a comprehensive 4-year academic program leading to a bachelor of science degree and commissioning as a second lieutenant in the U. S. Army. The curriculum strikes a balance between math, science, engineering, humanities, and public affairs subjects.

Although the facility at the academy is predominately military, it is supplemented by a civilian academician in each academic department. For example, the department of engineering annually invites a distinguished authority in the field of mechanical engineering, civil engineering, or engineering management to serve for one year as a visiting professor on the faculty.

Other departments at the Military Academy look for authorities in electrical engineering, computer science and engineering, mathematics, chemistry, and physics. These individuals help foster the growth of academic excellence, add depth to the faculty in their area of expertise, and provide an independent viewpoint to supplement the experiences of the military faculty.

As a result of this program, the visiting professor benefits from an interaction with outstanding peers and subordinates. The small student to instructor ratio, numerous extra curricular activities, excellent facilities, and a positive learning environment combine to allow each visiting professor to follow his own area of interest and to learn as well as teach during the year at West Point.

Visiting professors are drawn from a variety of sources including civilian universities, government research facilities, and private industry. The most recent visiting professor in the department of engineering, Dr. Richard Chait, was on temporary assignment from the Army Materiels and Mechanics Research Center, Watertown, MA. He presented courses on engineering materials and on fracture mechanics, bringing the latest technology in these subjects into his course and making them as current as any in the nation.

Each department at the U.S. Military Academy plans several years in advance in order to match the skills and desires of the potential visiting professor to the needs of that department. Interested individuals should contact the Office of the Dean at the Military Academy for further information regarding the Visiting Professor Program. Telephone numbers are (914) 938-2105/2695 or AUTOVON 668-2105/2695.

Walinchus Chosen for Executive Training

Dr. Robert J. Walinchus, an industrial engineer, has been selected as the 52nd participant in the technical executive training program at the Army's Chemical Research and Development Center (CRDC), Aberdeen Proving Ground (APG), MD.

Established in 1971, the technical executive training program includes a three-month assignment with the CRDC command group and a similar three-month assignment in the Office of the Deputy Chief of Staff for Research, Development, and Acquisition at the Pentagon.

Walinchus was awarded a bachelor of science degree in electrical engineering and a doctorate degree in engineering science and operations research by the Johns Hopkins University. He also holds a master of science degree in electrical engineering from the University of California at Berkeley.

Prior to his assignment to the CRDC in May 1982, he had worked in private industry as a consultant, project manager and staff engineer, and also as an instructor at the Johns Hopkins University.

In January 1984, Walinchus was selected as the project manager for CRDC's computer-aided engineering programs. He is a registered professional engineer in Maryland, and has been elected as a member of the scientific honor societies, Sigma XI, Tau Beta Pi, and Eta Kappa Nu.

Capsules...

AMC Creates Acquisition Management Office

The U. S. Army Materiel Command (AMC) has announced the provisional establishment of an Acquisition Management Office in the Office, Deputy Chief of Staff for Development, Engineering and Acquisition. The purpose is to develop, implement, and manage a program for improving acquisition management tasks and contractor performance. Arthur H. Nordstrom, as assistant deputy chief of staff for development, engineering and acquisition—acquisition management, heads the office.

Responsibilities of the new office include defining unique and systemic problems; recommending and monitoring corrective actions; establishing an integrated data base on contractor performance for use in current management and future source selection; and improving contract requirements. Correspondence should be addressed to office symbol AMCDE-C.

Establishment of a permanent Acquisition Management Office will be effective Oct. 1, 1984.

20th Annual Telemetering Conference Announced

The 20th Annual International Telemetering Conference, sponsored by the International Foundation for Telemetering, will be held Oct. 22–25 in Las Vegas, NV. More than 1,400 individuals from government, industry and academia are expected to participate.

Co-sponsored by the Instrument Society of America, the ITC is the largest conference of its type dedicated to telemetering and instrumentation systems. The agenda will include technical presentations, workshops, tutorials, and about 70 technical exhibits. Assistant Secretary of the Army (RD&A) Dr. Jay R. Sculley is scheduled as this year's keynote luncheon speaker. MG Andrew H. Anderson, commander of the U.S. Army Test and Evaluation Command, is opening session speaker. A blue ribbon panel on recent Army test range developments will be chaired by John P. Tyler from the Office, Deputy Chief of Staff for RD&A, Department of the Army. Recent conference policy has been to rotate the technical program chairmanship, the keynote speaker and the blue ribbon panel responsibilities among the three branches of the services. This is the Army's year to be host for these portions of the conference. Leon H. Glass, U.S. Army Armanment R&D Center, Dover, NJ, is technical program chairman. Additional conference information may be obtained from him by calling AUTOVON 880-6251/6258 or commercial telephone (201) 724-6251/6258.

Personnel Actions. . .

