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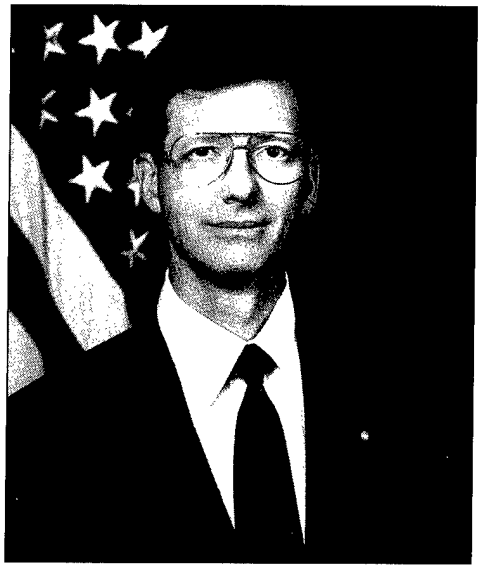
ARMY RD&A

JULY–AUGUST 1999

The SOLDIER as a System

FROM THE ARMY ACQUISITION EXECUTIVE

The Army's Most Important Resource



The soldier is the Army's ultimate weapon and our primary building block. The Army does not view soldiers as subordinate ("subsystems") to aircraft and ground vehicles. The soldier is the essential part of all systems. I am pleased to see this issue devoted to the soldier as a system. It is clear that advances in technology now allow us to increase our soldiers' situational awareness, survivability, and lethality, as well as lighten their load.

A highly trained and properly equipped soldier is the center of every Army system. While money for modernization is tight, we must equip our soldiers now for a wide array of future challenges. We must invest in new systems such as Comanche, Crusader, and the Future Scout and Cavalry System. We must invest in the recapitalization of our legacy systems and, we must invest in the soldier as a system. If we do not, we will put soldiers at risk.

We need to be mindful of the lesson of Task Force Smith, the first American ground combat unit to engage the North Korean Army after its surprise invasion in 1950. Our modernization program failed our soldiers in that important first battle of the Korean War.

On the rainy morning of July 5, 1950, a column of eight antiquated North Korean tanks attacked Task Force Smith. The task force had six bazookas for close-in anti-armor protection, but they proved useless against the old T-34 tanks. One soldier actually fired 22 rockets at the lead tank at point blank range and from a variety of angles—front, side, and rear—but to no avail. The T-34s drove right through the American position and, a short while later, North Korean infantry overran it, leaving 135 Americans killed, wounded, or missing.

Historian T. R. Fehrenbach states that this tragedy was avoidable:

> *"The American Army had developed improved 3.5-inch rocket launchers which would penetrate the T-34. But, happy with having designed them, it hadn't . . . place[d] them in the hands of the troops . . . there just hadn't been enough money for long-range bombers and aircraft carriers, and bazookas too. Now, painfully, at the cost of blood, the United States found that, while long-range bombers and aircraft carriers are absolutely vital to its security, it . . . had also to provide the bread and butter weapons that would permit her ground troops to live in battle."*

Fehrenbach said it well. The most fundamental measure of how effectively we invest our modernization dollars is whether those investments "permit [our] ground troops to live in battle."

We must avoid the pitfall of Task Force Smith—technological superiority, but deficiencies in fielded equipment.

Fehrenbach's observation highlights something else important. The crucial engagement in the Task Force Smith episode was not fought on the road between Suwon and Osan. It was fought some years before on Capitol Hill and Main Street, where the Army's case for procuring and fielding the improved bazooka got lost in the grand debate about long-range bombers and aircraft carriers.

Debate may rage about the role of America's Army in today's world, but no mission can be accomplished successfully without the commitment of ground troops. I am again reminded of what Fehrenbach wrote:

> *". . . you may fly over a land forever; you may bomb it, atomize it, pulverize it and wipe it clean of life—but if you desire to defend it, protect it, and keep it for civilization; you must do this on the ground, the way the Roman legions did, by putting your young men into the mud."*

America's Army was instrumental in making the United States the world's unchallenged superpower. Today, we are the world's essential nation. Where America goes, our Army goes—to more places than ever before. As our role increases, we must work to ensure that the soldier, a system himself or the center of a larger system, has the equipment he needs to accomplish his missions successfully and come home alive.

Paul J. Hoeper

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FEATURES

DEPARTMENTS

ABOUT THE COVER

As the Army moves into the future, the soldier will increasingly be viewed as a holistic system in which standardization and flexibility are balanced to provide 21st century combat overmatch.

UNITED STATES ARMY
THE SERGEANT MAJOR
WASHINGTON, D.C. 20310-0200

THANKS FOR KEEPING AN EYE ON THE FUTURE FOR OUR SOLDIERS

A note of thanks for all that Research, Development and Acquisition (RD&A) is doing for our Army, our Nation and the finest Soldiers serving in uniform. I'm very proud of your efforts in developing, integrating and acquiring the materiel necessary to sustain our Soldiers in peacetime and, thereby, ensuring they have the decisive edge in wartime. I applaud your continuous efforts in seeking new technologies and improved efficiencies for our Army to fight and win on the 21st Century battlefield.

It's most appropriate that you dedicated this issue of your magazine to the World's best fighting force - the American Soldier. For 224 years, the Soldier has endured the hardships of war and enjoyed the serenity of peace. The American Soldier would not have been as successful if it had not been for your efforts, dedication and enthusiasm in providing them the best food, clothing and equipment.

It is reassuring that you are there looking out for the most important part of America's Army - the Soldier. Again, thanks for all that you do for our Army.

Robert E. Hall
Sergeant Major of the Army

THE SOLDIER AS A SYSTEM

COL Bruce D. Jette and
Bill Brower

Introduction

The Project Manager for Soldier Systems (PM-Soldier) was officially chartered in June 1992. Creation of the PM-Soldier fulfilled the senior Army leadership's long-standing desire to structure an activity to centralize the life-cycle management of soldier system materiel acquisition. Since 1992, PM-Soldier's fundamental mission to modernize the individual soldier has remained constant, although the quantity and complexity of the programs managed by PM-Soldier have increased as we deploy the soldier onto the digital battlefield.

PM-Soldier is responsible for all combat, life support, ballistic, and environmental protective items worn or carried by soldiers for individual use in a tactical environment as well as nontactical clothing and equipment such as Army dress uniforms and physical fitness uniforms. A distinguishing feature of PM-Soldier is the range of quantities procured. Many items of clothing are procured for the total Army, and other items, such as the Self Contained Toxicological Environmental Protective Overgarment, are procured in very limited quantities for specific missions.

In modernizing the individual soldier, PM-Soldier currently has approximately 120 projects in various stages of research, development, test, and evaluation (RDT&E), and initial procurement. Including fielded items, PM-Soldier is responsible for nearly 10,000 items, considering the many different sizes and configurations needed to properly fit each American soldier. In addition to conventional RDT&E programs, development and fielding of individual soldier items is accomplished through several soldier acquisition programs such as the Central Funding and Fielding Program and the congressionally mandated Soldier Enhancement Program. An example of a recent Soldier Enhancement Program item is the Modular Sleeping Bag. Currently being fielded, it replaces three separate sleeping bags weighing 17.5 pounds with a single modular system weighing 9.5 pounds.

Vision

Historically, soldier equipment has often been developed as stand-alone and has been provided to the soldier as additional items with little regard to integration with other items already in the soldier's possession. While the intent was to improve combat effectiveness, it has resulted in the soldier becoming something similar to a "Christmas Tree," with many individual items affixed to him or her that have not been integrated. Through the years, these additional stand-alone capabilities have produced a more capable, lethal, and survivable soldier, but at the same time, have resulted in loads that are challenging our soldiers' capabilities. The time has come for a change to the stand-alone approach. The prerequisite for increasing combat effectiveness while decreasing combat loads necessitates a holistic approach to the individual soldier.

Land Warrior incorporates communications and computer processing onto the Modular Load Carrying Equipment.

The Challenge

The challenge for PM-Soldier is to equip a trained and ready soldier with the clothing and items necessary to provide protection from the operational mission environmental extremes, while providing enhanced lethality and connectivity on the digital battlefield. This is even more difficult to achieve when placed within the reality of the weight, space, power, and balance constraints of the platform—the soldier. Accepting this challenge, the PM-Soldier vision is a single integrated soldier system providing combat overmatch that is tailorable for all soldiers for the full spectrum of combat during joint and coalition operations, all within a supporting soldier system acquisition architecture.

To achieve this vision, PM-Soldier is addressing the soldier's materiel needs as a holistic system that consists of layers that build upon one another to meet a specific mission. These layers build from a foundation of a common set of items used by all, regardless of Mission Occupational Specialty (MOS), and culminate with

a very specialized group of items specifically dependent on mission, MOS, and environment. The key is that every item must be able to be integrated with other items that a soldier will be wearing for a given mission. An example is the relation among Air Warrior, Land Warrior, Mounted Warrior, and other warrior programs. Each warrior program requires a basic set of common items yet also has particular materiel solutions unique to the mission performed by the particular warrior, whether an Army infantryman, aviator, or mounted crewman. This tiered approach provides standardization and yet remains flexible to meet the varied missions and needs of the soldier.

Another example of standardizing hardware across the soldier platform is the Modular Lightweight Load-carrying Equipment (MOLLE) and Interceptor Body Armor Program. MOLLE and Interceptor are both joint programs with the U.S. Marine Corps and provide the soldier with a state-of-the-art load carriage system and ballistic protection armor. In addition to the initial fielding to the Army's Light Force, these items ultimately will be fielded throughout the Army and will include special applications such as Land Warrior.

Weight

With the soldier system, weight is a critical aspect. The total weight of the items worn and carried by the squad leader and infantry rifleman *cannot* be increased as capability and functionality is increased because of the adverse effects on mobility and fightability. As the soldier system is modernized, even at the most basic level of providing every soldier the ability to precisely know where he is located and where the other members of his squad are located, weight *cannot* be increased. Replacement or elimination of currently worn or carried items with modernized hardware providing increased capability or functionality must be performed on a "pound-for-pound" basis. This is not an easy challenge, particularly in light of the fact that additional electronics on the soldier require additional power sources, which equates to additional weight.

Land Warrior

The most significant program for the dismounted soldier is the Land Warrior Program. The Land Warrior Program will field a modular, integrated fighting system for the dismounted soldier. In conjunction with the TRADOC Systems Manager-Soldier, PM-Soldier is developing Land Warrior to improve the infantry's warfighting edge by increasing lethality, mobility, survivability, and awareness of the tactical situation.

Land Warrior provides infantry increased combat lethality, mobility, survivability, and awareness of the tactical situation.

The key performance parameters for Land Warrior are weight, power, digital interoperability, and reliability. The acquisition process for the Land Warrior Program is undergoing a shift to provide for a more open architecture with commercial architecture to reduce life-cycle costs, both unit production and sustainment costs. The key is to leverage areas in which industry is clearly the lead, such as computers and software, while maintaining government development of items unique to military operations. An industry and government team including industry representatives from Silicon Valley are working together to develop interface standards that will permit multiple manufacturers to produce subcomponents such as the computer board. This commonality will also facilitate the insertion of preplanned product improvements at the appropriate points in the future.

The holistic approach and the weight, space, power, and balance constraints are not limited to the confines of PM-Soldier projects, but must be extended to all other PMs providing materiel for the soldier to wear or carry. This requires a tremendous amount of communication among many PMs and may increase the risk of program changes because of the interconnectivity of programs.

Conclusion

The benefits of providing the soldier a capable, fightable system will be well worth the effort expended. As we move into the future, PM-Soldier, in concert with many other Army PMs and the science and technology community, must focus on the soldier as a holistic system in which standardization and flexibility are balanced to produce soldier systems providing 21st century combat overmatch.

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NEW SOLDIER TECHNOLOGIES

Peter F. DeCosta and Edward Crivello

Introduction

Joint Vision 2010 states, "People are the Armed Forces; at the end of the day, our success, in war or in peace, will rest ultimately on the men and women of the Armed Forces." These words serve to underscore and magnify the importance of the human system to our Armed Forces. Achieving optimum effectiveness in the human system, the soldier, requires technology that maximizes performance. Maximum soldier performance will be achieved by applying technology that will enhance the soldier's capabilities in the soldier system domains. These domains are survivability; sustainability; mobility; lethality; command, control, communications, and intelligence; and training.

Technology application to the soldier is challenged by increasing digitization of the battlefield, particularly when integrating technologies onto the soldier platform as a holistic, total system. Integrating technologies that have been developed in a stovepipe fashion into a systematically functioning whole is a formidable challenge and is the basis for the Soldier System Concept. This article provides an overview of the many technologies that will impact and benefit the soldier and are being systematically integrated into the soldier platform. More extensive coverage of soldier technology and its 16 science and technology (S&T) objectives may be found in the *FY99 Army S&T Master Plan* and the *Army Modernization Plan*.

The Soldier As A System

The now-accepted approach for the application of soldier technology is to treat the soldier as a system, much like any other weapon system platform. This approach is beneficial both technologically as well as programmatically because the effectiveness of a well-managed system is magnified when each of its functional components is systematically integrated into an interrelated unit.

The systems engineering approach is being applied to several soldier-based systems now being developed. Most notable is the Land Warrior, the first soldier system program nearing completion. Other soldier system programs are the Mounted Warrior and the Air Warrior. Although these programs have their own unique performance capabilities and requirements, they all have a common set of needs that result from the human platform and the requirement to function when dismounted.

The Force XXI Land Warrior (FXXILW) Program represents the Army's systems engineering approach for integration of multiple technologies to enhance the soldier system domains. Output from the FXXILW Program provides potential technology insertions to the Land Warrior System in the near term. Technologies worked under the FXXILW Program include an integrated navigation component to provide accurate geolocation data to the soldier whenever the Global Positioning System is unavailable; a combat identification capability that allows positive identification of friendly Land Warrior and non-Land Warrior soldiers; and a system capability to provide voice control of the major Land Warrior functions when a soldier is unable to use a hand control device.

Enhanced lethality is addressed in the FXXILW Program through the integration of significant advances in the Objective Individual Combat Weapon (OICW) and the Javelin Missile. The OICW is the soldier system's lethality capability component to attack fortified non-line-of-sight targets as well as targets that have gone to ground.

Force XXI command, control, communications, computers, and intelligence efforts are focused on optimal weight, power, and cost objectives. Commercial and military developments in personal wireless communications, mobile computing, and command and control applications will be explored.

What Is Needed

The Army Science Board's 1994 Report, *Technology for the Future Land Warrior*, states, "A key barrier in any Soldier System Program is weight." These words remain true and reflect the continuing need to consider "soldier load" as a primary factor in the application of any new technology for the soldier platform. But the myriad of technologies and capabilities encompassed by the soldier system domains requires additional focus to address the relevant needs of the soldier.

As a basis to properly focus soldier platform technology generation, the U.S. Army Training and Doctrine Command (TRADOC) System Manager for the Soldier (TSM-Soldier) prioritized what the soldier needs from technology generation. The TSM-Soldier's "top 10" list includes the traditional needs of weight reduction, improved materials for ballistic and environmental protection, and chemical and biological (CB) protection. Additionally, nontraditional needs such as power management, lightweight power sources, sensor fusion, laser protection, biomechanics, and increased lethality were identified.

Linkages

Knowing the soldier's S&T needs is the first step in achieving a focused soldier S&T program. The next step is to answer the question, "How does this technology get into the soldier's hands?" Multiple agencies are generating the technologies used in the soldier platform. Linking these technologies and identifying how they transition into the soldier platform is critical to effective modernization. To identify these links, the Warrior Systems Modernization Strategy (WSMS) was developed. As a Web-based tool, the WSMS links multiple technology efforts and identifies the transition paths to the many soldier-based systems currently in development and production. In effect,

the WSMS "connects the dots" for soldier research, development, test, and evaluation.

The soldier-focused team providing input to the WSMS includes multiple research, development, and engineering centers; program, project, and product managers; and government agencies such as the Defense Advanced Research Projects Agency.

Approximately 150 projects are currently included in the WSMS, and data are updated twice each year. Data such as project technical descriptions, transition plans, linkages to TRADOC's future operational capabilities, and funding (through special access) are included. Future capabilities will include linkages to other Service programs and international efforts. These capabilities represent a powerful tool for decisionmakers at all levels.

Technology Thrusts

The basic requirements to protect, sustain, and enhance the performance of individual soldiers while allowing them to function efficiently in environmental extremes (heat, cold, wind, and fire) and survive combat threats (ballistic, sensors, and lasers) must be met by a balanced integration of technologies. A major challenge is to develop advanced multifunctional protective materials that can be integrated with performance-enhancing electronic equipment, while simultaneously maintaining or reducing the soldier's load.

Developing passive protection against advanced sensors is a countersurveillance measure that is another critical technology thrust for the soldier. Another challenge is the mitigation of heat stress in cost-effective uniform materials that provide multithreat protection.

The response to the continuing need for eye protection from laser threat includes developing frequency-agile nonlinear optical materials that feature low-switching thresholds/high third-order nonlinearities that can be integrated into functional eyewear for day and night operations.

The continuing soldier load challenge is to develop a future integrated system capability required for the lighter weight, low-power soldier system for the Army After Next. System components will be integrated into "smart" designs. Optimal display and information parameters for individual soldier awareness must be further defined and developed.

Another major thrust is to reduce the physiological burden of the soldier's protective clothing and mask (reducing performance degradation) and protect against future CB threats. Efforts are underway to identify new materials that offer improved protection against a wide spectrum of CB agents without increasing the physiological burden to the individual soldier. Advanced selectively permeable membranes are being developed to reduce or eliminate the use of carbon in chemical protective ensembles. In addition, the soldier's biomechanical efficiency will be increased by improved footwear that will reduce stress-related lower extremity disorders as well as by the application of biomechanical analysis to the design of all soldier equipment.

Sustainment-related technologies must also be pursued for the individual soldier. Maximizing soldier performance is necessary while overcoming technical hurdles posed by the basic complexity of food systems and their effect on nutritional and physical attributes. Ration improvement will provide more energy while delaying fatigue, reducing response time, improving decisionmaking and, in general, minimizing the impact of stress on performance and enhancing situational awareness.

Additional sustainment-related technology efforts to support the soldier include enhancing nutritional bioavailability, particularly of performance-enhancing materials; quantifying acceptance and nutrition/performance relationships; optimization of food, food texture, and food structure; and improved ration packaging, preservation, and stabilization.

The need for lengthy ration storage times must be achieved without serious degradation of flavor or nutrition. New processing and packaging technologies as well as improved performance-enhancing nutrients will be employed to fuel the soldier. To support transportable kitchens in all environmental situations, technologies addressing clean, reliable diesel combustion; efficient heat transfer; thermoelectric power generation; nonelectrical refrigeration technologies and safe methods for storage of perishable subsistence; and modularization/integration of components are being pursued.

Human science, modeling, and analysis will significantly enhance the ability of system designers and combat developers to assess component-human interactions, component interfaces, and overall system functionality. In addition, they will conduct real-time, interactive design reviews to decrease development time, cost, and the number of prototypes. Appropriate human and system data will be integrated into the linked system to feed future iterations. Savings will be realized in development, test, and evaluation. High-priority soldier protective clothing and equipment technologies such as lightweight ballistic protection, load carriage optimization, nanotechnology for significant soldier system weight reduction, and baseline soldier system modeling will be addressed during this effort. Results will provide Army decisionmakers essential information for rigorous analyses of alternatives or trade-off studies of soldier systems and items. Also, comparisons of the "combat worth" among soldier systems and alternative platforms will be supported.

Technologies associated with individual airdrop will improve soldier safety and accuracy. Technology challenges include modeling transient parachute opening processes; developing lighter weight, lower cost, and reduced-volume parachutes; developing sensor systems for automatic parachute opening; developing nonparachute decelerators for soft landing; and improving designs and concepts for parachutes and gliding wings for personnel airdrop systems.

Conclusion

Today, numerous technology-generation efforts focus on the individual soldier and will ultimately create a positive impact on future soldier capabilities. Modern technology will provide the soldier with increased protection from physical forces and threats inherent in training, peacekeeping, and enforcement operations as well as combat operations. The Army's Science and Technology Program appropriately acknowledges the significance of soldier technology and focuses on continued enhancement of soldier capabilities to achieve the goals of Vision 2010 and to establish a path toward the Army After Next.

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THE MARCH TOWARD THE FUTURE WARRIOR

"If we are really good, and we are, the soldier of 2025 will be as effective as the tank of 1995."

—LTG Paul J. Kern
Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology
1997 Soldier Systems Review
Natick, MA

LTC Philip J. Carey

Introduction

In *Technology and War* (The Free Press, New York, 1991, Page 320), historian Martin Van Creveld wrote "the deed accomplishes, what thought began." While significant deeds must yet be accomplished to fulfill the ambitious vision of the future warrior of the Army After Next (AAN), the initial phases of such deeds are almost certainly being conducted today in laboratories and research and development centers throughout DOD and private industry. This article presents a portion of the conceptualization of what may ultimately materialize as the AAN warrior.

Warrior Of The Past

In *Technology and War*, Van Crewald divides the development of technology into four periods: the Age of Tools (from the earliest times to 1500 A.D.); the Age of Machines (from 1500 to 1830); the Age of Systems (from 1830 to 1945); and the Age of Automation (from 1945 to the present). With the possible exception of the Age of Tools in which virtually all weapons were handheld and thus it was presupposed that the warrior would be central to their use, many technological advances have eclipsed the pursuit of an integrated system for the soldier and focused instead on larger sea, land, or air systems.

The discovery of iron smelting in ancient times paved the way for the evolutionary development of metal weapons and body armor, which can be loosely described as a system that equipped some warriors with lethal capabilities and individual protection. During this period, the Age of Tools, protective metal armor in the form of scale, mail, or plate materials was developed. Eventually, these "suits of armor" receded in deference to advancements in the range, speed, and lethality of weaponry and the requirement for enhanced force mobility. The ensuing periods of technological advances tended to perpetuate this phenomenon and divert attention away from the development of soldier systems.

It wasn't until after World War II and the period that Van Crewald refers to as the Age of Systems that military thinkers truly began to envision treating the soldier as a system. BG Georges Doriot is credited with having originated the concept. Doriot, fresh from his World War II experience in the Office of the Army Quartermaster, vowed that U.S. soldiers should never again want for the basic needs of man—those items required to feed, clothe, shelter, and protect him. Doriot proposed the creation of The Institute of Man, in which research could be undertaken to study the soldier, his equipment, and the interrelationship between them. Despite Doriot's vision, systems thinking as it applies to the soldier waned for much of the 20th century until the early 1990s when the Soldier Integrated Protective Ensemble (SIPE) was originated. Today, with the Land Warrior Program having succeeded the SIPE, the U.S. Army Soldier and Biological Chemical Command (SBCCOM) and its various organizational elements readily provide the foundation for a vibrant "soldier systems" approach.

The lightweight weapon carried by the soldier of 2025, derived or evolved from the Objective Individual Combat Weapon, will feature integral sights and sensors and be capable of performing in multiple roles.

Warrior Of Today

The avenue of advance to the future warrior objective runs through the Land Warrior Program of the present, managed by SBCCOM's Project Manager-Soldier. With the objective of equipping soldiers for the digitized battlefield, Land Warrior is the Army's revolutionary program to develop and field a totally integrated soldier fighting system by the year 2000. Based on recent advances in communications, sensors, and materials, the Land Warrior Program integrates commercial off-the-shelf technologies into a complete soldier system. For the first time, the soldier's equipment is being designed as if the soldier is an individual, complete weapons platform. Each subsystem and component is designed for the soldier. The result is the first integrated soldier fighting system for the dismounted infantryman (see more about the Land Warrior Program on the U.S. Army Soldier Systems Center website at **www.natick. army.mil**.

Warrior Of The Future

The warrior of 2025 will be equipped in a way that will signal the crowning achievement of the soldier as a system concept. Providing warriors with a tightly integrated system of systems, the future warrior system will yield revolutionary enhancements in terms of individual and small-unit survivability, lethality, mobility, sustainability, and situational understanding.

In the soldier system of the future, the battle dress uniform (BDU) will provide fully integrated protection and will be a "uniform for battle," not garrison duty. It will be fabricated from lightweight, multifunctional materials that protect the soldier against a broad range of threats, including kinetic energy, temperature changes, and chemical and biological (CB) agents. This uniform, comprised of "smart" material, will incorporate embedded communication, computer, and power management electronic systems. The uniform's integrated, advanced physiological monitoring system will provide unit commanders with vital information pertaining to individual and unit medical status. Gloves and boots will also be constructed of advanced, multifunctional materials that afford protection against environmental and CB threats and will attach to the uniform to form an airtight closure system. A "spray-on" second skin will further increase the protective qualities of the uniform.

In its entirety, the future BDU will protect the warrior from various battlefield hazards without the encumbrance of a separate protective overgarment and the associated weight and heat stress.

To enhance the soldier's strength and endurance on the battlefield of the future, a system of body augmenting memory-fabric or mechanical-assist muscles will be incorporated into the uniform. This technology will form an exoskeletal system for the soldier that is able to learn and mimic his motions, forces, and outputs, thus greatly increase his physical capability in combat.

The future warrior's helmet will be lightweight and will feature an adjustable visor to protect his face, eyes, and ears against ballistic, energy, and acoustic threats. It will attach to the BDU easily and rapidly with an airtight seal. An air filtration system will provide protection against CB threats, while a microclimate conditioning system heats and cools the soldier automatically or on demand. Advanced display technologies will enable the display of tactical, positional, and situational data, mapping icons, contaminated areas, minefields, and a variety of other essential information on the helmet's visor. The helmet will also include an integrated global positioning system antenna to provide precision location information.

Soldiers will be scanned in three dimensions to obtain precise anthropometric data from which the future BDU and lightweight, advanced modular body armor will be custom manufactured. Fitting soldiers to their exact dimensions will improve comfort and performance of their uniform. The days of small, medium, and large sizes will be obsolete.

Further protections will be afforded by a metamorphic or chameleonic camouflage capability to mask the soldier's visual and infrared signatures and an integrated, 360-degree combat identification system to enhance friend or foe identification and reduce fratricide.

The lightweight weapon carried by the soldier of 2025 will feature integral sights and sensors and be capable of performing in multiple roles, such as an assault rifle, a sniper rifle, or a light antiarmor weapon. A derivative of or

future generation of the Objective Individual Combat Weapon, it will enable the future warrior to fire traditional, high-powered ammunition, as well as larger caliber, airburst munitions that are selectable for effect—antipersonnel, antiarmor, antiaircraft, incendiary, and smoke.

An advanced suite of sensors and information technology systems will allow the soldier to successfully identify and engage targets at ranges in excess of 1,000 meters with an extremely high degree of precision. Systems software will provide targeting interpolation capabilities to image, identify, range, and prioritize targets and will deliver firing solutions for small, distant, and moving targets. Future generation forward looking infrared, advanced low-light and thermal imaging, wall-penetrating radar, real-time motion video capture, and a laser designator/range finder will form the nucleus of the weapon's sensor package.

Advancements in electronics and communications will enable the total system weight of the future warrior to be dramatically reduced while simultaneously providing marked increases in capability. The reduced system weight, in conjunction with the previously described material advancements, will equate to significantly increased mobility and movement rates. Smart navigational software will automatically select the optimal route, predict enemy movements and countermaneuvers, and precisely synchronize troop movements. Enhancements in integrated navigation, an in-stride mine detection and avoidance capability, and the ability to airdrop small units, intact, with extreme precision, will provide future commanders with the capability to accurately and rapidly assemble units on the battlefield and conduct highly synchronized, precise lethal strikes on the objective.

An advanced humionics platform (AHP) will form the backbone of the future warrior's computing, communication, and power management systems. This wearable computer will connect to and use the embedded electronics in the future BDU as well as the display technology in the helmet. The helmet will interface with the soldier's weapon through a wireless communication system that will deliver sensor and site data to the visor display. The AHP will enable the soldier to connect to the secure wide-band mobile internet to provide and obtain critical battlefield information and to maintain a full-time link to all available battlefield assets. The AHP will be cognitively engineered and will provide hands-free computing and communications in addition to providing a level of data selected for each soldier that displays a congruent picture of the battlefield via complete sensor fusion.

The vision of the future warrior system presented here will translate into advancements that will revolutionize warfare at the individual and small-unit level.

The vision of the future warrior system presented here will translate into advancements that will revolutionize warfare at the individual and small-unit level. The future warrior will employ leap-ahead technologies in such a tightly integrated system of systems that the resulting overmatching capabilities will permit the Army After Next's warriors to become the dominant maneuver force on any battlefield in any environment—be it urban, jungle, desert, or arctic.

Future Challenges

Meeting the challenges of the future warrior concept will require an integrated program of stable investments across the spectrum of science and engineering. *Communications and information processing research* must provide improvements in information fusion and wireless distributed communications. Knowledge-based systems, intelligent systems, and complex systems and control research in the *mathematical sciences* will factor significantly into the future warrior's success. The *biological sciences* must continue their advances in biotechnology and CB defense, while on the *physical sciences* side, the challenges of image analysis, nanoscience, and photonics must continue to be addressed. *Materials science* must achieve advances in biomimetics and smart materials.