Wagner Succeeds Merryman as Army DCSRDA

LTG L. C. Wagner, Jr.

LTG Louis C. Wagner Jr., former assistant deputy chief of staff for operations and plans for force development, Office, Deputy Chief of Staff for Operations and Plans, HQ DA, is the new Army deputy chief of staff for research, development, and acquisition. He suceeds LTG James H. Merryman, who has retired from military service.

A veteran of more than 29 years of active commissioned service, LTG Wagner has a BS degree in engineering from the U.S. Military Academy, an MS degree in theoretical and applied mechanics from the University of Illinois, and is a graduate of the Naval War College, the Army Command and General Staff College, and the Armor School Basic and Advanced Courses.

During 1980–83 he was commanding general of the Army Armor Center and commandant of the Army Armor School, Fort Knox, KY. Prior to that he served in the Office of the Army Deputy Chief of Staff for RD&A, first as deputy director of materiel plans and programs, and then as director of combat support systems.

Other career assignments have included commander, 1st Brigade, 3rd Armored Division, U.S. Army Europe; special assistant for Army Materiel Acquisition Review Committee (AMARC), Management Directorate, Office of the Army Chief of Staff; and executive, AMARC, Office of the Army Chief of Staff.

LTG Wagner is a recipient of the Distinguished Service Cross, Silver Star, Legion of Merit with Oak Leaf Cluster (OLC), Bronze Star Medal, Meritorious Service Medal, Air Medals, Army Commendation Medal with two OLC, Purple Heart, Combat Infantryman Badge, and the Senior Parachutist Badge.

Cercy Takes Over as ERADCOM Commander

BG James C. Cercy, former deputy director of weapon systems, Office of the Deputy Chief of Staff for Research, Development and Acquisition (ODCSRDA), DA, has succeeded MG Emmett Paige, Jr. as commander of the U.S. Army Electronics R&D Command.

BG J. C. Cercy

Backed by more than 25 years of active military service, BG Cercy also served with ODCSRDA during 1982–83 as deputy director of combat support systems. In 1981–82 he was command director, North American Air Defense Command/ Aerospace Defense Command, Peterson Air Force Base, CO.

Other career assignments have included commander, 108th Air Defense Artillery Group, 32nd Army Air Defense Command, U.S. Army Europe; development project officer, U.S. Army Missile R&D Command (now MICOM), Redstone Arsenal, AL; executive officer, 108th Air Defense Artillery Group, 32nd Army Air Defense Command, U.S. Army Europe; and commander, 2nd Battalion, 60th Air Defense Artillery, 32nd Army Air Defense Command, U.S. Army Europe.

BG Cercy holds a BS degree in civil engineering from the University of Delaware, an MS degree in mechanical engineering from the University of Arizona and is a graduate of the Army War College, Army Command and General Staff College, Field Artillery School Advanced Course, and the Air Defense School Basic Course.

He is a recipient of the Defense Superior Service Medal, Bronze Star Medal with two Oak Leaf Clusters, Meritorious Service Medal with two Oak Leaf Clusters and the Army Commendation Medal.

Sobocinski Becomes USAMRDC Assistant DCO

COL P. Z. Sobocinski

COL Philip Z. Sobocinski has been appointed assistant deputy commander of the U.S. Army Medical Research and Development Command (USAMRDC) Fort Detrick, MD. He is also deputy assistant surgeon general for R&D in the Office of The Army Surgeon General, and director of plans at USAMRDC.

Formerly assigned as the director of research programs, Office of the Assistant Surgeon General for Research and Development, he is also the consultant in biochemistry to the surgeon general. He holds the "A" designator, the Army Medical Department's highest award in recognition of professional achievement.

COL Sobocinski has authored and co-authored numerous scientific papers concerning trace metal metabolism and the biological effects of radiation and infectious diseases.

He received a certificate of outstanding scientific achievement at the 1984 Army Science Conference for his work in cellular chemiluminescence.

COL Sobocinski received a BS degree in chemistry and biology from Tufts University in 1956, an MA degree from City University of New York in 1964, and a PhD from the University of Rochester School of Medicine in 1970.

He enlisted in the Army in 1956, and received a direct commission in the Medical Service Corps in 1959. His career has included assignments as chief of physical sciences, U.S. Army Research Institute of Infectious Diseases, Fort Detrick, MD; chief of biochemistry, Armed Forces Radiobiology Research Institute, Bethesda, MD; and chief of biochemistry at the SEATO Medical Research Laboratory, Bangkok, Thailand.

COL Sobocinski is a recipient of the Legion of Merit, the Joint Service Commendation Medal and the Army Commendation Medal with Oak Leaf Cluster.

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- Very High Speed Integrated Circuits
- Improved Methods of Designing Ceramic Armor
- SARDA, DCSRDA, and AMC Personnel Roster
- Net Forging of Titanium Components
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