Advances in *electronics* are essential to the realization of the future warrior concept as well. Low power/noise electronics, optoelectronic hybrids, and nanotechnologies will all contribute to the successful development of the future warrior system. In the field of *chemistry*, fast, energetic materials and continuing advances in electrochemistry are required, and smart structures must materialize out of the *mechanical sciences*. Finally, the *atmospheric, terrestrial, and space sciences* must provide advances in remote sensing capabilities that will be readily accessible to the future warrior.

Conclusion

There is an abundance of thought being devoted to the AAN and its components, including the future warrior. If, in the final analysis, deeds do indeed accomplish what thoughts once began, then let the many deeds continue toward the ultimate achievement of the future warrior—a soldier system in 2025 that achieves the effectiveness of the tank of 1995!

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Future Battlefield Medical Sensing . . .

WARFIGHTER PHYSIOLOGICAL STATUS MONITORING

COL John P. Obusek

Introduction

The U.S. Army Medical Research and Materiel Command (USAMRMC) is developing technologies to monitor the physiological status of U.S. warfighters in real time. The successful development of this capability is critical to the Army Medical Department and it is on the "top 20" list of priorities for The Surgeon General of the Army. The challenges inherent in this research effort are being met through a partnership among government, academia, and industry scientists and engineers. This article presents the concept of warfighter physiological status monitoring (WPSM) and explores its potential value to operational (field) commanders and military planners.

Emerging Technologies

Emerging military technologies, such as the Land Warrior, promise increased warfighter lethality through enhanced communications and ready access to information within a digitized battlespace. Individually worn microprocessors will improve the warfighter's ability to acquire targets and direct precision fires while interconnecting each warfighter on the battlefield. These microprocessors will also have the capability to process enormous amounts of data from advanced sensors deployed throughout the battlespace, providing the warfighter an unparalleled real-time awareness of both the friendly and enemy situations.

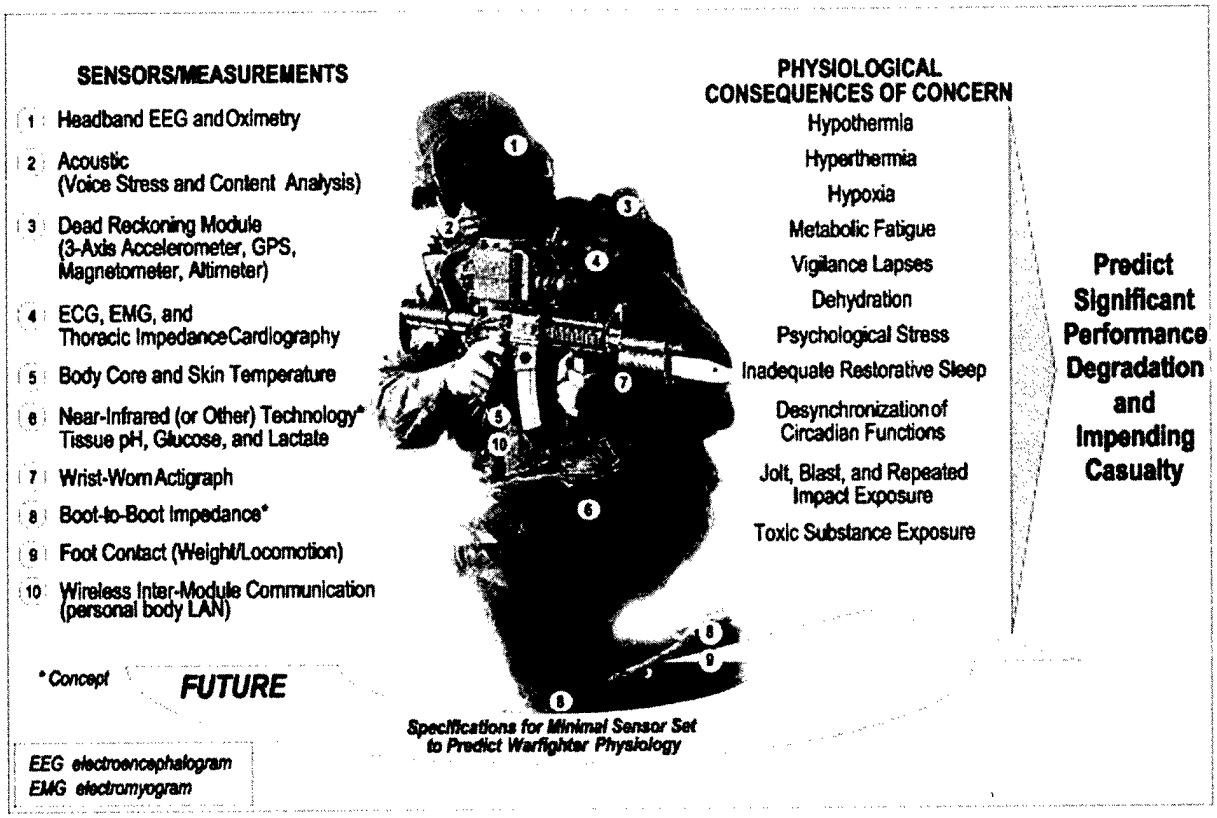
Future military operations will likely involve the employment of these digitally equipped warriors in strategically mobile, rapid-strike forces dispersed over large geographic areas. Conflicts are expected to be intense, yet short in duration. Superior information capabilities will compress friendly command decision-action cycles, and improvements in lethality and communications will afford an increase in the physical distance separating warfighters on the battlefield. In-theater logistical support will be minimized.

The likelihood of military operations in complex urban terrain will also increase as the disproportionate population growth in towns and cities continues worldwide. Information dominance and speed of action, from the highest levels of command down to the individual warfighter, are predicted to be critical components of combat success in future battles.

Increased physical fatigue and mental stress can be expected in warfighters who must rapidly assimilate and process information on the battlefield, operate with greater speed and lethality, and fight in greater physical isolation from one another.

Stressors

Such revolutionary changes in warfighting will undoubtedly accentuate the medical challenges of future operations. Increased physical fatigue and mental stress can be



Warfighter physiological status monitoring

expected in warfighters who must rapidly assimilate and process information on the battlefield, operate with greater speed and lethality, and fight in greater physical isolation from one another. The use of advanced sensors and digital technology will tremendously increase the volume of information that must be dealt with by the warfighter. These extensive information demands have the potential to exceed the limits of human cognitive processing capacity.

Rapid strategic deployment will increase the probability of exposure to extreme changes in environmental conditions and novel forms of infectious disease, many of which may be endemic to the large urban complexes of the future. These factors will intensify the stress on warfighters to levels well beyond those experienced to date.

The negative effects of these stressors on readiness are well documented. Decreased physical and mental performance and increased susceptibility to disease and nonbattle injury combine to diminish available combat power. In the lean combat force of the future, the availability and peak performance of every warfighting system will be essential, including the most critical—the soldier.

In the information age battle force, knowledge of warfighter physiological status and predicted performance capacity will furnish commanders with a means to instantly assess the physical and cognitive competency levels of their force. This type of information will aid in assessing operational risk, as well as planning logistical support. When this knowledge is coupled with strategies to restore and maintain maximal performance, commanders will possess a powerful force maintainer.

Warfighter Physiological Status Monitoring

Using an "Integrated Research Team," the USAMRMC is leading research and development efforts to produce individual monitoring systems that will provide critical information to commanders. The U.S. Army Research Institute of Environmental Medicine, the Walter Reed Army Institute of Research, and the U.S. Army Aeromedical Research Laboratory are key elements of the research team developing WPSM technologies. Team members from other government research agencies, academic institutions, and private industry ensure a broad-based research approach. In addition, representatives from the user and acquisition communities guarantee that WPSM development efforts will satisfy the user's anticipated operational requirements and mesh with other soldier systems under development.

WPSM will ultimately consist of a configurable array of miniaturized, wireless sensors distributed around the warfighter's body. The sensors will operate under their own power for several weeks at a time and be low-cost, disposable, and transparent to the user. Time-synchronized data from the sensors will be sent via a wireless personal local area network (LAN) to a central "hub" located on the warfighter. Once received at the hub, the aggregated data may then be stored or

passed to the individual warfighter's digital fighting system, command communication networks and, in the future, the Internet. The personal LAN, currently being developed commercially, is expected to have dual-use applications in the health care industry.

The current experimental WPSM prototype includes sensors for heart rate, metabolic energy cost of walking (marching), core and skin temperatures, and activity/inactivity. A dead reckoning/global positioning satellite (GPS) module provides geolocation. Sensor data are transmitted to the central hub, now the size of a pager and worn on the belt, using a low-power, wireless, personal LAN. Data from the current suite of sensors provide information on energy expenditure, thermal status, and alertness levels of the warfighter (figure on Page 11).

WPSM maximizes the use of intelligent sensors that contain embedded microprocessors. These sensors preprocess biological signals into useful information prior to transmission. For example, heart rate data are extracted by an onboard microprocessor from continuous electrocardiogram (ECG) data obtained by the sensor. Usually, the extracted heart rate data provide sufficient physiological status information, and the remainder of the ECG signal is discarded, thus reducing the volume of data for transmission and minimizing bandwidth requirements. Planned bidirectional sensor communication will allow sensor function to be reprogrammed on command or as the result of a specific event. For example, the heart rate sensor will be able to alter its function and provide a full ECG signal to medics in the event of wounding on the battlefield.

Performance Prediction

The relationship of energy expenditure, thermal status, and alertness level to an individual warfighter's predicted performance capacity is being defined. Predicting individual performance requires the development of complex algorithms based on understanding the human response to the previously mentioned stressors. The effects of these stressors, both individually and in combination, are being determined through rigorous investigation under controlled conditions in the laboratory, as well as in field experiments.

The goal of the Warfighter Physiological Status Monitoring effort is to provide future operational (field) commanders with important information regarding the current and predicted physiological state of their soldiers or Marines.

Strategies to mitigate the negative effects of stress are also being explored. This basic research is primarily supported by the core science and technology programs of the Operational Medicine Research Area of USAMRMC and is performed under several Army Science and Technology Objectives and Defense Technology Objectives. This research is highly leveraged with both academic and government research institutions through cooperative research and development agreements and extramural funding.

Warrior Medic

The development of WPSM sensors is closely related to the development of a Warrior Medic capability to perform remote triage on the battlefield. The primary function of WPSM is to provide commanders with the operational status of their warfighters. The majority of the time, WPSM sensors will be gathering and processing this type of information. However, if a soldier is wounded, WPSM sensors will be able to provide the warrior medic with valuable information regarding critical body functions prior to arrival at the casualty site. This information, combined with geolocation information provided by dead reckoning and GPS data, will allow the warrior medic to assess and locate the most critical casualties and to effectively manage their care.

Field Tests

Field tests of prototype WPSM systems have involved studies at Fort Benning, GA, in collaboration with the Massachusetts Institute of Technology Media Lab and the Dismounted Battlespace Battle Lab. In addition, studies were conducted in connection with the Marine Corps Infantry Officer Course at Quantico, VA. These field studies have demonstrated that experimental WPSM systems can reliably collect physiological data under diverse environmental conditions. We are also exploring the addition of physiological sensors to assess physical fatigue, total weight, hydration status, and blood oxygen levels. These new sensors will augment WPSM's ability to predict critical aspects of performance, especially under extremes of temperature and altitude.

Conclusion

The goal of the WPSM effort is to provide future operational (field) commanders with important information regarding the current and predicted physiological state of their soldiers or Marines. Armed with this type of information, commanders will be much better equipped to assess risk to their forces, plan operations, and tailor logistic support for rations and water. WPSM will ensure that commanders have the information necessary to guarantee their warfighters are operating at peak performance.

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THE ARMY'S PAST, PRESENT, AND FUTURE ROLE IN FOOD PROCESS DEVELOPMENT

Dr. C. Patrick Dunne

Background

Our current food processing industry can be traced back to a tasking by Napoleon that led his quartermaster to engage the services of the inventor Nicolas Appert to produce stable rations of food for his troops to carry into battle.

The canning industry that originated in 1809 has evolved for more than two centuries into a mature industry that still relies heavily on thermal processing to feed a growing population. The Army used thermal processing to develop the C Ration, which evolved into the Meal, Combat Individual that served U.S. troops from the end of World War II through the Vietnam era. These rations relied on cylindrical metal cans.

In the late 1970s, the Army replaced metal cans with the more flexible and versatile polymeric retort pouch for improved thermally processed products. This pouch was developed by the Natick Soldier Center in cooperation with industry and academia, and it is the central feature of the Meal, Ready-to-Eat (MRE). The 21st version of this ration to be procured in 2001 will have 24 different meals, each with a different entrée in a retort pouch.

Dehydration Process

To increase the mobility of individual soldiers, lightweight, calorically dense, or dehydrated rations are required. The freeze-dehydration process pioneered by the Natick Soldier Center produces high-quality meals with long shelf life. This process produced the Long-Range Patrol ration, which was first used during the Vietnam conflict. It is now used by industry for backpacker meals and survival rations, as well as for a variety of food ingredients.

Current processing efforts focus on cost-effective dehydration processes (such as osmotic dehydration) and the development of ready-to-eat, partially dehydrated intermediate moisture items.

Spinoffs

The military has continuously exploited a variety of mechanical, chemical, and electromagnetic energy sources and technologies for purposes of offense, defense, or communication. Numerous electromagnetic energy sources—initially developed for other purposes—can now be used for food and other materials processing. Currently, a considerable variety of thermal and nonthermal processes are being assessed to improve combat ration quality and variety. Thermal processes include high-temperature short-time processes such as ohmic, microwave, radio frequency, and induction heating.

To increase the mobility of individual soldiers, lightweight, calorically dense, or dehydrated rations are required.

The Natick Soldier Center and its predecessor, the Quartermaster Food and Container Institute, pioneered early research on nonthermal processes. This research explored the food preservation potential of ionizing radiation (from both gamma and electron beam sources). The Natick program was transferred to the USDA in 1980; however, data from the Natick project have been important in getting approval of low-dose irradiation to improve the safety of fresh meat products and to extend the shelf life of fresh produce. Sterilized irradiated meat prepared for NASA under Natick Soldier Center guidance is currently used in the Space Shuttle Program.

Other Technologies

Other pacing technologies envisioned for 21st century combat rations are two nonthermal processes: pulsed electric field (PEF) and high-pressure (HP)

The freeze-dehydration process pioneered by the Natick Soldier Center produces high-quality meals with long shelf life.

preservation. PEF processing is applied to liquids or pumpable products using a flow-through treatment chamber. HP, also known as hyperbaric pressure preservation, can be applied to either liquid or solid foods in flexible containers. The food preservation technologies are being used to:

- Minimize processed-induced loss of color, flavor, texture, and nutrition;
- Retain the highest possible quality of food that is stored in stressful environments;
- Provide shelf-stable foods with fresh-food attributes;
- Optimize ration variety, acceptance, and consumption;
- Reduce the logistics burden and cost in comparison with conventionally processed foods; and
- Enhance the overall quality of life of the warrior.

Key Issues

Because nonthermal processing is relatively new compared to conventional processing, two key issues are particularly critical for PEF and HP technologies. The first is safety and process assurance, and the second is sensory quality and consumer acceptance during the intended shelf life of the item. For the military, the shelf life for these products must be at least 3 years at 80 degrees Fahrenheit and 6 months at 100 degrees Fahrenheit. Several products that were made shelf stable by nonthermal technologies were selected for microbiological and sensory assessment. These assessments were conducted on prototypes produced under contract from 1992-1995. The technologies, the contractors, and the prototype foods are as follows:

- Pulsed Electric Field: FoodCo (now PurePulse Technologies), San Diego, CA, produced spaghetti sauce with meat, banana yogurt drink, milk, and orange juice (refrigerated product).
- Hyperbaric Pressure Preservation: Oregon State University and the University of Delaware produced Spanish rice, spaghetti with meat sauce, fruit salad, and yogurt with peaches.

Assessment Results

After the products were shown to be microbiologically safe, sensory screenings were conducted comparing equivalent commercial and military products using standard descriptive and consumer acceptance methods. For example, batch-processed HP products from Oregon State University were spaghetti with meat sauce and Spanish rice packed in 8-ounce polymeric bowls with aluminum tear-off closures treated in-package at 75,000-pounds-per-square inch for 20 minutes. Assessment results for the appearance, flavor, and texture of the spaghetti and rice items met or exceeded benchmark products (both initially and after 1 year of storage at 80 degrees Fahrenheit).

A follow-on technology demonstration on HP processing was conducted under the leadership of Oregon State University. One objective of this demonstration was to optimize throughput and efficiency of a batch high-pressure processing system. Elmhurst Research Inc., which turned to cannon technology for inspiration for both a rapid-closing end cap and stress-resistant pressure vessels, developed a novel design for a batch processing system. This effort has become a true "guns-to-plowshares" event in that a prototype system is now under development that uses recycled 6-inch cannon tubes as pressure vessels.

Summary

As noted earlier, the military is a potential beneficiary of technological advances in food processing to support battlefield operations and peace-keeping missions. In addition to benefiting the Army, these technologies appear to have considerable potential for the food industry because of consumer demand for minimally processed foods with maximum nutrient retention; consumer demand for high quality, convenience, and safety; and international industry competition. For example, ohmic (thermal) products are now commercially available in Europe and Asia, while HP products are commercially available in Japan.

In fact, the DOD Combat Feeding Program serves as a catalyst for the food processing industry in leveraging resources for food processing research. In this regard, DOD has co-sponsored workshops to address the key technical barriers to commercialization of PEF and HP processing. These workshops have led to the formation of a new Division of Nonthermal Processing in the Institute of Food Technologists.

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OPERATIONAL TESTING IS ABOUT SOLDIERS

Brian Barr and
MAJ Harold L. Ernest

Introduction

Operational testing is not about acquisition reform or streamlining; it's not about meeting milestones or staying within budgets; and it's not about cost as an independent variable or simulation based acquisition. Operational testing is about SOLDIERS. It's about making sure that the systems we develop are effective in a soldier's hands and suitable for the environments in which soldiers fight.

If you want to know how well a system works and how effective it will be in a combat environment, take it to the soldiers. Soldiers know "ground truth." A soldier will put a system through its paces, find its strengths and weaknesses, and provide operational testers with the data they need to properly evaluate system effectiveness and suitability. Keeping in mind the rapidly changing world of digitization and acquisition reform, this article examines new challenges facing the operational tester and reviews some old values that have guided Army operational testers for more than 150 years.

New Challenges

The challenges facing the operational tester today are significant. The Army is moving rapidly into the reality of a 21st century digitized force. The challenges for the operational tester today are complexity, new acquisition strategies, and resources. Of these, complexity has had the biggest impact.

Complexity

Individually, the systems being developed today are more complex than the systems they are replacing and, rarely, is there a new system that does not interact with other systems. These more complex systems have created the need for more complex tests and evaluations. A few examples illustrate the challenges for operational testers.

Examples Of Complexity

M1A2 Abrams Tank. The M1/M1A1 tank made huge jumps in firepower and survivability over the older M60 tanks, but the basic tactics, techniques, and procedures changed little. Then came the M1A2, our first digitized combat system with the Inter-Vehicular-Intercom-System to aid in command and control. With the development of this system, operational testers had to consider many new factors, such as the impact of improved command and control and situational awareness, and the increased force effectiveness brought about by the rapid exchange of information. The creation of an "operationally realistic environment" is much more complicated. Simple platoon-level exercises and gunnery exercises are no longer sufficient to

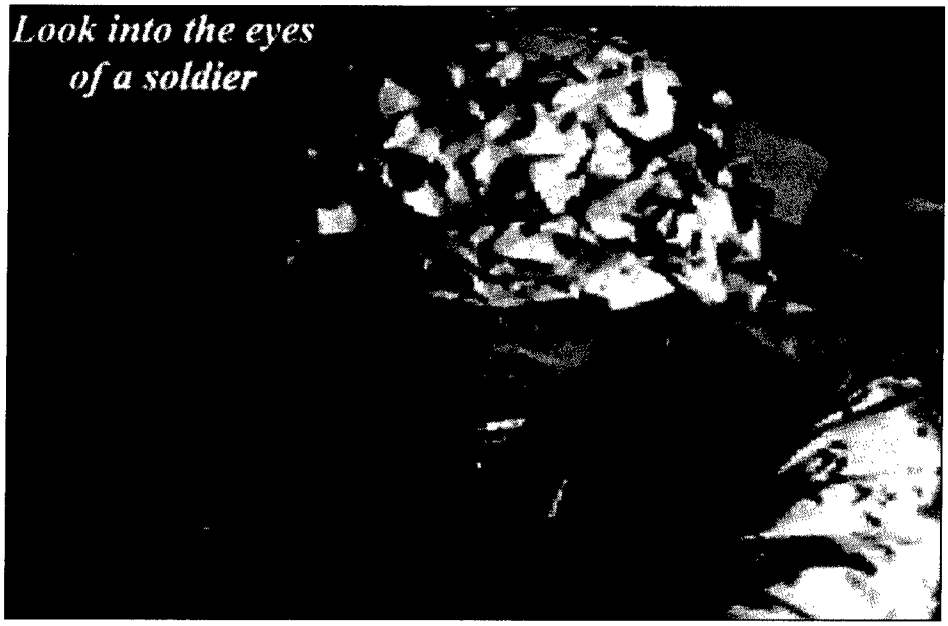
Well-executed operational tests happen only when the correct mix of vital professional skills is brought into the test arena.

assess system effectiveness. Computers are embedded into combat systems, and software is a major consideration for operational testing.

Army Battle Command System (ABCS). Fifteen years ago, tactical command and control systems meant map boards and overlays, written operation orders, and voice radios. The ABCS, which includes maneuver control, intelligence fusion, fire support, area air defense, and combat service support, has brought complex automation systems into the tactical command, control, and communications (C3) arena. The operational measures of effectiveness are far more complex than simple message completion rates. Testing systems that operate from battalion through corps in a realistic operational test environment can require huge, unaffordable deployments. This reality has pushed operational testers into using simulations as test drivers. This interaction of systems (or system of systems) concept has increased the complexity of operational testing more than anything else.

Force XXI Battle Command Brigade and Below (FBCB2). Although ABCS testing is complicated, it can be conducted in a command post exercise (CPX) environment. FBCB2 and the tactical Internet have changed that. Today we are looking at digitized systems that operate at the individual combat vehicle level and interact with the ABCS through complex communication devices. This development requires forced hybrid testing of deployed tactical units, of headquarters units in a CPX environment, and testing of new simulation tools that interact with both the CPX and the tactical field environment.

The Army leadership is committing a large portion of the 4th Infantry Division (4ID) to test FBCB2, which will eventually include the division headquarters, two brigade headquarters, two live and four simulated battalions, and hundreds of combat vehicles with FBCB2 hardware. This test will require hundreds of instrumented data collection boxes, a small company of subject matter experts, more than 100 data collectors and data reducers, and a sophisticated simulation device that will encompass all of the data streams from the tactical units to enlarge the scope of the test.



The Army's goal of fielding the First Digitized Division (FDD) by December 2000 has continuous, significant operational test impacts. As previously mentioned, the FBCB2 system is just one of the 70-plus Force XXI systems that will be fielded to the FDD (4ID). Most of these systems will go through some type of operational test before the FDD is completely fielded.

New Acquisition Strategies

New acquisition strategies, especially for software-intensive systems, are presenting new challenges to the operational tester. Developers have found it much more effective and efficient to develop systems in multiple hardware iterations with step increases in functionality. Sometimes, when full definition of requirements is difficult or needed technologies are rapidly expanding, programs are using the "spiral development" process to go through the multiple iteration of defining requirements, developing code, and testing.

Although these strategies have been more successful for materiel developers, they do not fit traditional patterns of program management or test and evaluation (T&E). The regulatory requirements for milestones and T&E to support milestone decisions just do not work. The operational tester is challenged by the Army leadership to think "outside the box" and develop T&E strategies that support both the materiel developer and the decisionmakers.

If operational testers ever lose complete and undeniable integrity, they can no longer accomplish their mission.

Resources

Army operational testers have taken a 65-percent reduction in personnel since 1990, yet the number of tests continues to grow. Furthermore, the ranks of uniformed testers have been reduced significantly. In addition, graduate-schooled operational research system analysts (ORSA), the backbone of operational testing in past years, are being replaced with graduates of the 13-week ORSA Military Application Course. Expertise is critical. Well-executed operational tests happen only when the correct mix of vital professional skills is brought into the test arena.

Perhaps the one bright note in the

personnel picture is the increasing number of experienced Acquisition Corps officers assigned to test organizations. Their experience in program offices adds valuable insight and skill to the test organizations, and they are returning to the materiel and combat development community with a new appreciation for T&E.

Same Mission, Same Values

Despite the challenges facing the operational tester, the operational test mission remains as valid today as in the past. Being able to adequately focus on the critical operational issues in a truly realistic operational environment remains invaluable in determining how well a system will perform in combat. The success of operational testing has been and will continue to be dependent on values, which, consciously or unconsciously, guide both people and organizations in their mission accomplishment. In particular, four values—competence, loyalty, integrity, and courage—are "the spirit and soul" of the operational tester.

Competence. Maintaining competence is a significant challenge when an organization has rapidly downsized, has had to adapt to a swiftly changing environment, and has undergone repeated organizational and procedural changes for more than 10 years. But unless the organization's members are competent in what they do, loyalty, integrity, and courage can only carry it so far. The tester must understand the system to be tested, the military environment to be tested in, the issues to be addressed, and the methods and techniques of T&E. The tester must be a planner, an executor, and a reporter capable of telling a clear and accurate story at the end of every test.

Loyalty. The operational tester is often described as being the "black hat" of the acquisition world, the least loyal of the acquisition players. However, loyalty must be correctly focused and prioritized or it can misguide us. Loyalty requires the tester to provide fair and impartial tests for the program manager's system, to test in a realistic operational environment, and to see if the system can withstand the mission challenges.

As stated in the beginning of this article, operational testing is about the soldier, and the soldier must top the list of loyalties for the operational tester.

Loyalty to the American soldier requires the operational tester to be an impartial referee, the guy in the "black-and-white striped shirt," who ensures that the system is tested in accordance with the rules on a level playing field.

The idea that the tester should become the friend (the "white hat") of the materiel developer is misguided. Loyalty to the American soldier requires the operational tester to be an impartial referee, the guy in the "black-and-white striped shirt," who ensures that the system is tested in accordance with the rules on a level playing field.

Integrity. We understand that "truth in testing" must be absolute. "Independent" Army testers and evaluators must have the complete trust of the Army leadership, the acquisition community, and the American soldier. Trust is the "child born of integrity." If operational testers ever lose complete and undeniable integrity, they can no longer accomplish their mission.

Courage. It is not always easy to be the honest broker, the one who sometimes has to deliver the bad news or the one who may have to stand between parties with competing priorities and goals. However, courage is what allows the operational tester to maintain integrity even in the face of opposition, to remain loyal to the American soldier despite pressure to keep programs moving, and put that extra effort into attaining and retaining competence.

Conclusion

The results of the operational tester's work are of great value to the program manager and the successful fielding of systems. An operational environment is a "test by fire." The operational test will show a system's strengths and its deficiencies. The operational testers must present and execute plans to the best of their ability, with the goal of obtaining ground truth.

It all goes back to the soldier and making the right decisions for our military. The operational tester must listen to the soldier, objectively assess the effectiveness and suitability of a system, and report accurately and fairly whether the system is ready to go to war. The materiel development and testing communities cannot lose sight of the fact that operational testing is about SOLDIERS.

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Looking Out For The Future . . .

THE MOUT ACTD ADVANCED CONCEPT EXCURSION

Dr. Kenneth R. Parham

Introduction

As we watch military events in the world unfold and see societies unraveling, the thought that weighs heavily on our hearts and minds is that the people of the world are, for the most part, just like us. While their clothing, in some cases, signals long-standing ethnic identities, it looks essentially like ours. Their familial structures and other social institutions reveal the same common concerns as the people next door or those in the next town. And as we view their infrastructures, their buildings, roads, and homes, particularly those that are ravaged, bombed out, and bullet-ridden, we silently shudder because we know that we share a common lifestyle with the displaced and dispossessed. All of this is a little too frighteningly close to home.

These common images are poignant because the battlefield is not some largely uninhabited or geographically marginal locale in the world. Instead, battles are being fought along avenues and in suburban backyards and parks. As we enter the new millennium, we must realize that this may be the predominant way of warfare in the near future.

The U.S. military is currently renewing its focus on Military Operations in Urban Terrain (MOUT). Doctrinal thrusts such as Joint Vision 2010, Army XXI, the Army After Next, Next Marine Corps, and the Marine Corps After Next emphasize that we will swiftly, precisely, and decisively preserve or re-establish peace, while retaining the infrastructure as much as possible and minimizing combatant and non-combatant casualties. This is no simple task because the challenges of warfare in urban settings are, in many cases, inherently different than those of traditional, open warfare, and any common elements are often magnified and exaggerated. How adeptly and effectively we address the requirements of MOUT today will determine if we achieve operational or military superiority in the future.

MOUT ACTD

An excellent near-term solution for improving operational capabilities of soldiers and Marines in urban environments is the MOUT Advanced Concept Technology Demonstration (ACTD). The MOUT ACTD has embraced a unique approach for achieving its objectives of evaluating advanced technologies to provide technological dominance in MOUT; providing interim capabilities and associated tactics, techniques, and procedures to operational units; and setting the stage for rapid acquisition of selected technologies. This approach employs a technology assessment process (TAP) to filter existing commercial off-the-shelf (COTS) and government off-the-shelf (GOTS) technologies that address a suite of 32 MOUT requirements established by the users (soldiers and Marines).

Ultimately, a final suite of technologies will be integrated into a viable "system of systems" and shown in a culminating demonstration (CD). The down-selection process for the components of the system has involved a series of six Army and four Marine Corps squad and platoon-level tactical experiments that looked at the most promising technologies initially selected from the TAP for specific MOUT ACTD requirements.

These individual experiments, conducted by the Army Dismounted Battlespace Battle Lab at Fort Benning, GA, and by the Marine Corps Warfighting Lab at Camp LeJeune, NC, will be followed by two joint company-level Army and Marine Corps experiments that concentrate on the full suite of systems derived from the individual experiments.

The CD will then operationally display the military use of the final integrated MOUT system of systems at the Joint Readiness Training Center, Fort Polk, LA. Units from the Army's 10th Mountain Division and the Marine Corps' 2nd Marine Division will serve as the experimental force. These participating units will retain the MOUT equipment as residuals once the CD is completed. Simultaneously, efforts will

be made to transition the most promising MOUT technologies to all warfighters as quickly as possible.

The MOUT ACTD is a joint Army and Marine Corps program with the Army Training and Doctrine Command as the program lead and the Commander-in-Chief of the U.S. Special Operations Command (USSOCOM) as the program sponsor. The program has three co-managers: the Operational Co-managers of both the Dismounted Battlespace Battle Lab and the Marine Corps Warfighting Lab, as well as the Natick Soldier Center Technology Program Manager at the Soldier Biological and Chemical Command.

Advanced Concept Excursion

While the MOUT ACTD is an excellent solution to address the near-term, urgent requirements of MOUT warfare, much more needs to be done to achieve military superiority on future urban battlefields. Recognizing this need, the Deputy Assistant Secretary of the Army for Research and Technology directed the MOUT ACTD co-managers to consider an event that would demonstrate emerging technologies not mature enough for MOUT ACTD mainstream experimentation or the residual package. This event would form the basis of a science and technology (S&T) investment strategy for supporting future Army and Marine Corps operations in MOUT. Thus, the Advanced Concept Excursion (ACE) was born and, as part of the MOUT ACTD, it provides an excellent mechanism for augmenting the COTS and GOTS more mature technology focus of the program.

An ACE coordinator (see author's biography for contact information) was appointed during the summer of 1998. In October 1998, a planning workshop for the ACE was conducted to develop technology selection criteria and to outline a plan that optimizes time and resource requirements to ensure a successful demonstration. ACE demonstrations are scheduled for Nov. 1-12, 1999, at the McKenna MOUT site at Fort Benning, GA. Hopefully, these demonstrations will influence the FY02 Program Operating Memorandum (POM) that delineates funding guidelines for developmental programs.

ACE Features

The ACE includes a number of unique features intended to draw as many promising technologies as possible to the event so a solid foundation for the future MOUT S&T investment strategy can be established. As indicated previously, the ACE is *not* a new technology search for MOUT COTS and GOTS; rather, the ACE seeks technologies that demonstrate a significant increase to an existing capability or that are revolutionary. From a developmental perspective, ACE is seeking technologies that can transition from S&T in the 2000-2005 timeframe and be fielded in the 2005-2015 timeframe (Figure 1).

Unlike the MOUT ACTD itself, which is structured in accordance with the 32 established requirements, ACE technologies may address the full spectrum of brigade and below

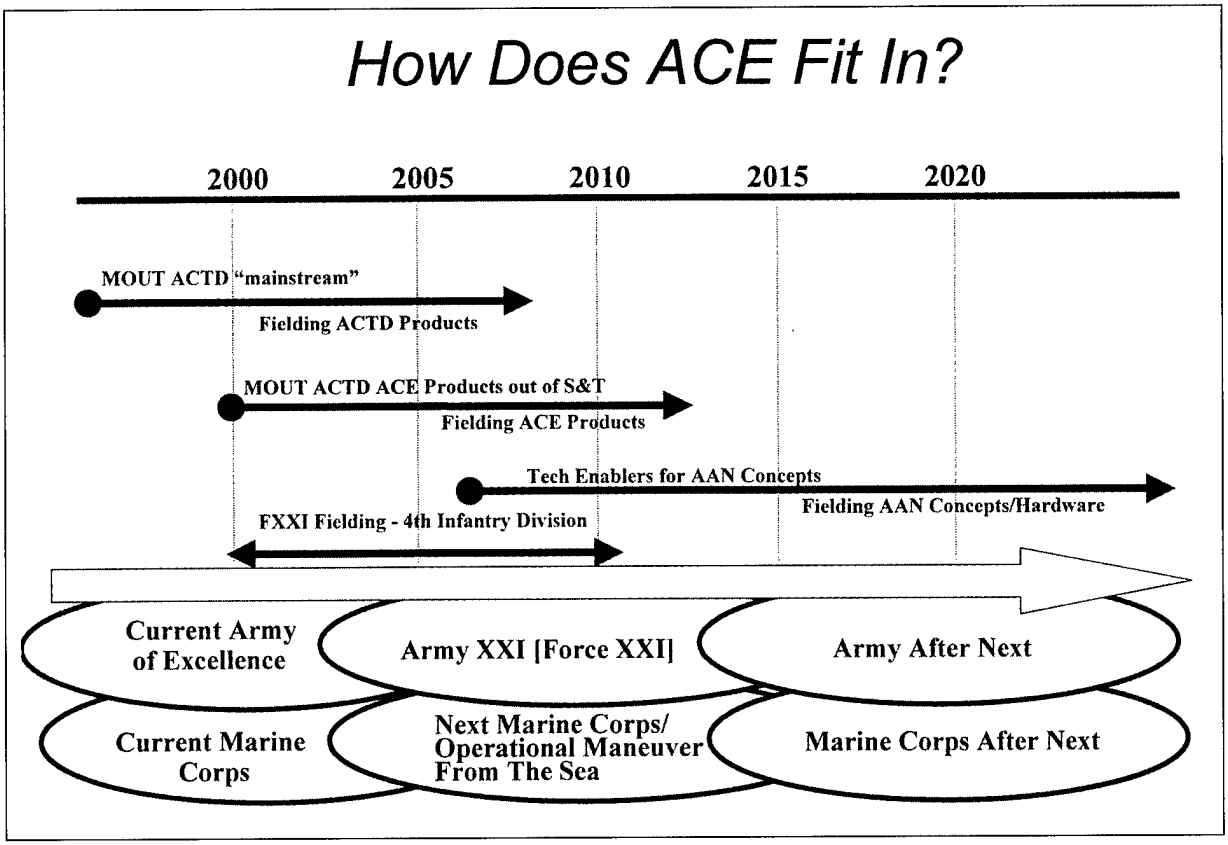

Figure 1.

operations within a MOUT environment. Additionally, consideration of technologies for ACE is open and need not be constrained by current doctrine because ACE is looking to the future.

A driving force behind the ACE, and its primary audience, is the "user jury," which evaluates the potential future military utility of each of the technologies demonstrated. This user jury consists of a military panel of both field-grade officers and senior enlistees, approximately 12 total, who have significant experience with MOUT. Participants for the user jury are sought from units in the XVIII Airborne Corps, the 2nd Marine Expeditionary Force, USSOCOM, and other key Army and Marine Corps organizations.

In addition to the user jury, many other organizations from the DOD materiel and combat development communities, as well as the S&T community, are invited to observe the demonstrations. Their participation promotes cooperative working relations with the technology developers so the most promising technologies can be considered for follow-on funding in government programs (e.g., Science and Technology Objectives, Advanced Technology Demonstrations, the Small Business Innovative Research Program, the Advanced Concept Technology II Program, and others).

Government and industry engineers who developed the MOUT-applicable technology will demonstrate their technology for the user jury (and observers) during a portion of one of the days of the 2-week ACE. The user jury will rate the potential future military use of each technology using criteria that will be developed for this event. These data will be reduced and analyzed and will form the basis of the inputs to the FY02-07 POM.

Participation In The ACE

The solicitation for ACE technology candidates has been published in the *Commerce Business Daily* on several occasions (closing date for submission is Sept. 1, 1999). In addition, the ACE Coordinator has provided briefings on the topic at a number of government and industry venues. To further promote this event, brochures on ACE have been disseminated among the government and industry development communities during the past several months. These promotions direct interested participants to the MOUT ACTD website (**http://mout.actd.org**), where one may access a short questionnaire that addresses basic criteria that each candidate technology must meet to be considered for the ACE (Figure 2). Appropriate technical experts and military personnel then evaluate the questionnaires. This effort serves as an initial screening process. If a technology appears to meet the criteria, it will be investigated more thoroughly to ensure that it is reasonable and feasible for demonstration during the early November 1999 timeframe.

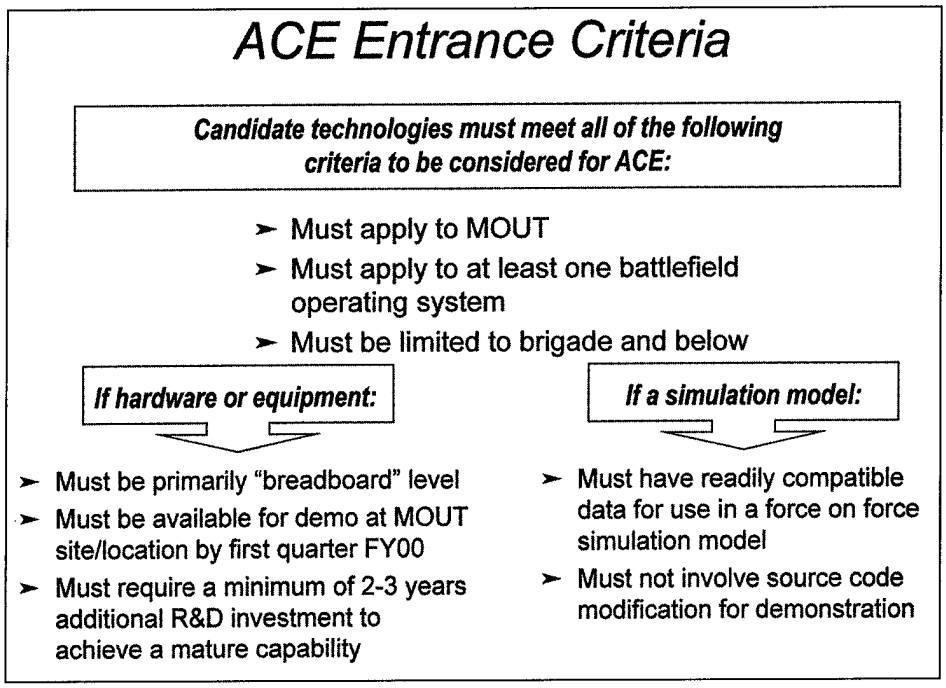

Figure 2.

The costs involved with developing a technology and actually participating in the demonstration is a recurring issue with the ACE. From the outset, developers have been asked to bear their own costs for technology development and travel to the ACE demonstration. However, the demonstrations will be planned and coordinated by the developer, the ACE Coordinator, and the Dismounted Battlespace Battle Lab at Fort Benning (who ensures that the proper demonstration requirements are met).

Conclusion

The ACE is a unique opportunity for government and industry technology developers to solidify user buy-in for new, promising MOUT technologies and paves the way for potential new funding streams. From a military perspective, it must be reiterated that the successful technologies that emerge from the ACE will help to build a foundation for an S&T investment strategy for MOUT in the future. In this regard, the ACE provides a MOUT linkage to Army XXI and the Army After Next and to Next Marine Corps and the Marine Corps After Next. The bottom line, however, is the safety and well-being of soldiers and Marines engaged in MOUT. Thus, the ACE is dedicated to supporting our soldiers and Marines in attaining the best possible MOUT capabilities as they preserve the peace.

DR. KENNETH R. PARHAM is the Coordinator of the MOUT ACTD Advanced Concept Excursion at the Natick Soldier Center, Soldier and Biological Command. He holds a Ph.D. and an M.A. from the University of Tennessee, Knoxville. Individuals interested in participating in the ACE can contact him at (508) 520-7076 or by e-mail: ***kparham@natick-amed02.army.mil.***

A Year 2000 Success Story . . .

WHITE SANDS MISSILE RANGE LEADS THE WAY

BG Harry D. Gatanas, Michael S. Garcia, and LTC Brian Sutton

Introduction

The year 2000 (Y2K) problem has been difficult and troublesome for the U.S. government and the Army. News about the government's handling of Y2K issues has not always been very positive. Y2K compliance is a leadership challenge. Success at compliance lies in the day-to-day engineering fixes made to "boxes" and software. Failure to make such fixes will lead to a less than optimal readiness posture.

Therefore, it is with great pleasure that I (BG Gatanas) present this "good news" story about the White Sands Missile Range (WSMR) Y2K Program. Upon assuming command in April 1998, I (BG Gatanas) immediately recognized the impact of the Y2K problem on WSMR and its important testing and materiel development activities. Consequently, we quickly elevated WSMR's Y2K Program to our highest priority and began applying necessary resources and command focus at all levels. Further, we conveyed our Y2K emphasis and concern to the highest DOD management levels to ensure continued support and funding. Recognizing the broad intrinsic value of a successful Y2K program, we instituted a successful outreach program to help other DOD commands in their efforts. I (BG Gatanas) am delighted to report that through leadership and fiscal support, steady command focus, and a comprehensive execution plan, WSMR's entire infrastructure, including all test and support computers and equipment, is 100-percent Y2K compliant. This article chronicles our successful journey to full Y2K compliance.

Setting The Stage

WSMR is nestled between the San Andres and Sacramento Mountains of south central New Mexico, and encompasses the Chihuahuan Desert of the Tularosa Bolson. Commissioned in 1945 just days before the first atomic bomb was exploded there, it has flourished for more than 50 years as one of the free world's premier test ranges. Known as the birthplace of America's missile and space activity, it is truly a place of history. From the late 1940s when Dr. Wehrner Von Braun was firing captured German V2 rockets until the recent landing of the space shuttle Columbia, WSMR has played a pivotal role in the development of America's aerospace technologies.

WSMR has an enormous and unique array of test and evaluation assets. With 3.2 million acres or 3,200 square miles of land area, it is the largest land-based test range in the nation, comprising more than 18 percent of the Army's total land holdings (Figure 1). WSMR maintains 1,900 buildings, 1,829 miles of roads, 54 launch complexes, and 3,300 surveyed instrumentation sites, rivaling many cities in size and complexity of infrastructure. With leased extension areas to the west and north and adjacent McGregor and Fort Bliss ranges to the south, WSMR can achieve a test firing of up to 183 miles. Broad testing flexibility is further enhanced by WSMR's control over 25,000 square miles of air space.

Other WSMR resources include scores of radar, precision optical instruments, telemetry ground stations, radio frequency relays, and timing synchronization stations. These assets are connected through a vast network of communication infrastructure to more than 6,500 computers and computer-based components of the WSMR data collection, processing, display, and posttest reduction systems. Amid these assets are many one-of-a-kind facilities such as the Aerial Cable Range (a 3-mile-long kevlar cable stretched between two mountain peaks over which aerial targets can traverse), a high-speed sled track, a full nuclear effects testing suite, modeling and simulation laboratories, hazardous environmental testing facilities, the High Energy Laser Test Facility, and the new $28-million, state-of-the-art Range Control Center currently under construction to replace the existing Range Control Center.

The purpose of providing these details is to underscore the shear magnitude of the potential Y2K problem at WSMR. As one might expect, the Y2K challenges at WSMR were substantial. What follows is a chronicle of the thought processes of those involved in this project, and the methods they used, successes they had, and lessons they learned in spectacularly overcoming those challenges. The compelling story of how WSMR has put its Y2K testing experience to work demonstrating the Y2K compliance of some of the Army's most important fielded weapon systems is detailed as well. And, finally, the WSMR Y2K experience is described in such a way that it may be useful to other organizations dealing with the Y2K problem.

Getting Started—Some Assumptions

WSMR began its Y2K Program in October 1997. At that time, there were some initial Y2K data calls from higher commands that were little more than "bean counting" and "paper shuffling." However, they heightened awareness of impending Y2K problems and confirmed that a more rigorous and far-sighted program was essential. Developing such a program was predicated on a hypothesis—an idea of how a Y2K program *ought to be*, based on the unique situation at WSMR. That hypothesis was based on the following assumptions:

- *WSMR would need to strike out on its own.* Although some preliminary policy and documentation existed, it was inconsistent and did not constitute a roadmap for a successful, tailored Y2K program.
- *Immediate, internal Y2K funding would be required.* Y2K funds were not initially available. To wait until they were could spell disaster as precious time passed. WSMR would have to "tax" itself to secure funds to initiate its program.
- *The Y2K problem is technical, not administrative, in nature.* Rather than concentrating on data formats, terminology, forms, etc., WSMR would need to assemble a crack team of technologists to develop a result-oriented program that could stand up to the rigors of official scrutiny that was sure to come.
- *WSMR systems are largely date independent.* In missile testing, the key time units are usually measured in micro-

and milliseconds. Rarely would a relevant time period exceed a few minutes in duration. Because date information is nearly absent from the real-time data collection process, it could be assumed that the impact of Y2K effects would be slight.

• *Command focus would be critical.* A successful Y2K program would require sustained and substantial investment of manpower and resources. The only way to achieve this level of commitment would be through the heavy and constant involvement of the WSMR Commanding General.

Individual Platform Testing

To set the WSMR Y2K Program in motion, a team of technical and management professionals from the various WSMR directorates was assembled. Individuals were selected based on their expertise in various critical technology fields. This team quickly agreed on simple, common Y2K data collection and reporting formats and proceeded to perform a complete computer hardware and software inventory. Hand receipts and other property records were used, but essentially every piece of computer or computer-controlled equipment and associated software had to be *physically* located and documented. In the final count, more than 6,500 computers were identified and more than 18,000 software packages catalogued.

Next, individual platform testing was performed on all the identified units. This was accomplished with a simple manual procedure that executed Y2K rollovers at the lowest command level of the piece of equipment being tested. Some automated test procedures were experimented with but produced inconsistent results. All automated individual platform testing was ultimately abandoned for this reason. The results of individual tests were documented on machine-specific forms and then entered into a common Y2K database providing a clear audit trail of test conduct. The key here was making physical contact with each one of the 6,500 computers and computer-controlled devices at WSMR.

Most of the individual units tested were not Y2K compliant but showed little or no adverse effect during testing. Test results revealed specific requirements for patches, upgrades, and replacements to achieve individual platform compliance. To fund these remediations, WSMR assessed a "tax" of 11.37 percent across its top 10 funded modernization projects. This produced $1 million that was used to procure the first round of identified "fixes." A decision was made early to keep the "fixing" at the highest level possible using widely available external commercial patches, general operating system upgrades, and whole-unit replacements. This high-level approach accelerated and simplified the overall process and minimized downtime during remediation.

The most proficient method of determining software Y2K-compliance status was to cross-reference the inventory against already available industry listings of the compliance status of various software packages. Automated software "checkers" were experimented with, but proved to be inconsistent and often generated more questions than they answered. For example, a 10,000-line C program was passed through one automated facility and produced 12,000 lines of diagnostic output! By and large, software Y2K compliance was achieved via operating system and whole-package upgrades or replacements. A small number of in-house developed packages was thoroughly wrung out in the successful end-to-end interoperability tests and demonstrations that would soon follow.

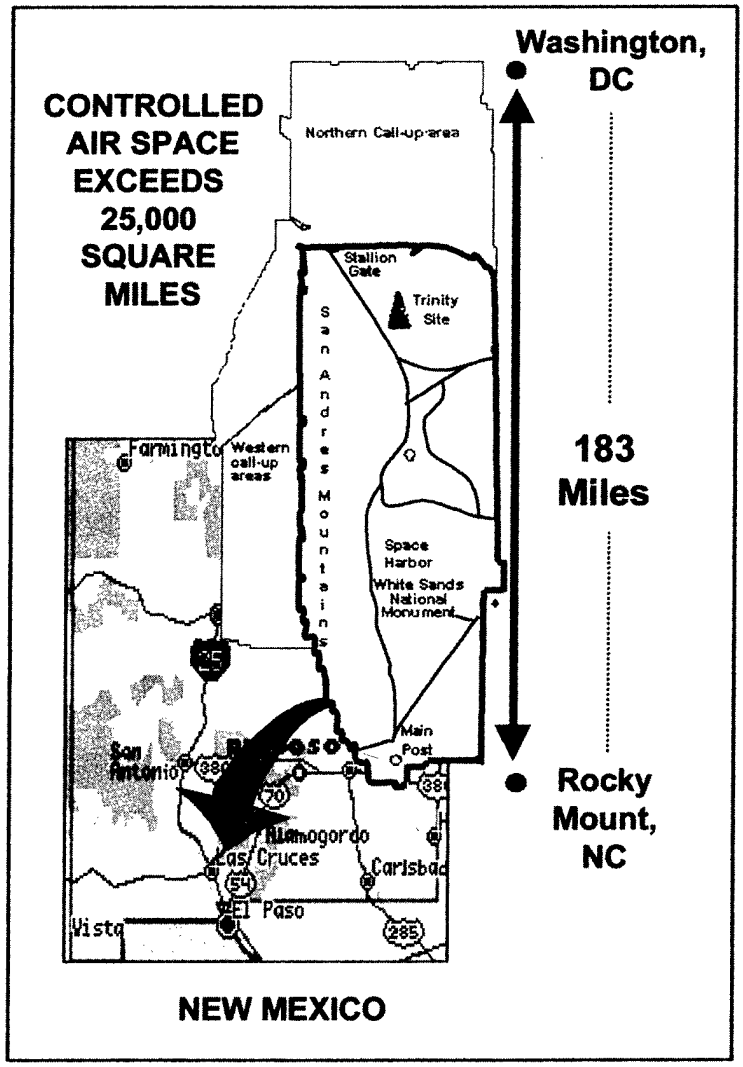

Figure 1. *White Sands Missile Range, NM*

First System-Of-Systems Test

By spring 1998, most individual fixes were complete and the majority of mission-critical systems were confirmed as Y2K compliant. The big question was whether or not those critical systems could perform as systems-of-systems, providing full real-time functionality. An end-to-end test was necessary to confirm the overall compliance of the WSMR real-time data system. WSMR engaged its existing, time-honored, test planning process to develop a scenario that would exercise and demonstrate the real-time data system in a way that most closely resembles the day-to-day customer operations of WSMR.

An aggressive and comprehensive Y2K end-to-end test scenario was quickly produced for the Year 2000 Certification Acid Test, or Y2CAT (Figure 2). During the Y2CAT, a full-scale F-4 Phantom drone was flown over WSMR under complete remote computer control. It followed a "racetrack" pattern typical of what might be used against a system like PATRIOT. A representative cross section of instrumentation, 4 radars, 11 precision optical instruments, and a telemetry tracker were trained on the F-4. Collected data were then passed through more than 50 miles of communication infrastructure to hundreds of computers in the Range Control Center. These computers performed critical functions: real-time data processing, telemetry data handling, drone formation control, and the posttest data reduction.

While this live mission activity was in progress, a series of five Y2K rollovers was conducted. The following specific rollover dates were tested:

- Year 2000—from Dec. 31, 1999, to Jan. 1, 2000;
- Leap day—from Feb. 28, 2000, to Feb. 29, 2000;
- Day after leap day—from Feb. 29, 2000, to Mar. 1, 2000;
- Last day of leap year—from Dec. 30, 2000, to Dec. 31, 2000; and
- Year 2001—from Dec. 31, 2000, to Jan. 1, 2001.

WSMR had the opportunity to participate in a test of space shuttle tracking stations in early spring 1998. During this test, the above dates were used in what would be the first actual date-forwarding operation that was conducted at WSMR. These tests went extremely well, although the operating systems of the computers involved were noncompliant. This resulted in a very telling and important finding because a great number of systems that were noncompliant by definition performed flawlessly under actual operating conditions when dates were forwarded. Leap-year considerations were emphasized during this test since they dramatically affect Julian date, or the count of days from 1 to 365 (366 in the case of a leap year). Julian day is one of the few date-related pieces of information that might find its way into data streams collected and processed by WSMR. The success of this early testing and its direct relevance to WSMR's mission made it a good, and now proven, model for the conduct of the Y2CAT.

The Results—No Disasters!

In the Range Control Center, computer displays, data monitors, and TV screens were set to show every performance parameter of the aircraft and participating instruments. Any aberration or abnormality in the operation of the systems under test was immediately visible and obvious to engineers and scientists observing the test. Master timing signals broadcast rollover time changes across WSMR, while a test conductor counted down manual date-setting marks for technicians operating systems in the field. One by one, the test rollover dates ticked by as a sizable contingent of national, regional, and local media looked on. For 2 1/2 hours, the testing continued and, at each date change, the White Sands Real-Time Data System performed flawlessly. There were no aberrations in any instrument displays, no obvious changes in aircraft flight characteristics, no indication whatsoever of anything other than completely normal operation. More important, computer screens did not go blank, the computer-controlled jet did not fall out of the sky, and there were no computer crashes or catastrophic data losses. In short, none of the often-predicted Y2K disaster scenarios occurred during this or any other Y2K operation at WSMR.

The initial conclusion from these observations was that the test was completely successful. However, a more in-depth and mathematically sound confirmation of the results was necessary to truly declare success. Millions of bytes of computer data and thousands of feet of film and videotape were collected during the test. These data were put through the normal, rigorous posttest data reduction regimen that typically follows an operation at WSMR. Data reduction system computers executed date rollovers to match those of the data sets they were working on during the data reduction process. The final output of the process, comparing truth data from the computer controller with collected instrument data, showed page after page of smooth, uninterrupted, and corroborating data across all rollover points. WSMR now concluded with confidence that its real-time data systems were fully Y2K compliant, having successfully completed what was then the most comprehensive and extensive test of its kind yet conducted by the Army.

The Next Step—Infrastructure

Focus quickly turned to testing and demonstrating the remaining systems that comprised the WSMR infrastructure—those systems and functions that perform the day-to-day business processes that are common to most installations. The now-seasoned

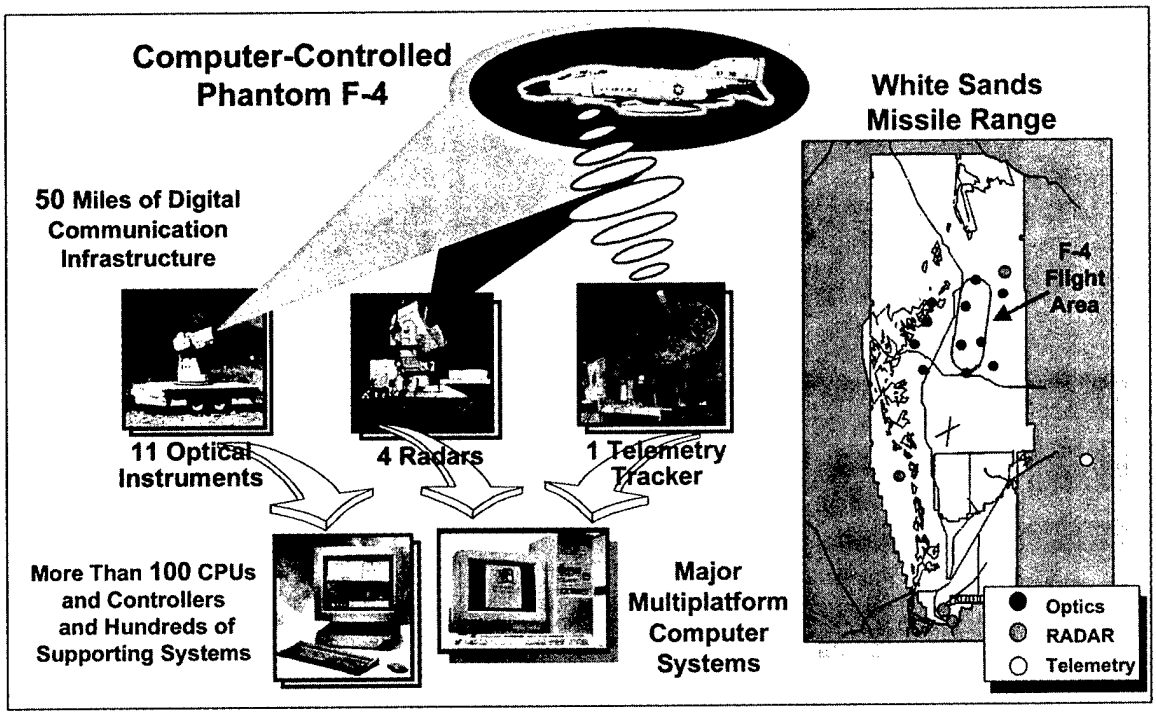

Figure 2.
Year 2000 Certification Acid Test conducted July 2, 1998

WSMR Y2K team, enhanced with some crack communication experts, began planning a basewide infrastructure test. This effort turned out to be much broader in scope and considerably more difficult to plan and coordinate because it included tenant activities, the local community, and private industry within WSMR's Y2K Program. The Year 2000 Infrastructure Test, or Y2KIT, was developed to bring these considerations together into a final, monumental test of WSMR systems.

The Y2KIT was centered on the first field test of Northern Telecom's (NORTEL) SL-100 telecommunications switch. WSMR purchased a $600,000 upgrade to this equipment to bring it into compliance. That upgrade was tested in the lab but had never been operated in a fielded application. This was WSMR's opportunity to engage private industry in its Y2K effort. NORTEL and GTE were contracted to assist WSMR in developing and executing a custom-tailored Y2K test for the SL-100.

The combined expertise of GTE, NORTEL, and the WSMR Y2K team produced an extremely comprehensive test plan that would roll through nearly 20 dates in the years 1999, 2000, and 2001. Built around this test of the SL-100 was a series of satellite tests involving a number of WSMR and local community activities relying heavily on the full functionality of the telecommunications switching network. The major categories of systems tested included the following:

- *NORTEL and GTE SL-100 Telecommunication Switch*—telephone services, long distance, local, DSN, and ISDN video transmission;
- *Local and wide area networks (LAN/WAN)*—electronic mail, file sharing, and data transmission;
- *Emergency response systems*—fire alarms, intrusion alarms, and 911 switchboard;
- *Base hospital tele-medicine capability*—video and voice link to Fort Bliss, TX;
- *Fresh water plant monitor*;
- *Educational systems*—WSMR elementary school; Las Cruces, NM, school district; and New Mexico State University; and
- *Tenant organizations*—Army Training and Doctrine Command, Army Research Laboratory, Office of the Test Director (Office of the Secretary of Defense), High Energy Laser Test Facility, and the U.S. Navy.

All these systems performed individually developed satellite tests as the SL-100 rolled through its series of Y2K dates. Telephone access of every kind, including picture phone and telephonic device for the deaf, was tested. Electronic mail, remote data transfers, World Wide Web access, and remote file access were completed across the LAN/WAN at WSMR. Sites as far away as Albuquerque, NM, and Washington, DC, participated in these exchanges. Fire, police, and medical crews were alerted and responded quickly to mock emergencies. School children from the local elementary school and child development center as well as the Las Cruces public school district forwarded clocks on educational systems to ensure their compliance.

Tenant organizations at WSMR demonstrated Y2K compliance of many of their systems as they passed information through the SL-100 and WSMR LAN/WAN. In a method similar to that used for the Y2CAT, WSMR control test conductors counted down timing synchronization marks as participants in the test watched master WSMR timing monitors. Many of the WSMR systems that participated in the Y2CAT were providing ancillary support during the Y2KIT and had a second opportunity to advance their dates and times.

Results—More Success!

A console device for the SL-100 was set up in the Range Control Center, and video links to many of the various remote test sites were active so that progress of satellite tests could be observed in real time. As the SL-100 operator clicked off Y2K rollovers, all the engaged infrastructure systems continued to work normally. For more than 4 hours, the above-described testing revealed no significant failure, data loss, or system crash. The pattern of success established in the Y2CAT, where systems continued to function properly in advanced-date situations, was repeated throughout WSMR's infrastructure components. WSMR now declared confidently that its major range facility base was Y2K compliant.

Follow-On Weapon Systems Demo

The cumulative success of WSMR's Y2K testing propelled it into a high-profile leadership position on Y2K issues. As the Commander of WSMR, I (BG Gatanas) soon began briefing Dr. John Hamre, Deputy Secretary of Defense, and John Koskinen, the President's Y2K Czar, about the Y2K successes. WSMR had now amassed perhaps the most comprehensive collection of empirical data and knowledge on Y2K testing, and the emerging message was clear: information about Y2K compliance needed to be shared far and wide, and it needed to be quickly applied to the testing and demonstration of fielded weapon systems.

The first opportunity to perform a field system demonstration was during a September 1998 Army Tactical Missile System (ATACMS) stockpile reliability test. In close coordination with the ATACMS Program Manager, the WSMR Y2K team developed a Y2K demo plan for conducting the live-fire test with all tactical computer systems set to actual local time but with the year set to 2000.

With dates forwarded, and all WSMR systems synchronized in date and time (now for the third time), the ATACMS missile was launched. It flew a nominal trajectory, achieved the designated target, and dispensed its munitions flawlessly. WSMR data collection systems confirmed the flight to be right on predicted flight profiles. This was also the first time that missile flight safety command destruct transmission systems and their associated displays were used in a date-forwarded condition during a live-fire operation. They too performed correctly throughout the entire mission, providing the critical range safety destruct capability that safeguards life and property on and about the missile range.

Another success was now counted and another addition made to the ever-growing body of Y2K knowledge archived at WSMR. It was now clear that assumptions by WSMR engineers early in the Y2K compliance process were largely correct—a steady string of testing and demonstration successes had proven it. This gave WSMR, and the Army, the confidence to boldly step up to true end-to-end interoperability demonstrations of major fielded Army systems.

The Grand Slam Sensor-To-Shooter Demo

In a major collaborative effort with the U.S. Army Aviation and Missile Command and soldiers from the 4th Infantry Division, WSMR developed plans and assisted in the execution of the sensor-to-shooter demonstration (Figure 3). This was the largest and most complex end-to-end, live-fire, interoperability demonstration yet attempted by the Army. It involved an impressive array of weapon systems that would be "first-to-field" in the event of a conflict, including: Apache A and D model attack helicopters; Kiowa Warrior helicopter; HELLFIRE air-launched, laser guided missile; Stinger air-launched missile system; Multiple Launch Rocket System (MLRS) with associated Fire Direction Systems and M270 Launcher; Advanced Field Artillery Tactical Data System (AFATDS); and Single Channel Ground and Airborne Radio System (SINCGARS).

The sensor-to-shooter demonstration was truly a marvel of planning and coordination of the complexities of aircraft fuel allocations, safe handling of live munitions, aircraft "attack routes," ground and aerial target placement, missile flight, and non-eye-safe laser safety, as well as WSMR instrumentation, timing, and ground safety coordination.

The objective of the demonstration was to set dates and times to Dec. 31, 1999, at 2300 hours and then rapidly execute a series of HELLFIRE and Stinger launches from the airborne platforms. Apache A and D models fired one HELLFIRE missile each against armored ground targets. The Kiowa Warrior then advanced and fired one HELLFIRE and a single Stinger against a suspended aerial target. Rollover to the year 2000 ensued immediately and automatically.

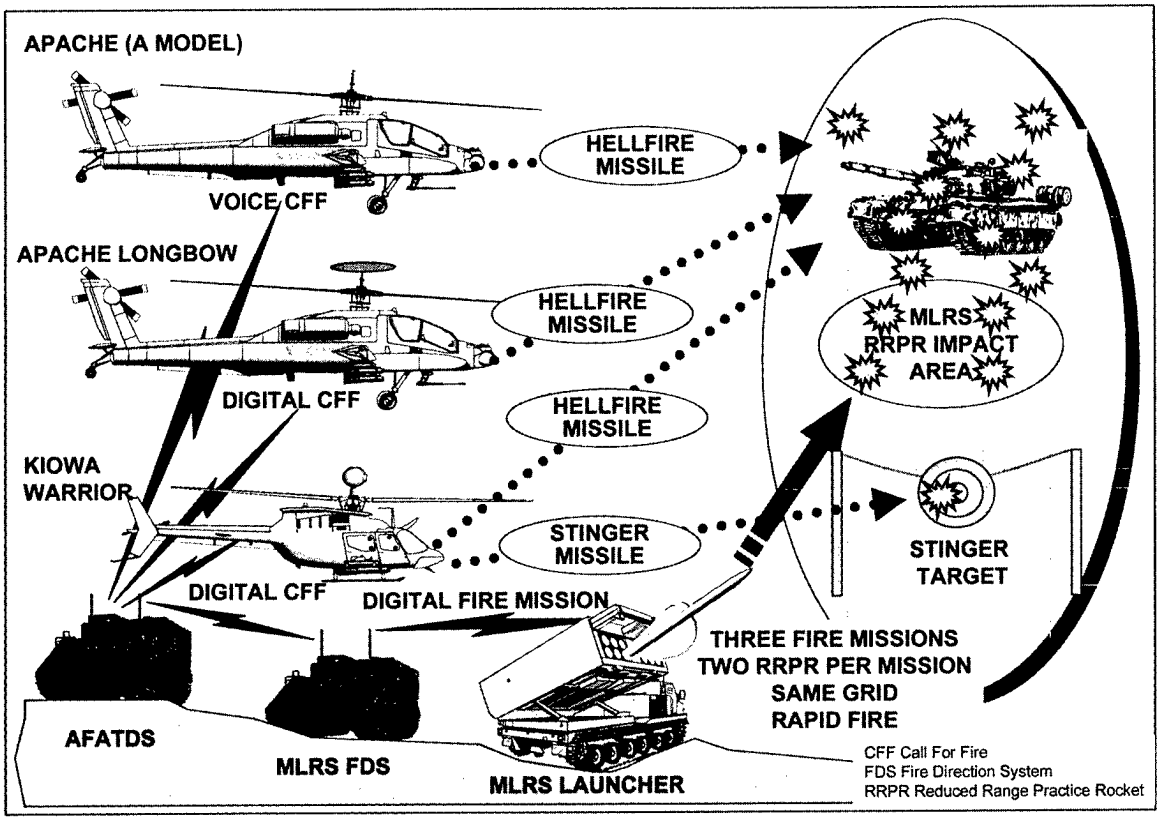

Figure 3.
Year 2000 sensor-to-shooter demonstration

After Y2K rollover, the helicopters performed an identical firing scenario, this time in the year 2000. After these firings, the airborne platforms transmitted target designation information and calls for fire to the AFATDS, which developed and transmitted fire missions to the MLRS launcher, culminating in a six-round ripple firing of MLRS rockets. Key to the success of this operation was the ability to "spoof" the Global Positioning System (GPS) timing inputs of the helicopters using a specially developed mobile system provided by Holloman Air Force Base.

Helicopter GPS antennae were disconnected so that surrogate, time-forwarded GPS signals could be inserted into their computer systems. Other tactical computer systems and all participating WSMR systems (now participating in their fourth Y2K operation) coordinated their date and time changes via WSMR's master timing system and control countdowns. Communications among the various tactical systems were conducted via the SINCGARS in its full-up frequency-hopping configuration.

With the precision of a Swiss watch, HELLFIRE and Stinger missiles were cleanly launched from the airborne platforms in both 1999 and 2000 date-forwarded environments followed by the launch of six MLRS rockets in a dramatic live-fire demonstration of Y2K compliance. All systems performed exactly as expected and the operation was declared a complete success. The soldiers of the 4th Infantry Division who were manning and operating the tactical equipment came away from the demonstration with a new-found confidence in the ability of their systems to perform on the battlefield of the 21st century. WSMR added another glowing chapter to its Y2K success story and another link to its chain of Y2K testing knowledge and experience.

The Investment

One of the most often asked questions about the WSMR Y2K Program is "How much did you spend?" This is a difficult question and is best answered by saying that WSMR committed substantial fiscal resources to the Y2K effort—effectively spending "whatever it took" to become fully compliant. There is value, however, in examining a more detailed breakdown of WSMR's Y2K expenditures during the last two fiscal years (Figure 4).

WSMR has invested nearly $5 million thus far. This seems a large figure at first glance but represents only a small fraction of an overall operating budget exceeding $300 million. This sum also pales in comparison to the lost productivity that would result if WSMR had to completely shut down for even a short time because of Y2K problems or the billions that might be wasted if a major missile program was delayed for the same reason.

What Have We Learned?

Hundreds of pages of detailed Y2K data and information have now been collected at WSMR. The daunting task of analyzing, organizing, publishing, and distributing that material is ongoing and will continue for some time. It would be exceedingly difficult to summarize or condense the bulk of that information in the context of this article, but some general "lessons learned" emerged:

- The Y2K problem is perhaps the most well-defined "bug" that has ever existed in the history of computers. We know exactly what causes it, exactly where to look for it, and its effects are easy to reproduce. This makes the problem manageable and correctable within reasonable timelines and budgets given that the following lesson is observed.
- There is a direct and nonlinear relationship between the level of commitment of top-level resources to a Y2K program and its depth and timeliness of success. Small increases in resources produce imperceptible differences in timeliness or success. To speed up or increase the proficiency of a program requires multifold increases in the resources applied.
- Simulations, approximations, and

contrived tests that are not exact representations of actual operating conditions should be avoided. There is no substitute for a live test. Live testing must involve the workforce at all levels engaged in the activities of normal business practice.

- The ability or confidence to do live testing is largely dependent on strong catastrophic recovery procedures. One reason WSMR approached live testing so boldly was that it could rebuild most of its software systems from scratch, even in the event of total data loss. Robust catastrophic recovery capability is the backbone of any Y2K contingency plan.
- A large area of concern in Y2K testing is *returning* dates and times to normal. The bulk of difficulties encountered during testing at WSMR occurred when clocks were being set back to actual time following date-forwarded tests. Error conditions encountered were strictly artifacts of the tests themselves and had nothing to do with the Y2K problem per se. Examples of these difficulties include induced license expiration, system clock hangs, and the "time dilation" problem. These conditions must be planned for during testing, but should never occur in actual practice.
- Continuing Y2K vigilance is crucial. Because many Y2K patches and "fixes" are external to the devices they "fix," they can be easily wiped out by common maintenance operations. Y2K policies governing maintenance practices, as well as a Y2K compliance requirement for procurement, are crucial to maintaining a high level of overall Y2K compliance.

Conclusion

This good news story of WSMR's Y2K Program is offered as a tribute to the dedicated effort of the Y2K team at WSMR that made it possible. Hopefully, this information, and the lessons learned it provides, will be valuable to the computer-using community at large and especially to others in DOD who may be struggling with their own Y2K programs.

Recent congressional language in the *Fiscal Year 1999 DOD Appropriations Act*, section 8117, directs the Secretary of Defense to conduct at least 25 commander-in-chief-level military exercises in 1999 to demonstrate Y2K compliance through a Defense major range and test facility base (MRTFB). The MRTFB at WSMR, now confirmed as Y2K compliant and with a wealth of knowledge and experience in Y2K testing, is ready to provide the full range of Y2K testing and evaluation services to DOD in addressing this mandate. WSMR may be one of the only facilities in the nation that can blend the requirements of testing, training, and Y2K-compliance demonstration under the MRTFB umbrella. Hopefully, the Services will take full advantage of these unique resources at WSMR. WSMR has embraced its Y2K leadership role and is extremely proud of its accomplishments in this area, and it will forge ahead into the 21st century ready to support America's warfighters and their materiel developers.

Figure 4. *WSMR's Y2K expenditures*

FY98	
200 Pentium II computers	$465,000
20 Sun Microsystems workstations	$140,000
2 Firewall software upgrades	$80,000
3 Desktop servers	$15,000
Silicon Graphics IRIX upgrade	$55,000
Drone Formation Control System	$63,000
Sun Microsystems Solaris upgrade	$25,000
MOTR Radar upgrade	$22,000
NORTEL SL-100 switch upgrade	$600,000
Replacement GPS timing receivers	$125,000
Civilian/Contract labor	$1,000,000
Y2CAT "Day of Test" execution cost	$40,000
NORTEL Y2KIT planning and execution	$100,000
Y2KIT "Day of Test" execution cost	$200,000
Sensor-to-Shooter Demo "Day of Test"	$100,000
FY99	
FY98 Deferrals to FY99 Equipment List	$1,000,000
Software Upgrades	$150,000
Contractor Support	$35,000
Civilian Labor	$241,000
Miscellaneous Requirements	$15,000
Grand Total	$4,672,000

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Natural Environment Testing . . .

COLD-WEATHER TESTING IN ALASKA ENSURES MILITARY EQUIPMENT READINESS

Chuck Wullenjohn

Introduction

The history of armed conflict is littered with debris of military equipment that worked just fine in fair weather, but failed when the going got tough.

Whether it was Napoleon's forces driven back by the subzero temperatures of wintertime Russia in 1812, or the communication gear issued to American troops on Guadalcanal during World War II that failed because of tropical humidity, realistic natural environment testing is something military equipment and ammunition developers ignore at the risk of endangering American lives.

Having long ago taken these lessons to heart, the Army today conducts extensive environmental testing operations at three diverse locations—desert testing at U.S. Army Yuma Proving Ground in southwest Arizona; cold-weather testing at the Cold Regions Test Center (CRTC) in Fort Greely, AK; and natural tropical environmental testing at the Tropic Test Center, currently located in the Republic of Panama. Under the central management of U.S. Army Yuma Proving Ground test professionals, these test centers ensure that American military equipment performs as advertised, wherever it is deployed around the world.

This article focuses on the facilities at CRTC in Fort Greeley, AK, where experienced operators test military weapon systems, equipment, and clothing in the same rigorous cold-weather conditions they might experience during military deployment.

CRTC Cold-Weather Testing

One of the most potentially deadly environmental extremes for the unprepared is cold weather, which can bring military operations to a virtual halt within minutes. With today's sophisticated equipment, cold-weather testing has become particularly important. Segments of the arctic environment, such as extreme cold, have been artificially created in environmental chambers at numerous testing locations over the years. These chambers, however, do not duplicate the synergistic effects of temperature, wind, and snow in a large enough arena to truly represent the complete challenge of winter warfare in its devastating totality. That means testing in the natural environment remains as meaningful today as in the past.

Alaska's CRTC, first established shortly after World War II when the importance of thorough environmental testing was fresh on everyone's mind, is the only test site on U.S. soil that realistically combines the elements of a winter battlefield with a test season long and cold enough to guarantee suitable test conditions.

CRTC's Environment

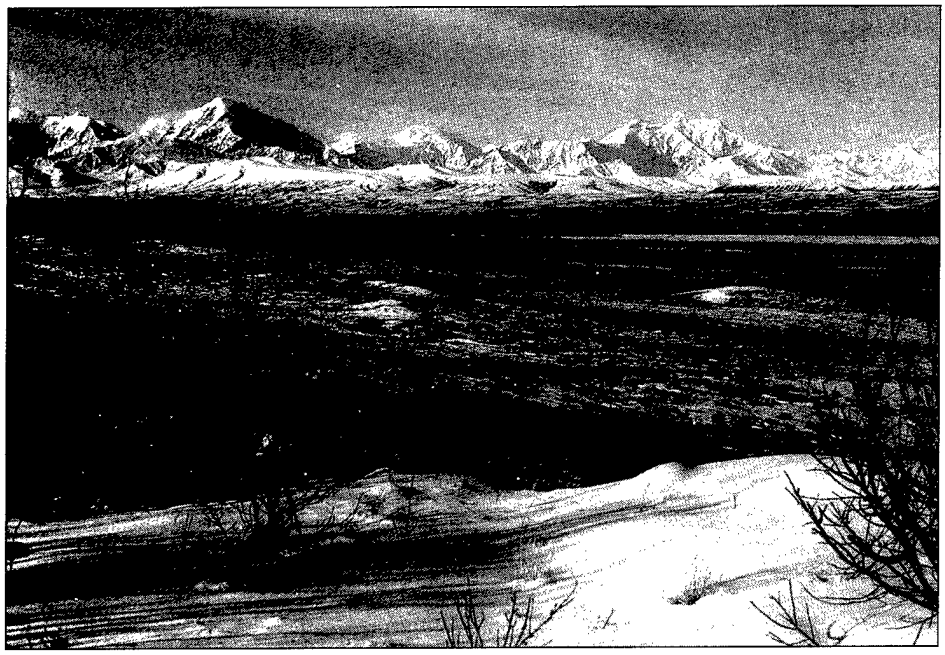
CRTC offers a full range of test capabilities and the professional expertise for all cold-weather test operations. The test center occupies more than 670,000 acres, amid one of the best cold-weather testing environments in the world. Almost all forms of individual subarctic environments are available within 50 miles of Fort Greely, including rugged mountains with glaciers, tundra, glacial streambeds, deep forests, and snow and ice fields. Maritime winter conditions are available in nearby Valdez, AK, which approximates the environment encountered in Scandinavian countries.

Situated in the heart of Alaska's rugged interior, CRTC is located in the only area in the western hemisphere cold enough to have an average winter temperature lower than 5 degrees Fahrenheit. The winter climate is characterized by periods lasting from several days to several weeks of below-zero temperatures, with lows falling to minus 50 degrees Fahrenheit.

Test experience has shown that successful cold-weather testing, which includes test setup, the actual test, and an evaluation period, requires at least a 6-hour block of time in which the ambient temperature remains within test guidelines. CRTC has 10 times more of these periods than winter test sites in the lower 48 states, thus allowing a longer period of time for repetitive testing to ensure proper assessment of all system components. Clearly, CRTC is DOD's best facility for thorough, reliable cold-weather testing.

"Though we are farther away, CRTC testing can prove much more cost effective to the customer. That's because customers don't have to spend extra time waiting for the correct temperatures. If they come to us, usually they will be able to go right out to conduct the test. Plus, we have the cold-weather experts who ensure that each test runs correctly and efficiently. No other cold-weather test site matches what we have to offer," said LTC Mary Brown, CRTC Commander.

CRTC testing is centered at the Bolio Lake Test Complex, located in a forested bowl-like depression next to Bolio Lake's cold, clear waters. The complex was specifically designed to accommodate a variety of test operations, with offices, large conference rooms, dining rooms, billeting space for 74 soldiers, maintenance and storage buildings, and much more. The coldest temperatures at Fort Greely occur here, which make the facility an ideal test staging point. Personnel from many nations have visited here, including British, Dutch,



The CRTC covers more than 670,000 square miles and includes nearly every imaginable form of subarctic environment available within a 50-mile radius.

Canadian, and American soldiers.

The great advantage of the remote land and cold weather would be of little value without a versatile, objective group of test operators. CRTC's Test Operations Division is staffed with senior enlisted soldiers and experienced civilians who understand and focus specifically on cold-weather testing. This group insists on providing good testing value to equipment developers with the single goal of ensuring only high-quality equipment is placed in the hands of American and allied military forces.

CRTC's Testing

CRTC test professionals have tested an astonishing variety of items in the cold-weather environment. These include combat and tactical vehicles, infantry and special operations weapons, ammunition, missiles, clothing, power generation and decontamination equipment, and much more. Once tested, many items incorporate technical changes or additions that improve cold-weather performance in the field. Additionally, many technical and operations manuals contain instructions formulated as a result of work performed at CRTC.

Art Trantham, Test Program Manager, has been a valued member of the CRTC workforce for more than 24 years. During this time, he has seen many military systems come and go, and he's also had a personal hand in identifying and solving cold-weather problems in weapon systems used today.

Back in 1979, a prototype version of the M1 Abrams Main Battle Tank was brought to the center for testing. Jim Storey, a co-worker of Trantham's, helped identify a critical problem that had never been seen previously, even in cold-chamber testing.

"At 0 degrees Fahrenheit and below, the gun tube uncontrollably oscillated up and down," explained Thantham, "which made accurate shooting impossible. Everyone was shocked. The developers had to bring it back to the factory to solve the problem."

Another situation Trantham remembers involved the 25 mm chain gun on the AH-64 Apache helicopter. An unanticipated problem occurred at temperatures below 0 degrees Fahrenheit when the synergistic effects of the climate affected the electronic logic circuits controlling the gun's elevation and deflection to the extent that the gun wouldn't work.

Trantham also remembers a 5-month test in which engineers identified a problem with the XM122 demolition firing device, which resulted in bringing the production line to a halt until the hazard was fixed.

"The XM122 is a digitally coded radio frequency transmitter and receiver that allows a soldier to remotely trigger a series of blasting charges. In our natural environment, it routinely malfunctioned. Sometimes it wouldn't fire, at other times it would fire when it wasn't supposed to. We helped engineers fix the problem, so production resumed relatively quickly. But it's a good thing we found it, for we sure don't want to equip our soldiers with faulty equipment," Trantham explained.

Though tests of these systems had been conducted in environmental chambers prior to CRTC testing, the artificial environment had failed to uncover the defects. The reason this happened was because only one spectrum of the environment—usually temperature—was used to simulate the natural environment. But a genuine natural environment is much more complex.

"A cold-weather environment includes low temperatures, to be sure," emphasized Trantham, "but it also includes snow on the ground that affects mobility, blowing snow that effects visibility, wind that affects all three of these factors by lowering the cooling rate, snow or ice that blows through or around seals, and much more. The compounding effect goes on and on."

For instance, vehicle shock absorbers can be tested in cold chambers by exercising them on a test fixture inside the chamber. But this is very different from exercising the same shock absorber on the road wheel of a tank that is driving on a rocky river bottom at minus 30 degrees Fahrenheit, said Trantham.

"I remember a test performed on an artillery round in a stateside cold chamber in the mid-1980s. They thoroughly cold soaked a projectile, then fired it into hot, humid air. That's an entirely unrealistic situation that caused the fuze to immediately freeze up and not arm. This is the same principle as when eyeglasses frost up when a person leaves a cold area and walks into a warm one.

"They had a 100-percent failure rate with this projectile, but when it was delivered to CRTC, and we fired it in the natural environment, we had 100-percent success. The lesson here is not to rely too heavily on artificial test situations. To prove the real value of a weapon system, you must test it as you use it," said Trantham.

Developmental And Operational Testing

One of the aspects of CRTC that makes it an invaluable testing location is the test center's long experience in combining developmental and operational testing, which has traditionally been performed separately at most installations. CRTC has always had a need for soldiers from tactical units to operate equipment or wear specially designed cold-weather clothing during tests, so it was a natural marriage.

Institutionally, the Department of the

Army has also recognized the importance of combining or closely coordinating these two types of testing, as is seen in the newly established Army Test and Evaluation Command. For the first time, this new major command combines developmental and operational testing as subordinate elements within the same command.

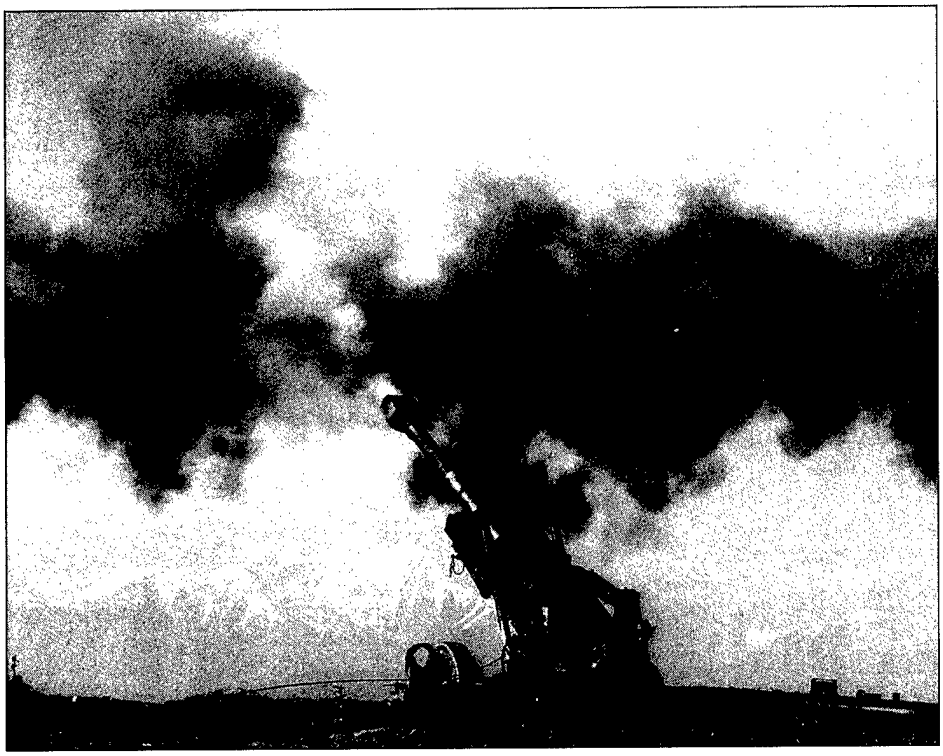
Combining these two types of testing into a single test involves give and take, for each has its own requirements. Developmental testing generally requires tightly controlled conditions that result in reliably reproducible data. Operational testing is more free flowing, requiring that units of military personnel use the equipment in a tactical environment. But through careful planning, the common elements of each can be highlighted and combined. One of the most significant benefits for customers is that test costs are sharply reduced, as is total test time.

According to Trantham, testing soldier systems, such as cold-weather clothing, requires soldiers to go out in the field. "You can test a uniform for warmth in a cold chamber, but the synergystic effects of the natural environment play a big role in determining how effective it is. For instance, can a mechanic successfully handle a crescent wrench or nuts and screws to repair a tank while he is wearing thick gloves? And exactly how does one conduct realistic testing of snow shoes or skis in a cold chamber?" Trantham said.

Jim Storey, a test engineer who has been at CRTC for 24 years, says soldiers in the special operations arena are very aware of the importance of realistic testing. "They [the soldiers] must have the highest level of confidence in their equipment, so they are beginning a 5-year program to examine all their small arms and other items of small unit equipment in our winter environment. This will identify any technical problems and will help them ensure that their procedures and tactics are as good as they can be. They know you can't substitute an artificial environment for a real one," said Storey.

Bob Torp, CRTC Technical Director, has become a testing expert during his 29-year Army career. He is now well into his second decade at the test center. He oversees the wide range of testing that takes place at CRTC, from the newest samples of "smart" artillery rounds to vehicle "cold kits" that ensure they will continue operating in below-zero temperatures. Some tests don't seem particularly "high tech," but are of the utmost significance nonetheless.

Torp relates the experience of the vapor barrier boot, which was first developed in the years after the Korean War and has since become the "gold" standard by which all other cold-weather boots are judged. Despite their high quality and reputation, America's solitary manufacturer has stopped producing them in recent years. A great many other boots and linings have been tested at CRTC, but all have been found lacking in one way or another. "This is an important issue, for boots are basic to cold-weather field operations. Frostbite comes quickly without proper footwear and heavy socks, so it's a critical combined test that will continue into the future," Torp explained.



The firing ranges at the CRTC are expansive and isolated, making them ideal for testing artillery in cold-weather conditions.

Torp feels one of the biggest misconceptions floating around the military today is that the CRTC won't be in business in the future because of the Base Realignment and Closure (BRAC) action ordered for Fort Greely. He wants everyone to know this is a totally false rumor. "The administrative personnel making up CRTC headquarters will be relocated 2 hours away to Fort Wainwright by 2001, but the major portion of the testing workload will remain at Fort Greely. Our test facility at Bolio Lake will remain in full operation and the job will continue. People need to know that CRTC is *not* going away," added Torp. That's particularly good news for the soldiers of America's Army, for CRTC's exclusive reason for being is to ensure that only the best military equipment and weapon systems are issued to soldiers in a cold-weather environment.

Conclusion

Just as soldiers need to "be all they can be," so must equipment. And to ensure quality, reliability, and confidence, there simply is no substitute for natural environment testing.

"The Army never knows where the next battle is going to be fought. We have to be prepared. It's part of our national commitment to other countries, and it will save lives. Natural environment testing ensures that American equipment functions properly in all environments," concludes Torp.

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

DOD APPROVES FIELDING OF ARMY'S NEXT GENERATION PERSONNEL MANAGEMENT SYSTEM

LTC Jenna L. Noble and
MAJ Calvin Bailey

Introduction

On Oct. 15, 1998, the Office of the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence gave the Army approval to begin full-scale fielding of its most advanced personnel management system, the Standard Army Installation and Division Personnel System Version 3.0 (SIDPERS-3). This action by DOD marks a major milestone achievement for the SIDPERS-3 Program, culminating an 8-year effort in developing the successor to the current personnel management system, SIDPERS-2.

The SIDPERS-3 Product Management Office (PMO) is located at Fort Belvoir, VA, and reports to the Program Executive Office, Standard Army Management Information Systems (PEO-STAMIS). The Product Manager (PM) receives requirements definition from the U.S. Total Army Personnel Command (PERSCOM) Field Systems Directorate, with matrix support from the Information Systems Engineering Command (at both Fort Belvoir and Fort Huachuca) and the Software Development Center within the Information Systems Software Center, Washington, DC.

SIDPERS-2 has served the Army well since 1972 and continues to do so today; however, personnel planners realized the inherent limitations of the system as early as 1982. SIDPERS-2 was not designed to provide commanders and their staffs real-time interactive access to personnel information databases, which adversely impacted time-sensitive decisionmaking regarding personnel assets. Lessons learned from Desert Shield and Desert Storm regarding the lack of real-time access to personnel information brought this limitation to the forefront and showed the need for SIDPERS-3 development.

In addition to the lack of real-time access to personnel information, SIDPERS-2 software is not year 2000 (Y2K) compliant; therefore, it will not process transactions involving date calculations after Dec. 31, 1999, without major software recoding. Conservative estimates indicate that renovating SIDPERS-2 software code would require 198 man-years of effort using Common Business Oriented Language (COBOL) programming. With the advent of fourth generation languages and rapid development environments, COBOL programming expertise has become increasingly difficult to obtain; therefore, recoding SIDPERS-2 was considered too daunting and expensive.

To further complicate matters, the computer system that is used as the input device for SIDPERS-2, the Tactical Army Combat Service Support Computer System–Enhanced, is no longer in production, which makes it difficult to maintain.

SIDPERS-3

SIDPERS-3 solves the Y2K and time-sensitive access problems while modernizing the Army's personnel system architecture with a system that leverages the latest in commercially

SIDPERS-3 solves the Y2K and time-sensitive access problems while modernizing the Army's personnel system architecture with a system that leverages the latest in commercially available hardware and software.

available hardware and software. SIDPERS-3 transitions the Army from the existing mainframe-based SIDPERS-2 architecture that operates in a batch mode with restrictive data flow to an architecture characterized as open, responsive, dependable, and decentralized.

The SIDPERS-3 product baseline includes, at the operator or battalion personnel action center (PAC) level, an Intel-based 233 MHz host terminal data server (HTDS) with 24X CD-ROM, 64 mb RAM, and a 4 GB SCSI hard drive. Most PACs will also receive up to four Intel-based 233 MHz workstations (24X CD-ROM, 32 mb RAM, 15-inch color monitor) and/or 166 MHz notebooks (20X CD-ROM, 24 mb RAM) with Windows 95 software. The HTDS, which is supported by the SCO UNIX operating system and Informix relational database management system, hosts the SIDPERS-3 software while the workstations perform terminal emulation. This architecture allows SIDPERS-3 to be flexible while providing greatly expanded capabilities.

SIDPERS-3 is engineered so that there are multiple database copies maintained at each echelon and multiple modes of data transmissions via local or wide area networks, magnetic media, and courier. The SIDPERS-3 database itself will accommodate three times as many data elements as SIDPERS-2. This allows commanders and their staffs access to more information and greater personnel asset visibility. Additionally, the relational database and distributed processing will greatly improve ad hoc query capabilities and database synchronization because users will be responsible for maintaining their own data. Personnel transactions entered at the PAC level will update the PERSCOM's Total Army Personnel Database in approximately 72 hours. SIDPERS-3 also includes many labor-saving improvements, such as a fully automated promotion module that features a worksheet and an application of cutoff scores to execute monthly promotions and promotion orders.

Converting To SIDPERS-3

A number of U.S. Army Forces Command and U.S. Army Training and Doctrine Command installations have been using SIDPERS-3 as their primary means of processing personnel transactions, some since 1996. With DOD's approval, the Army will now resume equipment extension, new equipment training, and site conversion from SIDPERS-2 to SIDPERS-3. All Army installations are expected to be operational using SIDPERS-3 by late 1999. Unit leaders and personnel support soldiers will then have several weeks of functional training prior to actual conversion to the new system. Once the installations are converted to SIDPERS-3, they will have at least 30 days of continued onsite technical support and assistance.

Although SIDPERS-3 is on its way to the field, enhancements continue to be developed. One such enhancement is an integrated Army personnel/pay module. The existence of separate personnel and pay systems has resulted in entitlement challenges for the Army leadership. To address these issues, the plan is to include personnel and pay functionality in SIDPERS-3 beginning in FY00.

Conclusion

With DOD's fielding approval for the SIDPERS-3, the challenge now shifts from system acceptance to fielding and operation of the system before the new millennium. Although the schedule is aggressive, it is also achievable by October 1999. The SIDPERS-3 PMO has the best team of professionals possible. They have repeatedly accomplished the impossible and are up to the challenge of successfully compressing a 36-month fielding schedule into 12 months.

Once the Army's Active personnel system is fielded, the PMO will begin fielding the system for Reserve components by 2002. (Because the Reserves will not be using SIDPERS-3 as a daily personnel management system, fielding completion by the new millennium is not necessary.) However, some Reserve components have already received SIDPERS-3 equipment, and training at the Total Army School System battalions will begin later this year.

After the Reserve system has been fielded, the next major modification will be the integration of SIDPERS-3 into DOD's corporate personnel management system, the Defense Information Management Human Resources System. This integration is currently scheduled for initial operational capability in 2003.

LTC JENNA L. NOBLE is the PM, SIDPERS-3. She has a bachelor's degree in music education from Bowling Green State University and an M.A. in management and human relations from Webster University. In addition, she is a graduate of the Command and General Staff College and completed the Program Management Course at the Defense Systems Management College.

MAJ CALVIN BAILEY is the Deputy PM, SIDPERS-3. He received a B.S. from Virginia Commonwealth University and an M.B.A. from the Florida Institute of Technology. He completed the Materiel Acquisition Management Course with honors at the Army Logistics Management College, the Systems Automation Course, Fort Gordon, GA, and the Command and General Staff Officer Course.

Do You Have Your Individual Development Plan?

The new fiscal year signaled major career management changes for the Army's Acquisition Workforce (AAW). Civilian AAW members have long been encouraged to prepare a 5-year Individual Development Plan (IDP) identifying achievement of anticipated education, training, and experiential opportunities. Since Oct. 1, 1998, however, all civilian AAW personnel have been required to develop and maintain an **automated** version of this IDP. Since January 1999, Active duty military AAW personnel must also develop and maintain the same **automated** IDP as their civilian colleagues. Finally, effective June 30, 1999, all civilian, Active duty, Reserve, and Army National Guard AAW members must have an approved and automated 5-year IDP in place, regardless of member's grade, payband level, military rank, acquisition career field, or certification level. All AAW personnel can access their IDPs at **https://rda.rdaisa.sarda.army.mil/idp/idpprod/idpstart.htm**.

According to Memorandum No. 96-01, *Career Development As A Mission*, which was jointly endorsed by the Office of the Assistant Secretary of the Army for Research, Development and Acquisition (now Acquisition, Logistics and Technology) and the Office of the Assistant Secretary of the Army for Manpower and Reserve Affairs, "The IDP is a vehicle for civilians to achieve a systemic approach to career development." The IDP is a critical planning document for employees and supervisors to identify and track career objectives in the areas of education, training, and experience. The IDP provides the capability to record and store short-range (2-year) and long-range (5-year) education training plans, and is a "living" document that can be changed at anytime.

IDPs are associated with an Acquisition Workforce member's record as depicted in the individual Acquisition Civilian Record Brief (ACRB) for civilians and Officer Record Brief (ORB) for Army acquisition officers. They are used to enhance current performance and prepare you for duties at higher levels. IDPs supplement annual career appraisals by recommending training, education, or other developmental activities. IDPs are progressive, sequential, and should address the training, education, and career development opportunities that will ultimately result in making you highly competitive for career advancement. Thus, all current and future acquisition-related education, training, and experience should be listed on your IDP and be approved by your supervisor.

Preparation of the IDP is a joint effort with input from you and your supervisor along with advice and assistance from your activity career program manager, proponency officer, and Acquisition Career Management Advocate (ACMA). Documentation of the IDP follows a discussion between you and your supervisor to assess previous training, education, and experience, and to evaluate realistic future career goals.

The automated IDP is the official repository for all of your accomplishments under the Continuous Learning requirement (80 hours every 2 years). It has been revised to meet certain requirements of the new Continuous Learning Policy. The automated IDP will now annotate and track continuous learning points. It is now easier to identify categories of career development and specific courses.

In May 1999, a new Web-based system to apply for Defense Acquisition University (DAU) training was implemented. When applications are submitted, the system checks to see if the individual has established an automated IDP. If they have not, the system will notify the individual and supervisor of the requirement to do so. Until July, this system was available as an additional method to apply for DAU courses in conjunction with the standard method. However, beginning in July, using the Web-based system in conjunction with the automated IDP became the only method available to apply for DAU courses. In addition, requested DAU courses must be listed on the approved IDP or the application will be disapproved.

For information on your particular career field, please contact the proponents listed in the accompanying chart.

In addition, please detach the handy reference card that follows this article. It can be used to access your Acquisition Civilian Record Brief and your Individual Development Plan. References and other points of contact are also provided.

Career Field Points Of Contact

Acquisition Logistics	Al Kinkella kinkelaj@sarda.army.mil	(703) 604-7115 DSN 664-7115
Business, Cost Estimating, and Financial Management	Cathy Doolos doolosc@sarda.army.mil	(703) 604-7114 DSN 664-7114
Communications/Computers	Sandy Long longs@sarda.army.mil	(703) 604-7125 DSN 664-7125
Contracting	MAJ Phil Yacovoni yacovonp@sarda.army.mil Mary McHale mchalem@sarda.army.mil	(703) 604-7106 DSN 664-7106 (703) 604-7105 DSN 664-7105
Industrial Property Management and Purchasing	Mary McHale mchalem@sarda.army.mil	(703) 604-7105 DSN 664-7105
Manufacturing and Production	Al Kinkella kinkelaj@sarda.army.mil	(703) 604-7115 DSN 664-7115
Program Management	Craig Spisak spisakc@sarda.army.mil MAJ Matt Barr barrm@sarda.army.mil	(703) 604-7101 DSN 664-7101 (703) 604-7136 DSN 664-7136
Systems Planning RD&E/Test and Evaluation	Craig Spisak spisakc@sarda.army.mil	(703) 604-7101 DSN 664-7101
Army National Guard	LTC Dave Perkins perkinsd@sarda.army.mil	(703) 604-7109 DSN 664-7109
CDG/CE Programs	Sandy Long longs@sarda.army.mil	(703) 604-7125 DSN 664-7125
Mandatory Training/DAU	Randy Williams willir@sarda.army.mil	(703) 604-7107 DSN 664-7107
Naval Postgraduate School	Jim Welsh welshj@sarda.army.mil	(703) 604-7116 DSN 664-7116
Acquisition Tuition Assistance Program	Sue Winkler winklers@sarda.army.mil	(703) 604-7118 DSN 664-7118

Value Engineering . . .

A SYSTEMATIC APPROACH TO O&S COST REDUCTION AND MODERNIZATION

Nannette M. Ramsey
and Cynthia Lovekin

Introduction

Operations and support (O&S) costs comprise more than 60 percent of the total cost of a typical system over the course of its "traditional" life cycle. As the systems in our inventory age and projected life cycles are extended, cost-effective management becomes critical to maintain readiness at the given budget levels. Readiness is too important to use a "hit-or-miss" approach. Value Engineering (VE) methodology provides a systematic process that maps out a positive course of action to both remove unnecessary costs and cultivate ideas for creative solutions. An approach that is planned and systematic is likely to be more productive than one that relies on undisciplined creativity. VE rolls all the skills, knowledge, challenges, issues, and details together into a dynamic and successful strategy to achieve the greatest possible benefit.

What Is VE?

VE is the systematic application of accredited techniques to identify the function of a product, process, or service; to establish a monetary value for that function; to discover alternatives through creative thinking; and to furnish the needed function, reliably, at the lowest overall cost. VE is an organized approach to problem solving, which is implemented by the use of a distinct assemblage of techniques.

According to Arthur E. Mudge, author of *Value Engineering: A Systematic Approach*, VE incorporates sound principles of economics and business management into its procedures. The objective of the VE systematic approach is to provide a means of total cost control anywhere within a product's life cycle. This is done while maintaining the required quality and reliability of the product to which the systematic approach is applied.

Value Engineering methodology provides a systematic process that maps out a positive course of action to both remove unnecessary costs and cultivate ideas for creative solutions.

VE is *not* a suggestion program. It is defined by Public Law 104-106 as "an analysis of the functions of a program, project, system, product, item of equipment, building, facility, service, or supply of an executive agency ... directed at improving performance, reliability, quality, safety, and life cycle costs." This same public law requires each executive agency to establish and maintain cost-effective VE procedures and processes. It is a law that energizes us to act smartly by looking beyond the status quo. If we don't, we will never become aware of the savings that could be available from other alternatives.

VE has always been used during production with great effectiveness to reduce system acquisition costs. VE applied during the earliest part of an item's life cycle is obviously most effective because significant expenditures have not yet been made. Acquisition reform has resulted in new ways of thinking about VE. VE must not be forgotten after production and initial fielding because there will still be significant costs in the operation, maintenance, support, and even the

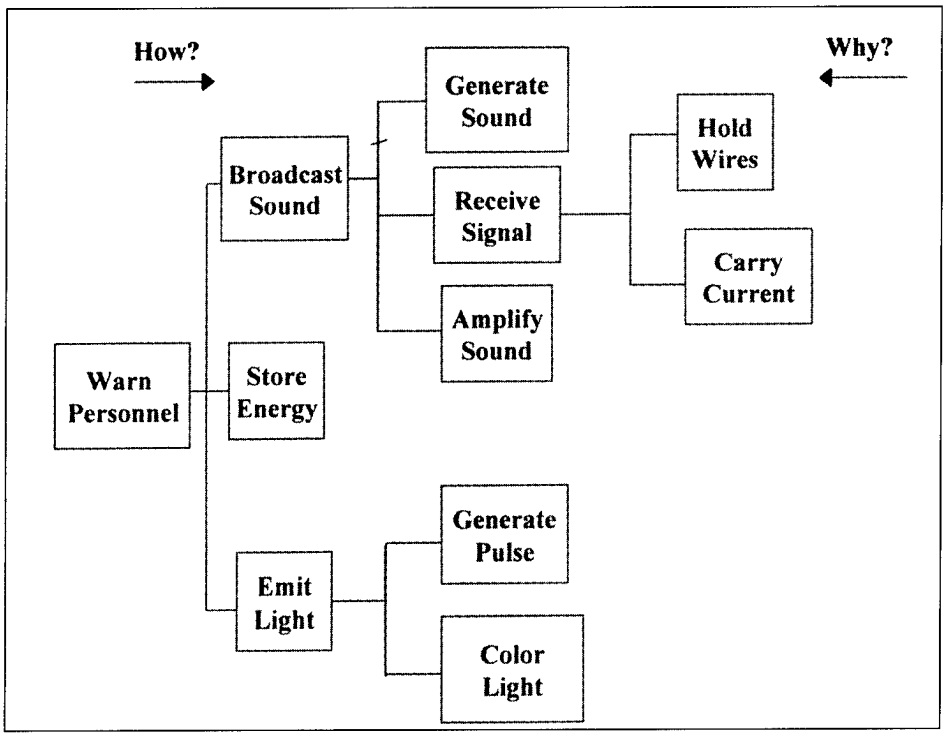


Figure 1.
Chemical agent alarm FAST diagram—basic functions

disposal of systems.

Function Analysis Promotes Creativity

At the heart of the VE process is function analysis. This process is unique to the VE methodology because it allows us to focus on the root problem or immediate challenge as opposed to the symptoms of an issue. The complex issues surrounding cost-reduction efforts are greatly varied; however, the Function Analysis Systems Technique (FAST) creates the framework for defining and understanding the problem. A two-word verb-noun format defines the function of every piece of hardware being analyzed (Figure 1). For example, the basic function for the chemical agent alarm described in the two-word verb-noun format is "Warn Personnel." In the function analysis, you would then ask, "How do you warn personnel"? Again, by applying the verb-noun format, the answers are "Broadcast Sound" and "Emit Light." These functions can be further broken out by continuing the process of asking, "How do we broadcast sound and emit light"? In simplistic terms, these functions then graphically display the relationships of all functions performed by a product, a service, or an organization. This diagramming technique is called FAST. Costs are allocated to each function and then these data are analyzed to determine function worth and cost mismatches. It is this two-word function identification that promotes "out of the box" thinking by focusing on the function you wish to satisfy instead of the hardware you are trying to improve.

Recent VE Workshop Successes

Value engineering workshops are extremely useful in identifying the O&S cost reduction and technology insertion opportunities. The structured VE approach, which for 40 years used the multifunctional integrated product team, created a powerhouse that produced incredible results. The U.S. Army Communications-Electronics Command (CECOM) has employed the "workshop" philosophy for the past 2 years with very successful results. The following workshops are examples of where VE methodology was used to pursue cost-reduction opportunities and identify areas for technology insertion.

TRAILBLAZER Workshop

The TRAILBLAZER is a high-capacity, ground-based communications intercept, processing, and direction-finding system produced by the Raytheon Co. The present TRAILBLAZER, which is more than 15 years old, consists of components and systems that are reaching the end of their useful life. The TRAILBLAZER replacement was scheduled for fielding in 1999, but this date slipped to 2008. As a result, the TRAILBLAZER mission was extended 10 years. The O&S command budget was unable to sustain the effort necessary to maintain TRAILBLAZER in field-ready condition for the next 10 years.

CECOM held a VE workshop to address the expenses associated with maintaining aging equipment having obsolete parts that are often difficult to replace. Because CECOM and Raytheon agreed to partner in this legacy system upgrade, Raytheon was a key member of the workshop. One of the workshop teams addressed ways to improve and upgrade the TRAILBLAZER. The focus of their investigation was replacing obsolete equipment with more reliable, lower maintenance cost, commercial off-the-shelf equipment. The second team addressed reducing O&S costs by studying ways to improve the O&S process and maintenance frequency aspects of the system.

The workshop generated more than 200 ideas that were refined into recommendations worth additional research or implementation. One of the ideas already implemented consists of replacing the TRAILBLAZER's air conditioner, which has a 30-percent field failure rate, with an ozone-compliant high-reliability unit. Another VE proposal implemented from the workshop involves developing a test program set for the signal analyzer subsystem to test eight unique circuit boards. This will increase turnaround time in repair and troubleshooting and save repair costs. In addition, 30 other workshop recommendations are being pursued, but additional data are needed.

PM FIREFINDER Workshop

VE can also be used as a systematic tool for resolving program issues. For example, a VE Methodology Workshop was established by PM FIREFINDER within command, control, communications, computers, intelligence, electronic warfare, and sensors to study the incorporation of the AN/MPQ-64 Sentinel radar system improvement changes into the existing AN/TPQ-36 production baseline. The AN/MPQ-64 Sentinel radar was originally developed from the FIREFINDER radar and shared many common components with the

Value Management Phase	Agenda	Possible Methods/Tools	Expected Deliverables
Initiation & Preparation WHAT IS TO BE STUDIED?	• Agree on study objectives, scope, procedure & methodology • Identify study team members • Prepare information packet • Project objectives at each stage	• Consultation • Discussion	• Objectives, scope, procedure & methodology clearly defined • Team members selected • Problem info extensively secured
Information/Analysis Phase WHAT IS IT? WHAT DOES IT DO?	• Value & risk management overview • Function analysis • Risk identification and assessment	• Group dynamics • Presentation • Discussion • Function diagrams (FAST/Value Trees) • Probability & impact scales	• Better understanding of project and problem areas • Function analysis completed • Risk issues clarified • Frequency & impact of risks/opportunities assessed
Creativity Phase WHAT ELSE WILL DO THE JOB?	• Generate alternative ideas for value improvement and risk reduction or mitigation	• Free association • Morphological analysis • Attribute list • What-if questions • VE checklists	• List of possible alternatives
Evaluation Phase WHAT DOES IT COST? WHAT IS IT WORTH?	• Agree on evaluation criteria & technique • Assess alternatives and related risks developed in creative phase • Rank alternatives and risks	• Idea filter • Relative cost ranking • Function worth	• List of selected alternatives to be developed further
Development Phase WILL IT WORK?	• Life-cycle cost (LCC) analysis for each selected alternative where appropriate	• LCC analysis • Break-even, trade-off, probabilistic, & sensitivity analyses • Simulation • Probability trees • Decision trees	• VE proposals finalized • Risk control/ mitigation measures
Decision & Action Planning Phase WHAT IS NEEDED TO IMPLEMENT?	• Decide on the competing options based on chosen criteria and weights • Responsibility for actions are agreed among team members	• Multicriteria decision matrix with risk as a criterion	• Competing options ranked and risk mitigation plans made clear • Action plan
Presentation Phase WHAT IS RECOMMENDED?	• Effective promotion of VE proposals to decision-makers	• Presentation • Consultation • Discussion	• VE proposals welcomed by decisionmakers
Implementation & Follow-up Phase	• VE report • Risk management plan • Feedback from team members • Lessons learned	• Consultation	• Proposals accepted & adopted by decision-makers and implementation of proposals

Personnel involved should include all relevant functional areas.

Figure 2.
A systematic approach to problem solving

For more than 40 years, the Value Engineering methodology has included the multifunctional team approach to solve problems and improve product value.

FIREFINDER. Through the years, enhancements to the Sentinel diminished the commonality between the two systems. During the VE workshop, the team, which included a contractor representative, addressed the following goals:

- Use the AN/MPQ-64 upgrades to modernize the AN/TPQ-36 radar antenna group to current technology without going through major system redesign.
- Bring the commonality back to reduce maintenance and logistics support for both systems.
- Reduce acquisition cost, time, and effort to bring a replacement system to the field.
- Extend the useful life of the AN/TPQ-36.

Cost and inventory analysis, undertaken in the development phase of the VE workshop, revealed that two of the five "drop-in" systems from the newer AN/MPQ-64 could economically be used in the older AN/TPQ-36. Engineering change proposals to insert the new technology are being implemented to provide a system that will have updated technology and a more easily supportable configuration. The development phase of the VE workshop, as shown in Figure 2 on Page 32, consists of finalizing the most promising alternatives identified earlier in the workshop using tools such as life-cycle cost analysis, trade-off, simulation, or other analyses tools.

FIREFINDER TPQ-36(V) Workshop

The FIREFINDER TPQ-36(V) Operation Central Electronics Upgrade Workshop used a team composed of government and contractor personnel from relevant functional areas to identify cost reduction and performance improvement opportunities. The Value Engineering Change Proposal that resulted from the workshop called for replacing the mass storage expansion unit with a CD-ROM unit. This project reduced costs by $786,400. The government and contractor shared the savings equally. O&S cost savings during the life cycle of each system are also expected because of the improved mean time between failures. The commercially available replacement parts will also cost less than the older custom-made units.

Why Does VE Work So Well In These Workshops?

The answer lies in the organized VE approach. While traditional cost-reduction approaches rely on suggestions, flashes of insight, and individual ingenuity to achieve results, the VE methodology uses the multifunctional team approach and rolls all the skills and expertise, issues, and details into a dynamic and effective strategy to achieve the greatest possible benefits.

Do I Have To Be An Engineer?

Everyone in an organization can learn and apply VE techniques. While many other techniques and programs are imprecise, VE is very specific in the steps taken along the way, so training in the techniques is essential. Figure 2 shows the basic steps used to solve problems in the VE process. Team members are selected based on their expertise regarding the problems or issues intended for research. Contractor participation is generally included. An established agenda with specific questions asked during each phase is crucial to the process.

Conclusion

VE is a systematic approach that provides a continuous action toward a stated objective. It is not magic. It is hard work and it takes time and often involves taking risks. However, it contains tools necessary to effectively solve problems and address cost issues. It will guide you to an optimal solution while creating a new mindset that points toward improved value, continuous improvement, and improved problem-solving techniques. It has been used effectively within the Army Materiel Command (AMC) to reduce cost and identify technology insertion opportunities. For more than 40 years, the VE methodology has included the multifunctional team approach to solve problems and improve product value. The escalating age of our systems and budgetary constraints are forcing the Army to make difficult economic decisions. We need analysis tools to help make those decisions. Value engineering can make consequential advances as a versatile technique that can be successfully applied to virtually every product, process, or service.

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CYNTHIA LOVEKIN is a General Supply Specialist in the Value Concepts Office, CECOM, Fort Monmouth, NJ. She is the VE Workshop Coordinator and a Workshop Facilitator, and she develops local guidance and policy and manages the VE External/Contractor Program.

The University Of Texas At Austin . . .

SENIOR SERVICE COLLEGE FELLOWSHIP PROGRAMS

LTC(P) R. Mark Brown and
Dr. Jerry G. Davis

Introduction

The Acquisition Senior Service College Fellowship Program (SSCFP) at The University of Texas (UT) at Austin is specifically designed to meet the senior service college-level requirements of the Army and the Army Acquisition Corps (AAC). Sponsored by the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT), it is conducted jointly and concurrently with the Simulation SSCFP at UT, which is sponsored by the Deputy Chief of Staff for Operations and Plans. The Simulation SSCFP examines the three domains of Simulation (Live, Virtual, and Constructive) and how it applies to the Army Doctrine, Training, Leader Development, Organization, and Materiel (DTLOM) process. Selected fellows reside at UT for 1 academic year and are awarded Military Education Level One (MEL 1) upon graduation, indicating completion of an SSCFP such as the Army War College or the Industrial College of the Armed Forces.

Active duty military officers are selected to attend the SSCFP by a Department of the Army (DA) centralized selection board, which convenes annually. Selected officers are then slated by the Acquisition Management Branch at the U.S. Total Army Personnel Command (PERSCOM) to participate in one of the available Senior Service College Fellowships, such as the SSCFP at UT (Austin). Reserve Component (RC) officers apply directly to their component for selection to attend the SSCFP. A centralized selection board is held annually by the component to consider qualified RC officers. Once the board is approved, selected officers are slated by the respective component for one of the available fellowships.

Civilian AAC members are selected to attend the SSCFP by an Acquisition Education, Training and Experience (AETE) Selection Board, convened twice annually by DA in January and June. The SSCFP at UT (Austin) is also announced in the AETE catalog published on the AAC home page. AAC members in grades GM-/GS-14 and -15 who meet the prerequisites outlined in the AETE catalog may apply to attend the SSCFP.

The UT's Center for Professional Development and Training (CPDT) manages the Acquisition SSCFP on campus and conducts a variety of training courses and seminars for the Army and the AAC. Examples are onsite short courses and seminars on leadership, communications, and strategic planning at such locations as Redstone Arsenal, AL; Rock Island Arsenal, IL; and the National Capital Region. The CPDT Director states the following:

The program is now in its seventh year of operation, and I believe we have enjoyed tremendous success. We have had strong support from the Army Acquisition Corps, which provides program funding for its members. Our fellows have benefited from the program, and Department of the Army evaluations and feedback from the fellows, visitors, and senior military and civilian leaders is outstanding. All our military graduates have been selected for promotion and command at the next level, which indicates a top quality student population. I believe our strong emphasis on the total spectrum of Defense Acquisition related activities is a key factor in the high quality of our program. Now, with the advent of the Simulation Senior Service College Fellowship, which is in its second year, we are seeing great synergy between the two programs and their respective fellows, especially in areas like simulation based acquisition and test.

The UT SSCFP is a total force program. The 1998-99 class includes five Active duty Army officers, one DA civilian, two U.S. Army Reserve officers, and four Army National Guard officers (one of whom is also a DA civilian). Three of the Active duty officers, the DA

The University of Texas Senior Service College Fellowship Program features a unique trilateral approach, with the fellows studying the relationships among the national security organization and process, the Army's critical technologies, and the industrial base.

civilian, two Reservists, and two National Guardsmen are in the AAC and comprise the Acquisition SSCFP. The remaining four fellows are in the Simulation SSCFP; but all fellows, if not acquisition professionals, generally have backgrounds, interests, and skills related to the Defense acquisition process, either as a user or as a combat developer.

The University

The University of Texas at Austin is the nation's largest university, a top 100 Defense contractor, and a major comprehensive research university with a broad mission of undergraduate and graduate education, research, and public service. UT places a premium on outstanding instruction. Its academic programs and professional schools rank largely among the top 20 programs and schools in the nation, particularly the Engineering School, Business School, Law School, and Lyndon B. Johnson (LBJ) School of Public Affairs, all of which play prominent roles in both SSCFPs.

The UT faculty is distinguished nationally and internationally. It includes Nobel laureates and many other leaders from the highest levels of government, business, academia, and the arts and sciences, including outstanding professors from the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences, and the American Law Institute. More than 1,000 endowed faculty positions exist at UT.

The innovation, creativity, and quality of the research and scholarship underway regionally and nationally at UT is reflected in the many sponsored research awards presented to UT faculty and researchers. In public service, UT is increasingly directing its resources toward initiatives aimed at building bridges to the community. Its widespread effects range from criminal defense clinics to business modernization projects and numerous outreach programs.

SSCFP

The UT SSCFP features a unique trilateral approach, with the fellows studying the relationships among the national security organization and process, the Army's critical technologies, and the industrial base. The program is comprehensive yet flexible in that it allows each fellow to tailor a program for maximum emphasis in a given area of interest.

National Security

The national security module explores all elements of national power, which are military, political, diplomatic, economic, and national will. This module addresses the history, philosophy, and organizational structure for national security, examines military strategy, and reviews the force development and acquisition process. The core of the module is built around a series of lectures by retired Admiral Bobby Ray Inman, a former Director of the National Security Agency and Deputy Director of the Central Intelligence Agency; and Elspeth Rostow, former Dean of the LBJ School of Public Affairs.

This module also allows fellows to audit selected UT graduate courses, which may be done at the fellow's option. The 1998-99 fellows audited such classes as the Art and Science of Negotiation in the UT Business School, Contract Law in the UT Law School, and Software Engineering in the Engineering School among many others. The choices are virtually unlimited, and almost the entire offering of the UT Graduate School is available for the fellows to pursue their own particular interests.

Additionally, each class participates in a number of ongoing conferences and symposia such as the 1998 San Antonio World Affairs Council sessions, where the fellows met and received a presentation from Ambassador Richard Armitage, former Assistant Secretary of Defense for International Security Affairs, and the Greater Austin Quality Practicum, which provided an opportunity to interact with high-tech industry leaders. The fellows were also provided the opportunity to attend the most recent meeting of the Defense Activities Council on Women in the Service in Austin. In fact, the fellows may participate in an unlimited array of broadening experiences, both professional and cultural.

In the future, this module plans to host several significant seminars. Among them will be one on professional ethics and leadership led by retired LTG Howard Graves, a former Commandant of the Army War College and Superintendent of the U.S. Military Academy and current endowed Professor in the LBJ School of Public Affairs. An additional significant seminar on National Security processes will be led by retired Air Force MG David Goodrich, former Commandant of the Industrial College of the Armed Forces and a current Naval War College Professor.

Critical Technologies

The critical technologies module focuses on key emerging technologies identified in the Army's Science and Technology Master Plan. Technologies such as microelectronics, robotics, directed energy, advanced propulsion, advanced power generation, software engineering, biological defense, digital signal processing, electromagnetic technology, and space technology are organized into short survey courses. A combination of professors from UT and leaders in the appropriate technology areas present overviews of the technology and its potential military applications. The courses are designed to provide a survey of the topic areas such that fellows gain a general top-level understanding of the technology, current work, and future potential. Fellows may also wish to audit university courses of their personal interest in support of the technologies module. Finally, fellows may participate in Division XXI and the Army After Next activities at nearby Fort Hood, TX, which is 45 miles northwest of Austin, TX.

Industrial Base

The industrial base module explores the relationship between government and industry. Austin is a rapidly growing "hot bed" for high-tech Defense and non-Defense industry. It is corporate and division headquarters for companies such as GEC Marconi, 3M, Solectron, Dell Computer, IBM, Motorola, Apple Computer, Advanced Micro Devices, and a myriad of smaller high-tech companies. The industrial base module includes spending a day in some of these industries. The approach is to review the organizational structure of the activity, tour manufacturing facilities, and spend "one-on-one" time with executives and supervisors discussing such key topics as quality, Defense contracting, governmental issues, and research and development.

AAC fellows will also have the opportunity to conduct a mini-internship (about 1 day each week) with selected companies such as GEC Marconi, if desired. The approach is to spend the fall semester getting to know the industry, its organization, policies, and executives, and then co-identify a problem or process to work with the industry and other students during the spring semester. This module offers a great opportunity for future project managers to gain a detailed understanding of industrial practices, processes, and challenges.

In fall 1998, the fellows visited Dell Computer, and in spring 1999, they visited Stewart & Stevenson Corp. in nearby Sealy, TX, where the Army's Family of Medium Tactical Vehicles is manufactured. The fellows studied the manufacturing process and the relationships among industry, the program manager, and the Defense Contract Management Command. At the time this article was written, presentations to the fellows by Intel Corp. and Microsoft Corp. were also planned for spring 1999. Fellows may also audit university courses in support of the industrial base module.

Distinguished Speaker Program

In support of the overall program, the SSCFP provides a dynamic guest speaker package on a variety of current Defense topics to significantly enhance the practical dimensions of the program. Guest speakers of national prominence, with past or present direct responsibility within the national security arena, are invited in support of each of the three major program modules. The fellows engage in "give and take" with the speakers in a very low speaker-to-fellow ratio, usually 10 to 1 or 15 to 1 or less, and for periods ranging from 2 to 6 hours. In 1998-99, speakers included such notables as Louis Caldera, the Secretary of the Army; GEN Montgomery Miegs, Commander of NATO Forces in Bosnia; Dr. Hans Mark, Director of Defense Research and Engineering and former Secretary of the Air Force; LTG Paul Kern, Military Deputy to the ASAALT and Director, Army Acquisition Corps; Dr. Walter LaBerge, former Under Secretary of the Army and Principal Deputy Under Secretary of Defense; and Dr. Edwin Dorn, former Under Secretary of Defense (Personnel and Readiness) and current Dean of the LBJ School of Public Affairs.

Conclusion

Comments from all quarters concerning the program have been overwhelmingly positive. The Department of the Army, visiting dignitaries, and other senior Army leaders have cited it as a model fellowship for the Army. Members of the 1997-98 graduating class offered the following program evaluation:

> *This program was an outstanding MEL 1 experience. It appropriately focused on national security and Army Acquisition Corps issues and brings to bear such outstanding assets as a nationally recognized graduate business program; a nationally rated engineering and graduate engineering program; the LBJ School of Public Affairs; excellent facilities and research in the hard sciences; a close relationship with a world-class Technology Incubator and IC2 [Institute]; the university-based national electronics research consortia of MCC and Sematech; as well as national Defense industrial partners such as Tracor, Texas Instruments, and Lockheed. It would be difficult to find another area that offers the potential synergy that this program offers as an AAC MEL 1 experience. Austin, Texas, is a technopolis of the first order, which combines distinctly unique assets of industry, government, and academia, and a plethora of retired national figures.*

For more information on the SSCFP, contact Dr. Jerry Davis or Jim Pollard at the Center for Professional Development and Training, (512) 232-4554/4560 (or email: **Jerry_Davis@iat.utexas.edu** or **Jim_Pollard@iat.utexas.edu**) or visit the UT website at **http://www.utexas.edu/research/cpdt**.

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Preparing For The 21st Century . . .

THE ARMY COMMUNICATIONS-ELECTRONICS COMMAND ACQUISITION CENTER

Estelle Klose and
Michael Gallagher

Introduction

As Yogi Berra is quoted as saying, "The future ain't what it used to be." What makes this statement, and many of Yogi's aphorisms, both comical and profound is its simplistic ability to capture a modern day truth. What distinguishes today's future from futures of the past is the explosive pace of change. Technological, political, economic, and societal changes impact our way of life and our way of doing business as never before.

At the U.S. Army Communications-Electronics Command (CECOM) Acquisition Center, we believe that an organization that relies on the traditional organizational structure to respond to today's ever-changing environment will be at a competitive disadvantage and will not effectively serve its customers or employees.

The traditional organizational pyramid is valuable only to the extent that the future is like the past. Although we do not want to discard lessons learned in the past, we must be aware of the inevitable impact of acquisition reform, technological change, and DOD downsizing. To be successful in the future, organizations must institutionalize the ability to adapt to changes brought about by global forces in the marketplace.

Goal

Our goal is to anticipate and respond to changes in customers' needs with an organizational flexibility designed for the DOD of the 21st century. Accordingly, the CECOM Acquisition Center examined its organizational structure. This examination focused on enhancing our organizational versatility; fortifying the skills, knowledge, and experience of contracting personnel; fostering innovation; and strengthening and expanding our customer base. As a result, the Acquisition Center is restructured with a strong emphasis on our core competency—customer service. This reconfiguration is based on the belief that an organization's core competencies provide leadership with the knowledge and experience that can be applied across organizational lines. This knowledge reduces redundancy and risk, increases the opportunity for transferring learning and best practices across business sectors, identifies potential risk and reward, and provides insight into other acquisition reform opportunities.

Reorganization

We are mindful that organizations can try to become more flexible and responsive in behavioral terms without recognizing how much inflexibility and unresponsiveness is built into their structure and systems. To address this, we made a conscious effort to introduce the "management of change" into our corporate culture. For example, our new organizational configuration replaces the traditional midlevel manager position (which oversaw the activities of a particular group of contracting officers and their teams) with two new redefined midlevel management positions: the Customer Representative (CR) and the Joint Partnering Contracting (JPC) Representative. The CR position strengthens our relationship with customers while the JPC Representative position forges a closer partnership with industry. These new positions demonstrate a more proactive approach by leadership to our customers and industry and underscores the commitment of senior leaders to overhaul our traditional way of doing business.

The CECOM Acquisition Center's former organizational structure was configured in the traditional "box." The new CECOM Acquisition Center organization consists of four new integrated components: three flexible contracting sectors (sectors A, B, and C are shown in the accompanying figure), CR positions, JPC Representative positions, and the Acquisition Business Process Sector. In addition, the Acquisition Center's Customer Executive Board represents the center's senior leadership.

Flexible Contracting Sectors

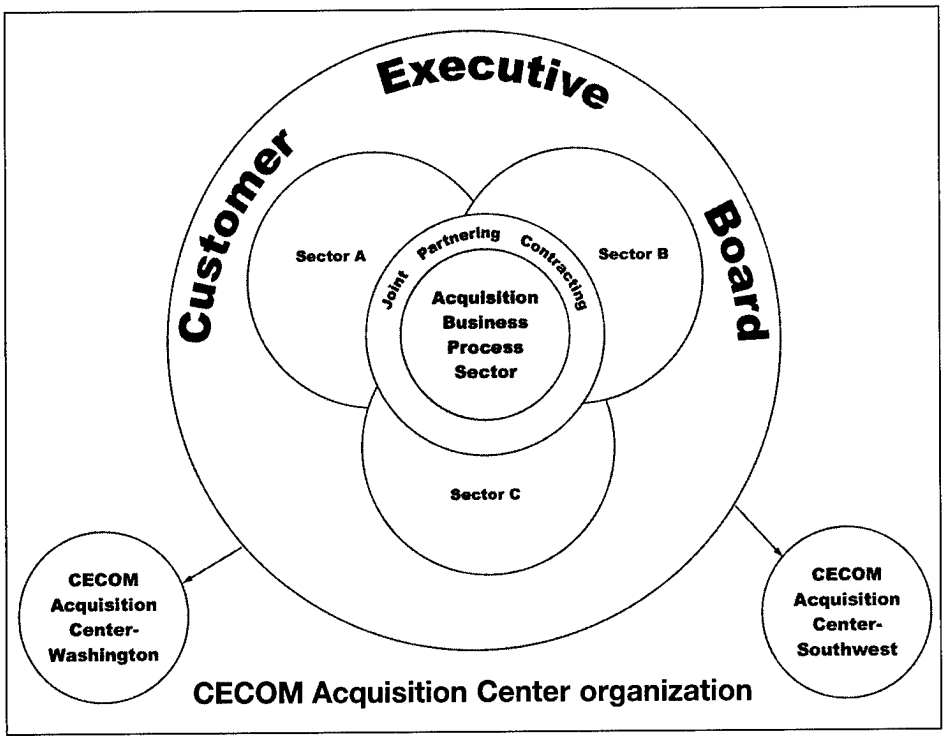
The CECOM Acquisition Center's vision is to be the "acquisition center of choice." This can only be realized by engaging the talent, creativity, and commitment of each employee. The 21st century organization will be characterized by responsibility, autonomy, risk, and uncertainty. Work must be "smart," appropriately targeted, and adapted to the particular circumstances of the process and the customer. This requires the workforce to be proficient in all facets of contracting. To foster this goal, the CECOM Acquisition Center reorganized by creating three flexible contracting sectors (formerly divisions), each composed of a pool of contracting officers (with a team of contract specialists). These contracting officers are no longer dedicated to a particular customer or system but, rather, are trained, experienced, and proficient in serving all of our customers within a prescribed cycle time, which is 120 days or less. Our intent is to redefine the role of contract specialists by broadening their knowledge and experience in the various contracting methods so that they become contract generalists, i.e., proficient in all methods of contracting, thereby able to satisfy any requirement for any customer.

Customer Representatives

The success of many organizations is often dependent on customer relations, and CECOM's Acquisition Center is no exception. As a service organization, the center values its customers and seeks their business. To underscore this commitment, we established the CR positions. Our CRs are experienced contracting professionals knowledgeable in contracting and management.

As the single point of contact for the customer or requiring activity, the CR is a periodic onsite representative of the Acquisition Center to the customer, participating in staff meetings and maintaining an open dialogue to ensure that program needs and objectives are met.

The CR also supports the contracting officer by working with the customer in planning and forecasting acquisition requirements, providing guidance on the acquisition strategy, and assisting in the development of the requirements package. The CR works across all sectors of the Acquisition Center and, in concert with the requiring activity and Sector Chief, participates in the selection of a contracting team to best manage the acquisition, keeping in mind experience, workload, cycle time, and other relevant considerations. In addition to improving customer support, this management approach is designed to reduce duplication of effort and ensure the efficient use of resources in accomplishing the Acquisition Center's mission.



CECOM Acquisition Center organization

The JPC Representative

The JPC Representative is a newly established position comprised of experienced acquisition professionals assigned to work with industry to find common solutions to common problems. The JPC Representative is charged with streamlining the acquisition process, promoting partnering relationships, and fostering innovation. JPC Representatives are tasked with eliminating the mistaken notion that the relationship between government and industry is inherently adversarial. The JPC Representative acts as a liaison between the CECOM Acquisition Center and assigned Defense contractors providing one "face" to industry. The JPC Representatives share insight into the acquisition process and monitor the status of major programs.

JPC Representatives promote new initiatives such as the CECOM Acquisition Center Business Opportunity Page, the first such electronic contracting process of its kind, and help resolve systemic contractual and programmatic issues with major Defense contractors. Although the concept of the JPC Representatives teaming with industry is still evolving, our efforts have already demonstrated early signs of success. We have received many favorable comments for opening the lines of communication, thereby strengthening our contractor-customer relationship, decreasing cycle time, and reducing contractors' bid and proposal costs through acquisition streamlining. An illustration of this success was commented on by Steve Lambert, President, Litton Electro-Optical Systems: "The U.S. Army OMNI V procurement under the partnering agreement between Team C4IEWS and Litton Systems Inc. was a remarkable achievement by both government and industry in that the entire process from RFP release to contract award was accomplished in 53 days. This proves that the JPC process can and will reduce procurement cycle time."

Jack Kulaga, OMNI V Contracting Officer, believes the 53 days "is truly remarkable considering OMNI V was a split award for Enhanced Third Generation Night Vision Devices, potentially reaching a collective value of over $367 million."

Acquisition Business Process Sector

A central focus of any organizational change must be on people and processes. As resources become more limited and new ways of doing business become imitable, what remains as the crucial sustaining and differentiating factor is people and how they work, i.e., the process.

To support our new organizational structure, the Contract Operations and Business Management Divisions were combined into the Acquisition Business Process Sector to more appropriately serve the workforce. Within this sector, a number of groups were established to assist employees in carrying out their mission. Simply put, this sector is charged to develop, deploy, analyze, service, and sustain state-of-the-art acquisition processes to continually move the organization forward.

Edward G. Elgart, Director, CECOM Acquisition Center, is a major proponent in educating his workforce. This investment will reinforce our organizational culture that challenges conventions and processes, resulting in more efficient and effective use of our employees' energy and talents.

Individuals in the Army Acquisition Workforce Development Group have also been assigned to work with contracting officers and their teams to assist them in their training requirements. With the ever-changing business environment, the Acquisition Center designated a group of senior contracting professionals, the Personalized Acquisition Center Exchange (PACE) Team, to assist contracting officers and their teams with unique and innovative approaches to acquisition. This PACE Team serves in an advisory capacity. In addition, a "help desk" has been established and is staffed by senior contracting professionals with extensive experience in best-value acquisitions, oral presentations, Alpha contracting, paperless contracting, cost as an independent variable, past performance, commercial contracting, electronic contracting, the use of IMPAC cards, and other reform initiatives. This collective experience will add value to the Acquisition Center's ability to provide customers with the most creative and innovative contracting services while protecting the government's interest.

Conclusion

Our new organizational structure is not about being different, but rather about creating and delivering something of value. It involves the integration of people, technology, and new ways of doing business that will require both common sense and solid business judgment. We need to know what new products, features, and services will benefit our customers. The successful organization of the future will be one that is constantly adapting. No longer will an organization be able to permanently depend on established systems. Change will replace stability as the new constant. The organization of the future will be based on a network of alliances and partnerships rather than a self-sufficient hierarchy. It will be driven by a new notion of rediscovery of the customer. The ultimate goal of the CECOM Acquisition Center reorganization is to achieve this more enlightened understanding, thereby providing us with the opportunity to continue to serve and set the pace in DOD well into the 21st century.

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ACHIEVING A PAPERLESS ENVIRONMENT

Holly A. Heinz

Introduction

The contracting process at the U.S. Army Tank-automotive and Armaments Command's Armament Research, Development and Engineering Center (TACOM-ARDEC), Picatinny Arsenal, NJ, is 100-percent paperless, from procurement request preparation to contract award, distribution, and archiving. This was achieved Jan. 1, 1999, 6 months ahead of the TACOM goal and 1 year ahead of DOD and Army goals.

Approach

Success is attributed to using a toolbox approach with commercial software that requires minimal training, empowering the contract specialists to find tools and develop solutions, and using metrics to track performance and improve the process. A Microsoft PowerPoint briefing outlining the methodology applied to achieve this 100-percent paperless procurement process is available at the following web address: **http://procnet.pica.army.mil/paperless/Pentasitefebpaperless/index.htm**.

Software Tools

The paperless contracting software tools used are listed below, followed by a brief description of how each was applied to key contracting steps.

Request. The requisition is generated using Jetform (which has a back-end database) and submitted to the contracting officer using Microsoft Exchange. For those requisitioners needing assistance in preparing a paperless request, the TACOM-ARDEC Acquisition Center has established a procurement-request preparation laboratory. The funds are received using the Standard Army Automated Contracting System (SAACONS).

The contracting process at TACOM-ARDEC, Picatinny Arsenal, NJ, is 100-percent paperless, from procurement request preparation to contract award, distribution, and archiving.

Solicitation. The solicitation is generated using commercial Federal Acquisition Regulations Automated (FARA) software offered by Compusearch. Like the solicitation generation module in the new DOD Standard Procurement System (SPS), FARA is Windows-based and generates a Microsoft Word solicitation.

Electronic Commerce. The solicitation is released to industry by uploading it to a Web-based Procurement Network (ProcNet) Business Opportunities page at **http://procnet.pica.army.mil**. The ProcNet solicitation upload module is automated and includes submission of the solicitation to the *Commerce Business Daily*.

Contractors download the solicitation directly from ProcNet. To facilitate this process, ProcNet includes a solicitation search engine, download instructions, and links to any necessary utilities. For example, large solicitations are compressed using Winzip.

As part of the solicitation download process, ProcNet requires contractors to provide their company name and e-mail address. These data are used to create a database to generate solicitation or bidders' mailing lists, amendment notifications, and subcontracting opportunities.

If the technical data (drawings) are not included with the solicitation, contractors can order technical data online. The technical data are mailed to the contractor on a compact disc that includes a viewer.

Proposals. Contractors are required to submit digitized bids, quotes, and proposals using one of several

Request	Solicitation	Electronic Commerce	Proposal	Evaluation	Award	Management
Jetform	FARA	ProcNet	Exchange	Word	Jetform	Word
Word	SAACONS		ProcNet	FEDSELECT	FARA	Exchange
Exchange	SPS (Future)		Floppy, CD, Zip disk		SAACONS	SPS (Future)
AcqPro						

Paperless contracting software tools

options: ProcNet, e-mail, floppy disk, zip disk, or compact disc. For concerned contractors, encryption software protects the contents transmitted via the Internet. Bids are submitted to a virtual Microsoft Exchange "Bid Room," whereas proposals and quotes are submitted directly to the contracting officer.

Evaluation. Proposals are evaluated using FEDSELECT, a commercial software tool used to streamline the source selection process when factors other than price are evaluated (i.e., technical, management, logistics, and past performance). FEDSELECT is a groupware program that allows for single entry of evaluation data and comments, online time management review, caucus review of inputs, and Microsoft Word compatible reports. The program supports all aspects of the evaluation, conduct of negotiation, debriefings, and file documentation.

In-process solicitation and contract feeder reports (i.e., Defense Contract Audit Agency, Equal Employment Opportunity conduct, and past performance reports) and reviews (i.e., legal review) are done using Microsoft Exchange and the Internet.

Award. A Microsoft Word contract is generated again using FARA. The signed contract is uploaded to ProcNet after obtaining digitized signatures, sending an automated award notice, and distributing the contract via the Web.

Pen-and-ink-type signatures are obtained on the *Amendment of Solicitation/Modification of Contract* (SF30) using a variety of tools: e-mail, fascimile, and scanners.

Distribution is made by e-mail notification to Defense Contract Management Centers, the Defense Finance and Accounting Service, the contractor, and the requisitioner that the contract is available for download from ProcNet.

Management. Solicitation and contract archives are maintained on the ProcNet for interested parties and in response to Freedom of Information requests.

The digital file containing the official contract is saved on a floppy disk, zip disk, or compact disc and kept in a permanent, fireproof repository. A backup copy is kept on the TACOM-ARDEC Acquisition Center's file server.

The SAACONS is used solely as a financial obligation system and to generate the *Individual Contract Action Report* (ICAR/DD Form 350).

Monthly performance metrics are used to monitor the process. Performance was originally benchmarked in January 1998 across steps comprising the contracting process. Monthly measurements are taken at the divisional level and rolled up into an organization Pareto chart showing steps needing improvement. Everyone in the organization is empowered to develop, test, and share successful solutions.

Going paperless is a "team" effort. The technology and commercial tools are in place. It's just a matter of integrating the tools and moving the "critical mass" using training and performance metrics.

Conclusion

Going paperless is a "team" effort. The technology and commercial tools are in place. It's just a matter of integrating the tools and moving the "critical mass" using training and performance metrics. Everyone can do it!

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SPIRAL DEVELOPMENT: NEW OPPORTUNITIES AND CHALLENGES

Marc W. Gutleber

Introduction

Throughout the years, various changes have accelerated the materiel development and acquisition process. Concurrently, technology, manufacturing, and logistic processes have continued to advance at an ever-increasing pace. The challenge for the materiel and combat developer communities, therefore, is to continuously implement processes that incorporate advancements to ensure that our warfighters have the most effective and advanced equipment possible. One means of meeting this challenge is implementation of a spiral development process.

Spiral development is a materiel management philosophy where the materiel developer, combat developer, test, and user communities work together using an iterative development, fielding, and sustainment process to provide the latest materiel capabilities to our warfighters in minimal time and on a continuous basis.

This article discusses the spiral development acquisition process and identifies important issues the Army acquisition community must address to implement this concept. To ensure that we implement the advantages of spiral development, we must have open discussion and dialogue among various Army organizations.

Spiral Versus Linear System Life Cycle

A materiel system developed in response to a military need has traditionally followed a linear life cycle. First, research and development (R&D) was conducted. The system progressed to the engineering and manufacturing development phases, was produced, and then fielded. Once fielded, the system was maintained until the Army no longer needed it. Finally, it was eliminated from the inventory.

In this traditional approach, organizational responsibilities were assigned along each phase of a project's life cycle. For example, basic technological research was assigned to the Army Research Laboratory. Once a project progressed to a specific commodity area, it transitioned to one of the Army Materiel Command's commodity commands for advanced development (advanced technology demonstrations and applied research programs). At this stage, a commodity command leveraged organizational research efforts to advance a technology to the point where it could be applied to a specific system or effort. The next step was assignment as an "acquisition program."

An acquisition program was initiated to develop a materiel system in response to a required capability and was validated by an operational need. A project manager (PM) was designated to field a system that met these requirements. Once a system was fielded, had a stable configuration, and had a logistics "tail" established, it was transitioned to a commodity command logistics center for sustainment. The commodity command sustained the system until it reached the end of its life. When the system was no longer required, it was eliminated from the Army inventory.

With rapid technology advancements and enhanced manufacturing processes, the materiel developer community has recognized that the traditional method of managing a system life cycle may no longer be adequate. In fact, numerous articles and reports have stated that the Army's acquisition process takes years to field a system that may already be obsolete by the time it reaches the soldier.

What Spiral Development Offers

Using the traditional approach, developers take many years to meet a specific requirement on a go/no-go basis. With spiral development, requirements are adjusted to a package of "capabilities," each being a more advanced version of a system. As each version is researched, fielded, and evaluated by the military and commercial communities, adjustments are made to the requirements of the system version being worked (or subsequent versions). These adjustments are not preplanned product improvements because the additional and changed capabilities for the second or objective version are based on the state of technologies, military requirements, or other factors. These adjustments may not have been identified earlier; therefore, they are not

"preplanned" into the system. In addition, because the objective system may change at each review point, the possibility exists that it will never be fielded (although the field will have systems in their hands earlier and the capabilities of these systems will be increased constantly).

The benefits of the spiral development process are numerous. Systems that provide increased capabilities to the warfighter are fielded in less time, technological advancements are incorporated faster, and user feedback is received and considered more quickly.

Adjusting Responsibilities

Spiral development impacts traditional lines of responsibility. With spiral development, a PM can potentially manage a number of versions of a system simultaneously. At any time, a PM may be maintaining and sustaining a previously fielded version of a system (version 1); a version being fielded (version 2); a version being tested (version 3); research, development, test, and evaluation efforts of the next version (version 4), and advanced research (version 5 to objective system). In this scenario, the PM manages all efforts, which may include advanced research, acquisition, fielding, testing, and sustainment. In contrast to a spiral development, the traditional "straight line" life-cycle responsibilities get turned on their side, and the responsibilities of the PM transition to the functional areas traditionally managed and executed by the commodity commands.

Spiral Development Versus Traditional Development

The spiral development process requires PMs to transition to research areas normally managed by the commodity command's research development and engineering centers. This is especially true if a "version 1" has been fielded and new technologies have been identified for incorporation into subsequent versions. PMs may find themselves working an R&D effort that relates to the advanced research area, but additionally has specific applications to their own program. The challenge is determining what provides the greatest return to the soldier and then assigning appropriate responsibility. For example, if a technology has the potential to be applied to numerous systems, the management decision must be based on which application would provide the greatest benefit to the Army.

The traditional linear acquisition process enabled the testing process to be well structured, with the test community developing criteria to ensure that the system met the technical and operational objectives. A decision was made whether a system passed or failed the requirement, and this finding was then addressed as part of the milestone decision. With spiral development, the test community must be an integral part of the process and decisionmaking for each version. One factor that becomes part of the analysis for the next version (or future versions) is associated test requirements. The materiel and combat developer communities must ensure that associated testing impacts are part of the trade-off decision for each version.

Another key departure from traditional weapon system management is in the areas of fielding and training. The Army generally provides a standard system to all our forces so they all have the same equipment, and all equipment has the same parts, maintenance, and training. With spiral acquisition, the Army must make key decisions as additional versions are fielded. For example, a decision must be made whether to "backfill" all previous versions or to equip select units with the newer versions. The Army may upgrade the "first-to-fight" units, cascade earlier versions, or field the latest version to the scheduled units.

If all units are not updated with the latest version, what sustainment and compatibility issues arise? If all units are backfilled, are costs associated with upgrading, refielding, and training resourced? These are some of the issues associated with equipping our forces under the spiral development concept.

Sustainment

A number of sustainment functions are managed and executed by the commodity command. With increased emphasis on life-cycle cost management, there are efforts to place PMs in charge of the "total life cycle" for assigned systems. This is similar to spiral development, especially if follow-on versions potentially impact earlier fielded versions. However, if sustainment responsibility is transferred to the PM, the impact to the Army must be analyzed. The individual sustainment functions of a system must not be maximized to the detriment of the efficiencies offered from a global Army sustainment process.

Spiral development also requires a review of the contracting process. Conceptually, each version of a spiral development system involves an individual contract because the specific capabilities and requirements of each version may not be finalized until the previous version is reviewed. Therefore, current contracting rules and regulations may prohibit each of these versions as an option on an initial contract because the specifics of the option are not known at the time of the award. However, it may not be beneficial to initiate an entirely new contract for each version. The contracting process must ensure that flexibility is built into the process to continue expansion of later versions.

Various processes and requirements associated with life-cycle management of systems must be reviewed to fully implement spiral development. The areas of reporting, financial planning, programming, and execution must all be reviewed for potential problems. For example, in a spiral development process, the baseline of a system is no longer a constant. Because a system is a collection of various versions, and some of these versions can change within the week, the static definition of a baseline must be adjusted. This has dramatic impacts to the traditional methods by which a PM is measured. Ideas such as measuring a system against static cost, schedule, and technical parameters are no longer valid because each of these variables may change.

Conclusion

Spiral development provides the opportunity to adjust the linear acquisition process to a dynamic process that minimizes the time to get systems and equipment to the soldier. This process shifts responsibilities from a defined area to a fluid one requiring adjustment to traditional lines of responsibility and associated rules and regulations. These benefits require the involvement of the materiel developer, combat developer, test, and user communities in the materiel acquisition process.

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FY00 BEST QUALIFIED PROJECT/PRODUCT MANAGER SELECTION BOARDS

Karen Walker, Craig A. Spisak, and R. Kenneth Murphy

Background

The FY00 Best Qualified (BQ) Project/Product Manager (PM) Selection Boards continue to yield favorable results for all components of the Army Acquisition Corps (AAC). These components include Active and Reserve military officers and civilians competing head-to-head in BQ selection boards for PM positions.

The policy to compete PM positions head-to-head to select the best qualified individual was established in 1995. Since then, new initiatives have increased the number of opportunities AAC members have to compete for PM positions. Originally, the policy was restricted to competition for Acquisition Category (ACAT) I and II programs. However, the FY99 PM Selection Boards expanded this policy to include ACAT III programs. The FY00 PM Selection Boards added three separate initiatives. First, eligible Reserve component officers (U.S. Army Reserves and U.S. Army National Guard) were fully integrated into the BQ selection board process. Second, a pilot program was established to allow a regionalized application process for civilians. Third, eligible members of the Army Medical Corps were integrated into the BQ selection board process. These initiatives resulted in the FY00 PM Selection Board choosing 1 Army Medical Department officer, 4 civilians, and 50 Active duty officers to fill product manager positions. Some civilian demographics from both the Project and Product Manager/ Acquisition Command Boards for FYs 99 and 00 are shown on Page 47.

Regionalized Application Process

Because the civilian population has indicated that mobility is a major concern when considering job opportunities, a 2-year pilot "regional" civilian application process was established. This process began with the FY00 PM Selection Boards as an effort to increase civilian participation.

The country was divided into four regions that encompass all PM position locations. The National Capital Area includes Washington, DC; Aberdeen Proving Ground, MD; and Fort Belvoir and Fort Lee, VA. The Southern region includes Huntsville, AL, and Orlando, FL. The Northeast region encompasses Fort Monmouth and Picatinny Arsenal, NJ, and Natick, MA. The North region is comprised of Warren, MI, and Rock Island, IL.

This effort provides civilians the opportunity to apply for one, two, three, or all four regions. Applicants may be slated to and offered a position outside a preferred region. However, unlike previous PM boards, civilians will not be adversely affected for declining a PM position outside their stated preferred regions. Nevertheless, some mobility may still be required because every region encompasses more than one geographical location. Expectations are that "regionalization" will not only increase competition, but will also indirectly improve the quality of civilian applications.

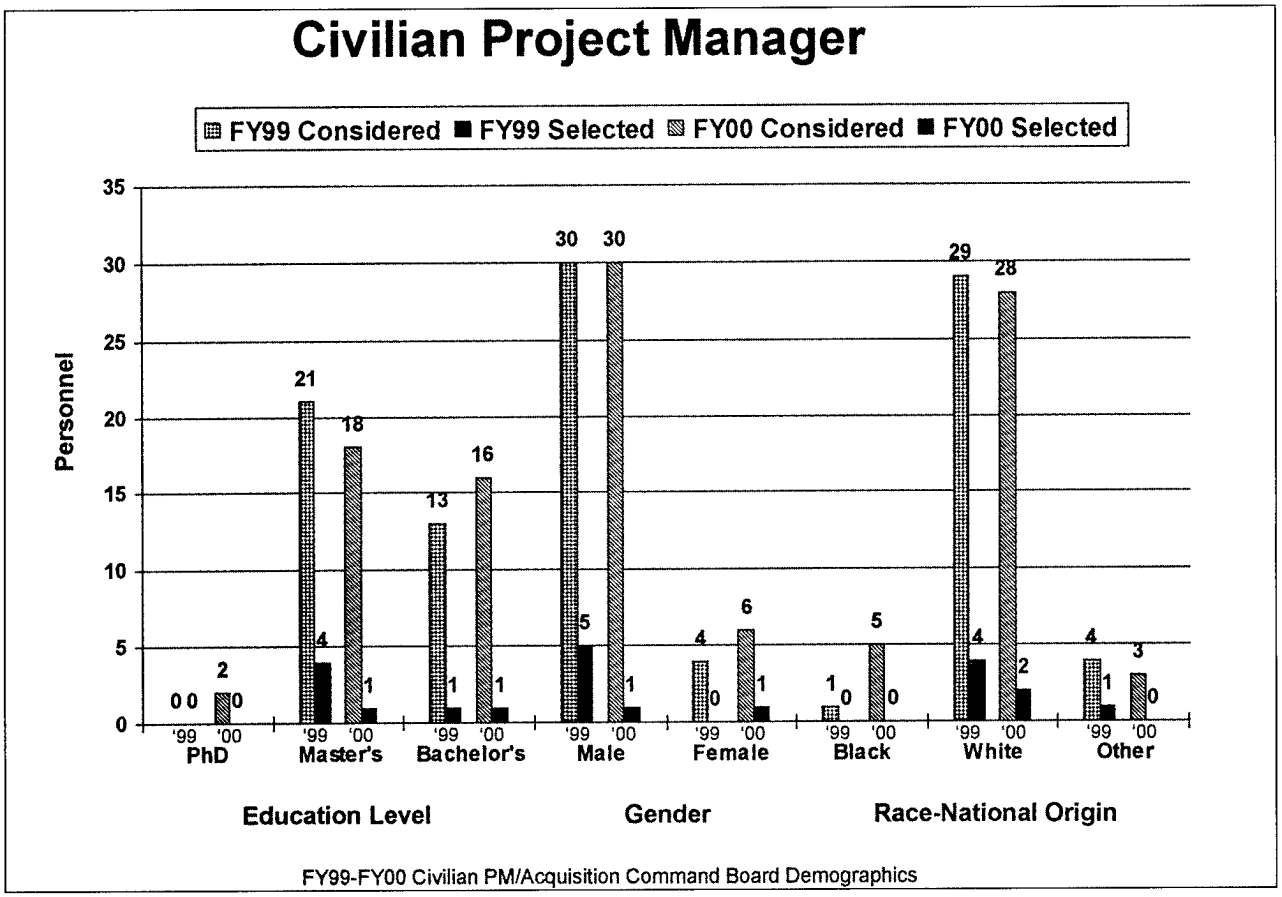
The first year of the 2-year pilot resulted in an 87.5-percent increase in the number of civilian applications submitted to the Product Manager Board and a 6-percent increase in the number of civilian applications submitted to the Project Manager Board. While these results are encouraging, prior to full implementation, we must ensure that regional competition will be fair and based on the population of eligible AAC members versus PM opportunities in each region.

Building A High-Potential Feeder Group

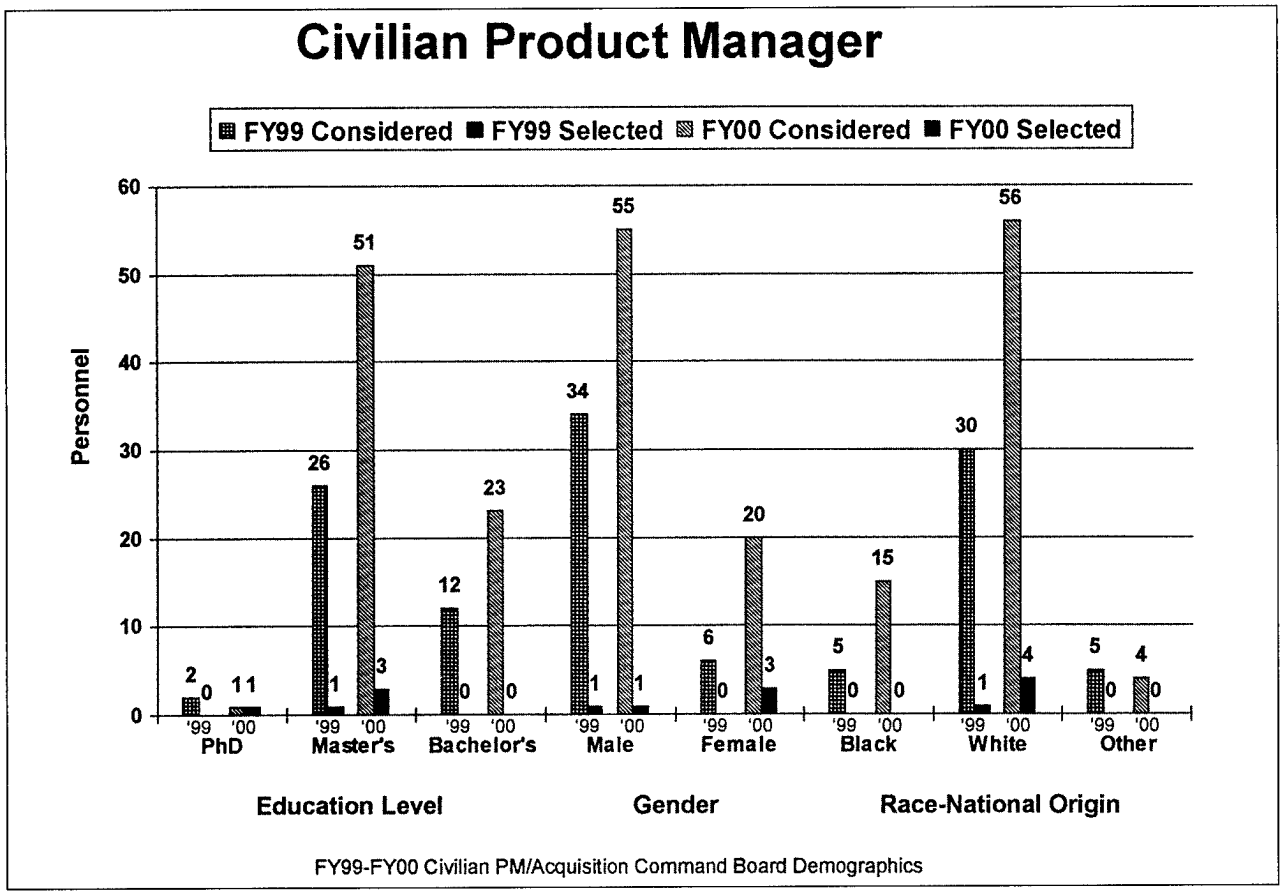
The results of the FY00 PM Boards indicate that the career development initiatives established for and undertaken by many of the applicants have increased their competitiveness. The Deputy Director for Acquisition Career Management's (DDACM's) plan to build a high-potential "feeder" group for critical acquisition positions through the Corps Eligible and Competitive Development Group (CDG) Programs is beginning to pay dividends. The four civilians selected by the FY00 Product Manager Board are all CDG members: one from year group (YG) 1998 and three from YG97. The visibility these selectees were provided in the CDG Program; the education, training, and experience opportunities offered to them; and their dedication to keeping their Acquisition Civilian Record Brief and other board-required documentation current made them more competitive in the head-to-head BQ Board.

Closing The Gender Gap

Results of BQ selection boards are paying dividends in other areas as well. As with other BQ boards, females fared very well at the recent Product Manager Board. The number of female military applicants considered by the board increased from 15 percent in FY99 to 27 percent in FY00, and selections went



FY99-FY00 Civilian PM/Acquisition Command Board Demographics



FY99-FY00 Civilian PM/Acquisition Command Board Demographics

from 100-percent male in FY99 to 75-percent female in FY00. It should be noted that gender data for civilian applicants are not provided to board members. The FY00 Project Manager Board considered 5 percent more female applicants than were considered in FY99. However, selection results were not available at the time this article was written.

Because more females are applying and being selected for PM positions, we asked three female product managers about the challenges they face in their positions. The questions asked and the PMs' detailed responses follow this article.

More Initiatives Underway

The DDACM is interested in strengthening project and product management offices by maximizing the relationship between the PM and Deputy PM (DPM) positions and capitalizing on the synergy of a proper military and civilian mix. The DDACM has established a process action team (PAT) to investigate and make recommendations on the centralized management of DPM positions. Currently, most product managers are not authorized a deputy, but this is expected to change. Although the PAT has not completed its efforts or received approval for its proposed initiatives, the following are being considered.

A General Officer Steering Committee will be asked to review requests for deputy product manager positions and create an Order of Merit List (OML). This OML will be used to identify product managers who will receive manpower and high-grade authorizations to hire a DPM. These deputy positions will be filled by graduates of long-term training (LTT), by rotating incumbents of other critical acquisition positions, and by competitive selection. Additionally, these positions will provide individuals on-the-job training to gain the experience needed to compete and succeed in key leadership and PM positions.

Also being considered is maximizing program management office (PMO) effectiveness by assigning a civilian DPM to a military PM and vice-versa. Providing experience diversity by assigning a civilian PM possessing a technical background with a military DPM who has experience in contracting will also enhance the program's effectiveness. This diversity should enable the PMO to have experience in all aspects of system management and allow for continuity in the program. It should also aid in communication with contractors, the user, the Army staff, and various other organizations with which PMs must coordinate.

To improve the quality of civilian application packages for BQ selection boards, the Acquisition Career Management Office (ACMO) was developing a training program focused on preparing an application package for a board at the time this issue of *Army RD&A* went to press. This training program should be piloted this summer and will be geared initially toward applications for PM Selection Boards. It will be expanded in the future to include applications for CDG boards, acquisition education and training boards, etc. The program will also include guidance on writing direct, concise explanations on a DA Form 2302-R (*Civilian Qualification Record*); tying duties and responsibilities to the leadership skills and executive core qualifications set by the Office of Personnel Management; and supervisory tips on successfully completing a Senior Rater Potential Evaluation.

Another initiative is to allow the PM Selection Board to view civilian files comparably with military files. The information in a civilian board application package must be presented in the same way as the military to allow equitable review by the board. We must eliminate the possibility of a civilian being adversely impacted because their proof of meeting a requirement is not apparent or entails reading and understanding an extensive work history on a DA Form 2302-R.

For years, the military has placed an officer's personnel evaluations on microfiche. This microfiche is then used for all BQ selection boards. A method or information technology solution must be developed to make selection board application reviews more equitable among military and civilian applicants. One project under consideration is to similarly present civilian applicant's files on microfiche.

To properly manage the careers of rotating PMs, the ACMO is developing a policy that will address the placement of outgoing PMs. One option being considered is to immediately place the PM into an LTT assignment. This option compensates PMs for training opportunities missed while assigned as a PM, assists them in meeting their continuous learning requirements, and allows them to regain currency in their career field. Additionally, the LTT assignment will allow the ACMO to better consider the PM's preferences while reviewing a wider range and greater number of post-PM job opportunities.

A final initiative is identification of acquisition positions needed to become "branch qualified" in the Army Acquisition Workforce (AAW)/AAC. These positions will provide the incumbent (both military and civilian) the necessary skills and experiences critical to performing the tasks of a key leadership position or assignment as a PM. The ACMO is currently in the process of establishing this policy and will use the military and civilian acquisition position list review process to identify these positions.

Conclusion

The AAC is committed to providing increased opportunities for all members of the workforce. However, members must be ready to take full advantage of these opportunities to reach their full potential as senior acquisition leaders.

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THREE PRODUCT MANAGERS DISCUSS CAREER CHALLENGES

Because more females are applying and being selected for project and product manager (PM) positions (see preceding article), we thought it would be timely to ask three female PMs about the challenges they face in their current positions. These PMs are LTC Deborah Chase, Product Manager, Comanche Crew Support System (CCSS); Debra O. Davis, Product Manager, Heavy Equipment Recovery Combat Utility Lift and Evacuation System (HERCULES); and Yvonne Jackson, Product Manager, Small Computer Program (SCP). The questions addressed to each PM and their responses follow.

1. Would a specific type of training have helped you prior to assuming your duties as a PM?

LTC Deborah Chase: No. Most of the work I do as a PM requires me to draw from my cumulative experience in the military. The Program Managers Course at the Defense Systems Management College was an important component of my education. However, the problem solving and leadership skills that we develop throughout our careers are the most important elements I've seen for operating in the environment. My assignments as a Staff Officer in the Office of the Assistant Secretary of the Army for Research, Development and Acquisition (now called the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology) and as an Assistant Project Manager were among the most valuable training experiences I received in preparation for becoming a PM.

Debra O. Davis: I have been the Product Manager for the Heavy Equipment Recovery Combat Utility Lift and Evacuation System (HERCULES) since August 1997. As a first time PM and supervisor, I believe it is important to know how to execute the program, build and lead the team, and manage internal operations.

There are many skills that must be learned and achieved through experience prior to becoming an effective PM. Additionally, I believe there are at least three types of training every PM should have.

• Advanced Program Management Course (APMC). The APMC builds on your knowledge and experience and allows you to hone your skills. You obtain a detailed working knowledge of the tenets of the acquisition process, the roles and responsibilities of program management and execution, the importance of program stakeholders and champions, risk management, and team building. While attending the APMC, you have the opportunity to build professional and personal networks, mentor and be mentored, obtain lessons learned from your peers, and have fun at the same time.

• Partnering For Success. Team building and leadership must be accomplished both internally and externally. The internal team consists of those core and matrix personnel for whom the PM has control. The internal team is the program's foundation; therefore, they must understand the commander's intent and be empowered to execute.

The external team consists of major stakeholders in the program. However, the PM can only influence this team. The external team can make or break a program. It is important to establish your team early, keep them informed, and identify program champions to further the team objectives.

On June 11, 1998, Team HERCULES signed a partnering agreement with the major stakeholders in the program. This partnering agreement has been a good investment for Team HERCULES because of the significant number of government and contractor personnel at all levels who are committed to pursuing a true partnership. To date, we have turned around the negative perceptions of the program, resolved issues and concerns as a team, obtained support for the program at high levels within the acquisition community, and benefited the soldier in the field.

COL Donald F. Schenk, Project Manager for Combat Mobility Systems, is my immediate rater. He has been instrumental in steering the program around landmines and paving a path for the future.

• Supervisory Training. As a first time supervisor, I have learned to manage internal operations to ensure timely processing of personnel actions and awards, travel and leave policies, training, etc. During the past 1 1/2 years, I have hired personnel, dealt with performance concerns, mentored, empowered, fostered creative and innovative approaches, and provided opportunities for career advancement. It's important that a PM know where to get help on personnel concerns when needed.

My time as a PM has been enjoyable because of the talented, professional, experienced, and dedicated Team HERCULES.

Yvonne Jackson: The PM Skills Course at Fort Belvoir, VA, is a very good course for new PMs. It is a great refresher from the Advanced Program Management Course and allows students to discuss specific work situations in class. It also gives the student a chance to learn about the new office and some situations the PM will encounter. The student has the opportunity to discuss these situations with classmates, instructors, and guest speakers.

2. Would an operational experience prior to assuming your PM duties have assisted you in meeting the challenges of your job?

LTC Deborah Chase: Other than combat duty, I don't think additional operational experience would have been especially helpful in my PM duties. The Comanche Program Office has several Active duty and retired CW4s and CW5s assigned. Their contributions provide us a much better understanding of operational requirements than my having had an additional

operational assignment.

Furthermore, aviators assigned to the U.S. Army Training and Doctrine Command (TRADOC) System Manager's Office assist the Comanche crewstation development process by participating in incremental evaluations of crewstation functions. The "part-task" evaluations help us determine if we meet the operational requirement. Because of the input from seasoned combat aviators, we are not dependent on my level of operational experience for either credibility or success.

On the other hand, the programmatic experience I bring to the team adds to its capability. I am comfortable with the balance of programmatic and operational experience that members of the Comanche Crew Support System (CCSS) team maintain.

Debra O. Davis: An operational experience is beneficial in meeting the challenges of program management. Even the military side of the Army Acquisition Corps recognizes the need to periodically "green" officers. I have made it a priority to learn how to operate and maintain HERCULES, which has helped me immensely to promote the system's capabilities. I have also made it a priority to understand HERCULES employment and how it fits into the Combat Service Support Structure.

I would recommend that operational experience become an optional learning feature in the APMC. While attending the APMC, you have the opportunity to get organized and hone your skills prior to being thrown into the heat of battle.

Yvonne Jackson: I feel very confident with the level of experience I had prior to assuming duty as PM-SCP. I have 10 years of experience in program management, serving in PM offices and the program executive office. In addition, I supported program managers while working in the Missile Command Acquisition Center and the Research, Development, and Engineering Center. I think the transition was very smooth for me.

3. Do you have any difficulty communicating with your user?

LTC Deborah Chase: No, I don't experience any difficulty at all. Because we are premilestone II, the user that I deal with is the TRADOC System Manager (TSM) and his staff. I believe they view me as a strong advocate for the soldiers who use the weapon system and, therefore, focused on ensuring that my share of the development meets the defined operational requirements. It also helps that the crewstation development process includes opportunities for periodic evaluation and input by the pilots assigned to the TSM Office. Further, I make it a point to include a representative from the TSM Office in our significant activities.

Debra O. Davis: I have no difficulty communicating with my user. I attribute this to the partnering agreements previously mentioned. With partnering, we have the opportunity to explore roles and responsibilities, develop trusting relationships, and have open and honest communications. As a result, we assume responsibility for program issues and concerns as a team, we have a better understanding of the constraints endured by other members of the team, and we appreciate the differences in perspectives. The glue that binds us is the ability of the partnership to define common goals and objectives to accomplish the mission. Again, the ultimate beneficiary is the soldier in the field.

Yvonne Jackson: No. Because of the nature of my business, I have customers of varied backgrounds. I manage the Small Computer Program Office. This office is responsible for providing DOD and the Department of the Army (DA) interoperability-compliant information technology (IT) products and services to support the Army sustaining base, power projection base, and strategic and theater tactical base. We provide these services through the development and award of a number of indefinite delivery contracts and blanket purchase agreements, which consist of products and services that are compliant with standards (Technical Architecture Framework for Information Management, Joint Technical Architecture-Army, Defense Information Infrastructure Common Operating Environment, Y2K, etc.). We communicate with the customers often to ensure that we have the products and services they need, can assist them in preparing their orders, and aid in problem resolution.

4. What have been your top three challenges since assuming your PM position, and how have you implemented plans to achieve success in these challenges?

LTC Deborah Chase: The PM-CCSS is responsible for the interfaces between the aviator and the weapon system. The interfaces primarily include, but are not limited to, the "goes-intos-and-goes-outas" of the switch functions and display symbology generation that allow the pilot to operate the mission equipment and that are codified in the Pilot Vehicle Interface Mechanization Specification.

Issues of interest, however, include geometry of the cockpit itself; helmet; helmet-mounted displays; nuclear, biological, and chemical protection; displays; controls; and essentially anything that the pilot can touch, see, or come into contact with in any way. Many of the CCSS areas of interest involve products that are being developed by someone other than in PM-Comanche. The CCSS position gives the PM-Comanche a tool to horizontally integrate multiple efforts into the focal point of the weapon system—its cockpit. The challenge of this situation is that it requires the PM-CCSS to communicate and coordinate information across multiple organizational and management structures to ensure that the elements that come together in the aircraft's cockpit are integrated appropriately. The objective is to ensure that the Comanche helicopter is an effective weapon system that meets the requirements of the armed reconnaissance and light attack mission. However, my underlying goal is to ensure that the Comanche is an aircraft that Army aviators are proud to be associated with and will seek opportunities to fly.

The challenges I face relate to three facts. First, while the job is not particularly complicated, it is not easy to define in the proverbial "25 words or less." Nor is it easy to define in the traditional terms of funding line and organizational structure.

Second, we have not yet mastered quantum physics, so it is still not possible to be in multiple locations simultaneously. Like every other PM, I'm constantly required to prioritize activities and focus only on the most important ones.

Finally, the demands of the job require surprising levels of physical and mental stamina. My plan to achieve success includes four basic elements:

- Define the mission. To define the mission, it is necessary to identify the requirements and then codify mission statements, perhaps by integrated product team (IPT) charters, for the teams working to satisfy the requirements. A clear mission statement based on requirements helps the team focus on necessary activities and ignore the distractions.
- Identify resources. The work breakdown structure helped me learn the organization of the program office, identify who has cost accounting management responsibility for subsystems within the CCSS areas of interest, and identify the key people with whom I need to coordinate and include in the IPT process.
- Focus on the "hot" issues. The first step is to identify and prioritize issues. Where issue-tracking matrices did not previously exist, we are building them. Where issue-tracking matrices existed, we are identifying the priority of the issue and ensuring that they are mapped to the events that are the schedule or funding drivers. Further, we are working to ensure that issues are closed at the appropriate level so that closed issues remain closed. The next step is to establish a path to resolution for the major issues. Not every issue on the tracking sheet requires this kind of attention, however, when deemed necessary, the crewstation IPT mapped its plan for a complex issue in MSProject to show the essential elements of data collection and subordinate issue resolution. In the inchstone plan, we also identified, by name, the IPT members responsible for each plan event. This methodology has helped all members of the IPT keep their eyes on the ball.
- Exercise. A disciplined physical fitness program is an essential part of my stress

management plan. I also think it is an important component in maintaining the level of stamina required for the job and in preventing potential injury related to "schlepping" heavy briefcases and suitcases from one temporary duty location to another.

Debra O. Davis: There are many challenges I face as a PM; however, my top three are as follows:

- Balancing personal and professional responsibilities. I am a single parent with two daughters. Both of them require my love, presence, and undivided attention. This is hard to accomplish when I travel frequently and have numerous high-priority issues to work simultaneously. The "To Do" list never shortens, and I never have enough resources to accomplish the mission. I use time management techniques to accomplish both my personal and professional goals. I make sure my family is a priority and that we make time just for us. I also have a strong support network with family and friends.
- Sustaining the momentum of the Team HERCULES partnership. As mentioned previously, the Team HERCULES partnering agreement has been in place since June 11, 1998. Since that time, we have faced many obstacles where there was an inherent tendency to blame other team members when things didn't turn out the way we wanted. As a result of our partnership, we have resolved issues as a team, accumulated cost avoidance and savings, and developed creative and innovative approaches to program execution. To sustain the momentum of the partnership, we make it a priority to recognize the team's efforts, conduct forums for information exchange, distribute weekly activity reports to the team, and conduct follow-on partnering sessions as required to address key personnel changes. This is an area of continuous improvement given I am always trading off other high-priority issues and concerns.
- Personnel management. It's important to make personnel a priority. It's so easy to be driven by program activities because that's where all the excitement appears to be. If you neglect the personnel side to program management, personnel issues can become an obstacle to program success versus a means to an end. For example, emphasis must be placed on maintaining appropriate staffing to accomplish the mission, dealing with performance issues as they arise, and ensuring personnel receive training to maintain skills and expertise. The more prepared you are to deal with this aspect of program management, the more you can focus on executing the program. Efforts I have pursued to make personnel a priority are to acknowledge and reward the individual and the team, have high expectations for performance, encourage training opportunities, and create a work environment that is open, trusting, and fun.

Yvonne Jackson:

- Staffing. The Quadrennial Defense Review eliminated the military billets in my agency. I lost two civilians to industry and have not been able to replace either one. This is the greatest challenge, doing more with less.
- Rapidly changing technology. Information technology (IT) changes very rapidly. It is a challenge to stay abreast of the technology, the performance, keeping contracts updated, testing products for compliance, etc.
- Policy and procedures. I was used to working in traditional PM offices where the customer has to come through the PM office to get a missile system, tank, etc. This program was established to provide compliant IT products and services to the user, but there is no mandate or requirement that the customer and user must use the SCP. SCP contracts are DOD and DA compliant, with excellent terms and conditions (5-year warranties, support within and outside the continental United States, 48-hour on-site service) and very affordable pricing. We spend a great deal of time ensuring that the scopes of work and specifications include DOD and DA interoperability standards and that the terms and conditions are the best value for the Army. But in the end, the customer is not required to use the program office to procure IT products and services. Most of the time, the alternate procurement sources do not provide compliant products. Contracting offices are allowed to initiate their own contract vehicles for IT, and customers and users are allowed to make credit card purchases at local stores, via electronic commerce, or directly from companies. This hurts the customers in the long run because they don't get compliant products, and their small quantities don't allow them the great deals the SCP can get because of the volume buying power we have. We generate several hundred million dollars in IT business each year and are therefore able to get huge discounts on IT products and services for the customer and user. If I could change one thing—I would require that Army users procure their IT products and services through the Army Small Computer Program (which is chartered to provide compliant products and services) just like users get missiles, tanks, High Mobility Multipurpose Wheeled Vehicles, radios, etc., through the PM offices.

5. Would you compete for another PM position, and what would be an ideal post-PM position for you?

LTC Deborah Chase: I would definitely compete for another PM position. At the risk of sounding a bit maudlin, I'll say that I believe the most significant impact I've been able to effect came as a result of potentially devastating circumstances that occurred when I was a second lieutenant. Without speaking to the details, I was able to help two soldiers and their families in a powerfully positive, life-changing way. The two events are representative of the essence of what military leadership means to me and why I have chosen a career in uniform. I believe that the PM job allows me to have a very positive, long-term impact that will benefit the lives of many soldiers. I also enjoy the challenge of the job, which requires me to draw on all of my entrepreneurial and team-building instincts.

There are several post-PM positions that I think of as ideal considering my keen interest in international finance and commerce. If I am selected to attend Senior Service College (SSC) following my tenure as PM, I will seek to attend the Industrial College of the Armed Forces, or seek a fellowship that would allow me to learn what is required for an "emerging nation" to develop fully in a free-market economy. If not selected to attend SSC, I will seek an assignment with the Office of International Cooperation either in the Office of the Secretary of the Army or in the Office of the Secretary of Defense.

Debra O. Davis: I have asked myself these questions numerous times. My current assignment is very challenging and time consuming; however, it is also very rewarding. The time spent on the job is worth the investment, especially when the results are successful. Sometimes it can be frustrating when activities outside my control negatively impact the program; however, I have the benefit of working the issues as a team. I enjoy program management, and I have worked as a PM or in support of program managers within the U.S. Army for 15 years.

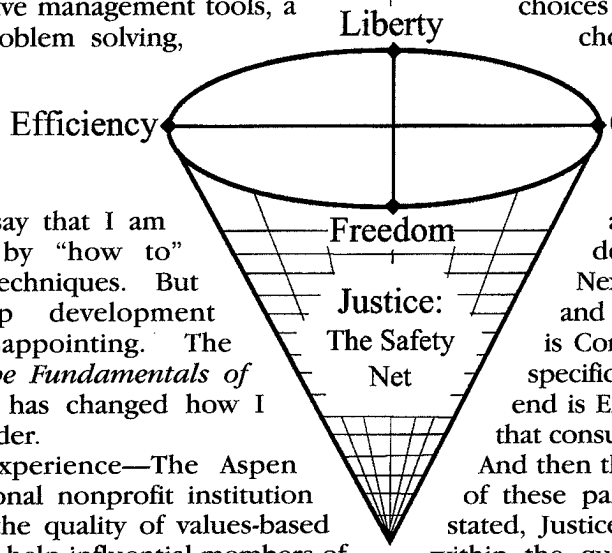
I plan to obtain my master's degree in business administration or program management, then move on to a PM position where the program is in development. I would like to have more opportunity to influence the design, reduce operations and support costs, and manage the transition to production.

Yvonne Jackson: I would compete if the future assignments after existing PM positions were more clearly defined. Currently, PMs don't know where they will go following their assignment. There is no placement roster, identified follow-on positions, etc., for current PMs. I would like to see this change to make it less risky for civilians to give up an existing job for a temporary position (3-year PM position) with no idea of future placement (even if relocation is required).

I think the ideal position for me after my current PM assignment would be to attend the Industrial College of the Armed Forces (ICAF) for 10 months, followed by 2 years or greater in either the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology or the Office of the Director of Information Systems for Command, Control, Communications and Computers. I am very interested in attending ICAF and would like to do so following my duty as PM-SCP.

FROM THE DEPUTY DIRECTOR ACQUISITION CAREER MANAGEMENT

After nearly three decades of government employment, I recently completed the second leadership development experience of my career. The first was *Senior Executives in Government*, a 3-month program at Harvard's Kennedy School of Government. Like many of the programs the Acquisition Corps sponsors today, this course provided me with some practical and effective management tools, a strategic approach to problem solving, and a chance to practice the skills associated with leadership. That was 15 years ago. Today, you would be right to say that I am beyond being helped by "how to" management tools and techniques. But my second leadership development experience was not disappointing. The *Executive Seminar on the Fundamentals of Values-Based Leadership* has changed how I approach my role as a leader.



The source of the experience—The Aspen Institute—is an international nonprofit institution dedicated to enhancing the quality of values-based leadership. The goal is to help influential members of society become more effective leaders by motivating the people within their organization to believe in and achieve a united mission. So what is values-based leadership, and how does it enable one to become a better leader? That is essentially what I learned.

The primary method of learning at the Aspen Institute is through advanced reading, followed by seminar discussion, of selections from such classic thinkers as Sophocles, Aristotle, Plato, and Machiavelli, as well as contemporary sources like Harriet Taylor Mill, Milton Friedman, Nelson Mandela, and Martin Luther King Jr. These readings were the most difficult I've ever had the challenge to understand. They represent centuries of thought on human nature and the values on which a democratic society is based. The participants in the seminar offered the most stimulating exchange of ideas that I have had the privilege of experiencing. Each brilliant in their own right, they represented diverse viewpoints and backgrounds in business, labor, government, and the arts. Alone, the readings were at best interesting, but coupled with this group—and its willingness to explore complex ideas and reveal personal life accounts—the experience was extraordinary.

Trained moderators guided 15 of us through an examination of the values of liberty, equality (freedom), community, prosperity (efficiency), and justice. As we examined issues of individual and collective rights, equality and efficiency, and democracy and community, we were exposed to new perspectives for addressing the broad questions that confront decisionmakers, both as individuals and as part of the global community.

So what does this mean? Well, what is illustrated in the accompanying diagram represents the conflict that each of us faces as we strive to apply these values to the decisions we make every day.

First, we have the continuum of Freedom and Liberty. On one end of this spectrum is Freedom—best described as the *individual's* ability to make choices and decisions and to act on those choices and decisions—i.e., doing what's best for the individual. On the other end is Liberty, the *group's* ability to make choices and decisions and to act on those choices and decisions—i.e., doing what's best for the group.

Next, we have the continuum of Community and Efficiency. On one end of this spectrum is Community—a focus on what is best for a specific group *despite* the cost. On the other end is Efficiency—a focus on a means to an end that consumes the *least amount of resources*.

And then there is the "safety net" that embraces all of these parameters—and that is Justice. Simply stated, Justice is what is right. When you operate within the quadrants defined by these four values, justice is served. Step beyond the bounds set by these values and you run the risk of not doing the right thing.

As a means to better understand the process, we used the accompanying diagram to map many entities (nations, companies, associations, etc.), many people, and many decisions. My perception of America—upper right-hand quadrant. Then we mapped ourselves, immediately followed by several of our most recent decisions. My perception of me? What a surprise! I have concluded that my perception of where I am is many times NOT reflected in my decisions. My challenge to you is to identify where you are. And more important, where do you want to be? I started this note by stating that I was beyond being helped by management tools—perhaps I was wrong. I believe that this is a tool that proves to be very useful in analyzing a decision. See what you think.

Keith Charles
Deputy Director,
Acquisition Career Management

The Army Acquisition Corps Celebrates 10 Years!

In recognition of an exciting first decade, the U.S. Army Acquisition Corps (AAC) will commemorate its 10th anniversary during the week of the 1999 Association of the United States Army (AUSA) Annual Meeting Oct. 11-13. Since the inception of the AAC on Oct. 13, 1989, when the Army Chief of Staff approved its creation as an organization of dedicated military and civilian acquisition specialists and leaders, it has had a tremendous impact on the Army's acquisition community.

Events

A series of events will precede the 10th anniversary celebration. These events will highlight the development of the AAC and show the progress it has made in professionalizing the field of acquisition.

An AAC display commemorating the 10th anniversary will be on view at the AUSA meeting. In addition, career development guidance will be available at the AAC career development hospitality suite.

An AAC team will also participate in the Army Ten-Miler on Oct. 10.

Creation Of An Association

The 10th anniversary commemoration will also serve to inaugurate the establishment of an association of acquisition professionals that will offer unique opportunities to its members. As a national association, it will be headquartered in Washington, DC. It will also provide an opportunity to help preserve the heritage of the AAC. An important part of the association's role will be to publicize and reinforce Army acquisition goals and ensure that the lessons of history and the proud traditions of the Army Acquisition Workforce (AAW) are remembered by future generations.

Initially, Keith Charles, the Deputy Director for Acquisition Career Management, Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology, will serve as president of the association. "I'm very excited that acquisition is finally being recognized as a profession with its own professional society. I'll do all I can to support it," said Charles. The AAC's Acquisition Career Management Advocates will sit on the inaugural board as well as serve as regional chapter presidents.

Army Acquisition Corps Ball

AAC 10th anniversary activities will include the AAC Ball on Oct. 10 in the main ballroom at the Crystal Gateway Marriott in Crystal City, VA. It will be a black-tie affair and is expected to draw many senior leaders from the acquisition community. Those traveling to the Washington, DC, area for the AUSA Annual Meeting are invited to attend.

The host of the AAC Ball will be Paul J. Hoeper, the Assistant Secretary of the Army for Acquisition, Logistics and Technology, and the Army Acquisition Executive. The Master of Ceremonies will be Keith Charles. George G. Williams, President of COLSA Corp., will be the keynote speaker. Williams, a former recipient of the Department of the Army Excellence in Acquisition Management Award, has had a distinguished career in acquisition and will be sharing his positive experience with the AAC. Organizers anticipate more than 700 people will attend the function. Invited guests include personnel from the Office of the Under Secretary of Defense for Acquisition and Technology; other Service Acquisition Executives; the Defense Acquisition Executive; personnel from the Army Secretariat and Army staff; senior program, project, and product managers; and program executive officers. Entertainment will be provided by a U.S. Army field band, a musical group specifically formed for this type of event. The Military District of Washington will provide ceremonial support, and the U.S. Army Old Guard will present the colors. Special award presentations, as well as charter memberships and chapter presentations, are also planned for the evening.

Process Action Team

To help plan for the AAC's 10th anniversary commemoration, Director for Acquisition Career Management LTG Paul J. Kern requested formation of a process action team (PAT). The PAT defined the overall goals and objectives of the AAC's 10th anniversary, identified specific events, and recommended an implementation strategy. To provide input or to obtain additional information, contact Mary McHale in the Acquisition Career Management Office at (703) 604-7105, DSN 664-7105, e-mail: **mchalem@sarda.army.mil**.

A special website has been created for the AAC's 10th anniversary. Log onto the AAC home page at **http://dacm.sarda.army.mil** to access this new website. This link provides information on the AAC 10th anniversary events and the new acquisition professional association. The link also provides the AAW with an online registration for the AAC Ball.

The ACMO's Information Technology And Analysis Division Relocates

The Acquisition Career Management Office (ACMO) Information Technology and Analysis (ITA) Division has been relocated from Fort Belvoir, VA, to Crystal City, VA.

Listed below are the members of the ITA Division and their new telephone numbers. For the present, their e-mail addresses remain the same and are available on the AAC home page at **http://dacm.sarda.army.mil/contacts**.

MAJ Michael Williamson
DSN: 664-7022 or (703) 604-7022

Don Faxon
DSN: 664-7145 or (703) 604-7145

Greg Zyto
DSN: 664-7144 or (703) 604-7144

Greg Little
DSN: 664-7143 or (703) 604-7143

Mimi Janes
DSN: 664-7134 or (703) 604-7134

Arvindar Singh
DSN: 664-7146 or (703) 604-7146

Frank Noonan
DSN: 664-7147 or (703) 604-7147

Manjeet Kaur
DSN: 664-7142 or (703) 604-7142

Acquisition Structures Division Shifts To Army Acquisition Executive Support Agency

The Acquisition Structures Division, formerly a part of the Acquisition Career Management Office in Crystal City, VA, has been realigned as a formal division of the Army Acquisition Executive Support Agency (AAESA) and relocated to AAESA Headquarters at Fort Belvoir, VA. As such, the Acquisition Structures Division will now report to the Director of AAESA.

The points of contact for the Acquisition Structures Division are listed below along with corresponding phone numbers and e-mail addresses.

Karen Walker, Chief,
Acq. Structures
DSN: 655-1070 or (703) 805-1070
Walkerk@sarda.army.mil

Wanda Meisner
DSN: 655-1068 or (703) 805-1068
Meisnerw@aaesa.belvoir.army.mil

Paul Richard
DSN: 655-1059 or (703) 805-1059
Richardp@aaesa.belvoir.army.mil

Joe Andricosky, Contract Support
DSN: 655-1063 or (703) 805-1063
Andricosj@aaesa.belvoir.army.mil

Ken Murphy, Contract Support
DSN: 655-1071 or (703) 805-1071
Murphyk@aaesa.belvoir.army.mil

Sarah Ingram, ACMO LNO
DSN: 664-7025 or (703) 604-7025
Ingrams@sarda.army.mil

USD(A&T) Continuous Learning Policy

The Under Secretary of Defense for Acquisition and Technology (USD(A&T)) Continuous Learning Policy, which became effective December 1998, can now be found online at **http://www.acq.osd.mil/ar/#otherhot**. The Army's guidance for implementing the policy is available in draft on the Army Acquisition Corps home page at **http://dacm.sarda.army.mil**. The purpose of the policy is to ensure acquisition professionals develop and maintain the leadership, disciplinary, and functional skills that augment the minimum education, training, and experience standards established for certification in their career fields. The following continuous learning standard has been established:

> *Workforce members shall earn a minimum of 80 continuous learning points every 2 years, either from the date of position certification or from the date of the previous 2-year continuous learning certification. Individuals who are not certified in their position should concentrate on obtaining certification; they are not subject to the continuous learning standard.*

The Individual Development Plan (IDP) will be used to record the workforce member's plan for meeting the continuous learning standard and for documenting continuous learning points. The IDP has been revised to accommodate this new, expanded requirement.

The point of contact in the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology is Patricia Hopson, (703) 604-7126, e-mail: **hopsonp@sarda.army.mil**.

DOD Fulfillment Program Reinstated

The DOD Fulfillment Program was reinstated April 8, 1999, and may be found on the Defense Acquisition University (DAU) home page at **http://www.acq.osd.mil/dau**. The Fulfillment Program enables members of the Acquisition Workforce to receive credit for mandatory DAU courses for which they are able to demonstrate competency through experience, education, or alternative training.

The Army's instructions for implementing the program should be available by the time this issue of *Army RD&A* magazine is published. The most significant differences between DOD's guidance and the Army's implementation are as follows:

- The Army does not support fulfillment for mandatory Level III DAU courses. This is based on the rationale that acquisition professionals certified at Level III are considered experts in their functional areas. As such, their expertise and knowledge are expected to be current and continuously updated. Fulfillment of mandatory training at Level III would not be consistent with this philosophy.
- Approval authority for fulfillment is with certification officials identified for each acquisition career field (ACF). The list of certification officials is being developed. Upon approval by the functional chiefs, it will appear on the following website: **http://www.dacm.sarda.army.mil**. (Note: These are the same certification officials who will certify individuals meeting all education, training, and experience requirements established for an ACF.)

The point of contact is Patricia Hopson, (703) 604-7126, e-mail: **hopsonp@sarda.army.mil**.

AAC Professionals Take A Staff Ride

Ever hear of a staff ride? In case you've never participated in one, it is a professional development teaching tool by which historical places and events, military principles, and political realities are analyzed at their origins to learn new perspectives.

LTC William T. McGuire, Acquisition Career Management Office (ACMO), hosted an Army Acquisition Corps (AAC) Staff Ride for the ACMO staff on April 13, 1999. By taking a walking tour of Washington, DC, and exploring its rich history, ACMO's acquisition professionals analyzed and compared events and issues of the past with those of the present to gain a better understanding of today's challenges.

A website about this colorful and vividly described self-guided tour is available at **http://dacm.sarda.army.mil/news**. Log on and let the historical neighborhood of our nation's capital broaden your perspective of the AAC.

PERSCOM Notes . . .

FY00 Colonel/GS-15 PM/Acquisition Command Board Results

The Acquisition Management Branch (AMB), U.S. Total Army Personnel Command, recently completed an analysis of the FY00 Project Manager (PM)/Acquisition Command (AC) Board results and overall command opportunity for Army Acquisition Corps (AAC) officers and civilians. Results and possible trends are summarized below.

Overall Results

Board members reviewed the files of 78 AAC members. These files included 42 Active duty officers in year groups (YGs) 1974 through 1978 and 36 civilians. From this population, the board selected 33 principals for PM and AC assignments. These principals included first-time selection of 28 AAC officers, 2 AAC civilians in the grade of GS-15 or eligible for promotion to GS-15, and the revalidation of 3 deferred principals. AAC results for Army officers by functional area (FA) and YG are as follows:

FA	1974	1975	1976	1977	1978
51A	0	1	1	12	3
51R	1	1	0	3	0
51C	0	0	2	3	1

Who Got Selected?

- Selection Year: Twenty-four (77 percent) of the 31 Army officers selected as principals were selected on their first time considered. One (50 percent) of the two acquisition civilians selected as principals was selected the first time considered.
- Civilian Education: Thirty (97 percent) of the 31 officers selected have advanced degrees. One (50 percent) of the two acquisition civilians selected as principals has an advanced degree.
- Military Education: Twenty-one Army officers selected are Senior Service College (SSC) graduates, six are SSC selectees, one declined attendance to SSC, and three have no current credit for SSC. Both AAC civilians are graduates of the Advanced Program Management Course.
- Lieutenant Colonel (LTC)/GS-14 PM/Command: Thirty (97 percent) of the 31 military AAC members and both (100 percent) of the civilian AAC members selected served as LTC/GS-14 PM/commanders.

General Observations

The file quality of PM/command selectees continues to be high. Competition is tough for these key positions. Generally, individuals are selected for COL/GS-15 PM/command assignments the first or second time considered after successful completion of SSC and LTC/GS-14 PM/command assignments. For civilians to be competitive for PM/command assignments, previous program office experience is most important. However, there is no evidence that consecutive or repetitive program office tours better qualify an individual for PM selection. On the contrary, a successful program office tour, coupled with successful performance in a major headquarters staff, is a common formula for PM selection. Contracting officers require extensive contracting training and experience in pre- and postaward contracting. Success in other acquisition positions enhances overall file strength toward selection.

Command Opportunity

The AAC continues to afford officers in all three areas of concentration and civilians from all career fields a good opportunity to command at the COL/GS-15 level. AAC command opportunities will remain stable for the next few years, and provide increased opportunities for selection.

Summary

Prior to future PM/Command Boards, officers must take the time to personally "scrub" their Officer Record Brief (ORB) and microfiche to ensure accurate information is conveyed to board members. The AMB will send preboard scrub packets to officers in the zone of consideration 90 days before the board convenes. The preboard scrub packet will consist of an ORB, a microfiche request form, and a checklist. Officers should use this packet to prepare their files for the board. Although not a part of the preboard scrub packet, the photo is also an important part of the board file. Photos should be replaced if they are more than 3 years old. Prior to taking a new photo, officers should check their awards, branch, U.S. insignia, etc. Attention to details makes a difference.

Civilians should also the ensure that their application packages are complete and contain all required documents. Special attention should be given to ensuring the accuracy of the data on the Acquisition Civilian Record Brief (ACRB). Dates reflected on the ACRB should match dates on the DA Form 2302 (*Civilian Qualification Record*). A "fresh" ACRB should be obtained from local Acquisition Workforce Support Specialists (AWSSs) or Functional Acquisition Specialists (FASs) and submitted with application packages. Any discrepancies in the record (such as missing evaluations) should be explained. Remember, your application package reflects your career and defines your training, education, and experience to the board.

FY00 COL PM/Acquisition Command Selectees

Name	Rank	Branch	Career Field
ASADA, MICHAEL K.	COL	AR	51
BENNETT, DAVID B.	LTC(P)	SC	53
BIRMINGHAM, ROBERT P.	LTC(P)	AV	51
BROUGHALL, STEPHEN E.	LTC(P)	QM	53
BROWN, ROBERT M.	LTC(P)	AR	97
DURSO, JOSEPH A.	LTC(P)	AV	51
FAIR, MATTHEW J.	LTC(P)	AR	51
FULLER, MARY	LTC(P)	SC	51
HALLAGAN, ROBERT E.	LTC(P)	MI	51
HEULER, RONALD R.	LTC(P)	SC	51
IRISH, WILFRED E.	LTC(P)	AR	51
JOHNSON, JOSEPH E.	COL	QM	97
KAURA, MARY A.	LTC(P)	SC	51
KEYNER, HUGO	COL	SC	51
LEES, ROBERT B.	LTC(P)	OD	51
MAJOR, EDWARD B.	COL	OD	51
MCKAIG, TIM R.	LTC(P)	AD	51
MCMASTER, CHARLES F.	LTC(P)	SC	51
MERKWAN, JOHN A.	LTC(P)	FA	97
MORRIS, ROBERT	GS-14		301
NAUDAIN, JAMES C.	LTC(P)	FA	51
NELSON, RONALD J.	LTC(P)	SC	51
NEWBERRY, TOMMIE E.	LTC(P)	AD	51
O'REILLY, PATRICK J.	LTC(P)	OD	51

Name	Rank	Branch	Career Field
OWENS, CARL D.	LTC(P)	IN	97
POWELL, JOANNE C.	GS-14		301
RISSER, SCOTT O.	LTC(P)	SF	97
SCHWOEBEL, CHARLES G.	COL	AV	53
STAUTZ, THOMAS R.	LTC(P)	SF	97
TART, RANDAL G.	COL	MP	53
THOMAS, DWIGHT E.	COL	OD	97
WEBSTER, CECIL R.	COL	IN	51
WEINZETTLE, JOHN P.	LTC(P)	AD	51

FY00 Lieutenant Colonel/GS-14 Product Manager And Acquisition Command Board Results

The Acquisition Management Branch (AMB), U.S. Total Army Personnel Command (PERSCOM), recently completed an analysis of the FY00 Product Manager (PM)/Acquisition Command (AC) Board results and overall command opportunity for Army Acquisition Corps (AAC) officers, Reserve component officers, and civilians. Results and possible trends are summarized below.

Overall Results

Board members reviewed the files of 325 AAC members. These files included 238 Active duty officers in year groups (YGs) 1979 through 1984, 12 Reserve officers, and 75 civilians. From this population, the board selected 55 principals, which included 1 Reserve officer and 4 civilians, for PM and AC assignments. Results by functional area (FA) and YG for Active duty personnel are as follows:

FA	1979	1980	1981	1982	1984
51	1	8	10	14	1
53	0	0	1	4	0
97	0	0	3	7	0
70	0	0	1	0	0

PM/Acquisition Command Board Procedures

The board recommended those individuals best qualified to serve as LTC/GS-14 PMs (43) and acquisition commanders (12). PERSCOM will slate each of these individuals to PM/command positions after considering Department of the Army guidance, position criteria, experience, training, and personal preferences.

Who Got Selected?

Of the 51 officers, 47 (92 percent) have master's degrees and 2 (4 percent) have Ph.D's. Three civilians (75 percent) have master's degrees and one (25 percent) has a Ph.D. Only five of the selectees (10 percent) had not been previously selected for resident Command and General Staff College. Of the 39 officers and 4 civilians selected to become PMs, 32 officers (92 percent) and 3 civilians (75 percent) have at least 2 years of experience in a program office. Thirty officers (77 percent) and three civilians (75 percent) of the selected PMs have major headquarters staff experience (Department of the Army, U.S. Army Materiel Command (AMC), Training and Doctrine Command, or Defense Logistics Agency (DLA)). Eight of the nine officers (89 percent) selected to be contracting commanders have at least 4 years of contracting experience with DLA, AMC, Forces Command, or the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology. Two of the three officers (67 percent) selected for test commands have at least 3 years of test facility experience.

Analysis

Based on the analysis applied to the above information, it is apparent that officers who complete at least 2 years in a program office and serve on a major headquarters staff are competitive for PM selection. All four of the civilians selected are members of either the FY97 or FY98 Competitive Development Group (CDG). Officers competing for contracting commands require at least 3 years of "hands-on" contracting experience to be competitive. The inflation of the old Officer Evaluation Report (OER) system required a "top block above-center-of-mass" performance in those key developmental positions. It is too soon to tell the impact of the new OER, DA Form 67-9. However, it appears at least a center-of-mass-plus OER is needed to be competitive. It should be noted that not all of the officers considered had a new OER in their file.

General Observations

The file quality of PM/command selectees continues to improve. Competition is tough for these key positions. Generally, officers are selected for command the first or second time considered. For the FY00 board, 57 percent of those officers selected were chosen on their first look. Of the civilians selected for PM positions, three of the four individuals were first-time-considered selectees. The civilian selectees have reaped dividends from the CDG Program experience and have made themselves more competitive by expanding their scope of training, education, and experience. However, unlike the military, civilians are not restricted to competing a limited number of times. Additionally, the population of eligible civilians is significantly greater than the number of civilians who actually apply for consideration.

Previous program office experience is most important if an individual expects to be competitive for PM/command assignments. However, there is no evidence that consecutive or repetitive program office tours better qualify an individual for PM selection. On the contrary, a successful program office tour, coupled with successful performance in a major headquarters staff, is a common formula for PM selection. Contracting officers require extensive contracting training and experience in pre- and postaward contracting. Success in other acquisition positions enhances overall file strength toward selection.

Command Opportunity

The AAC continues to afford officers in all three functional areas and civilians from all career fields a good opportunity to command. AAC command opportunities have compared favorably with the Army average of 10 to 14 percent for the past 4 years. Forty officers out of 90 (44 percent) in YG79 had an opportunity to command. Because each YG is considered four times for command, total opportunity to command for a particular YG cannot be determined until the fourth "look."

CAREER DEVELOPMENT UPDATE

Summary

Prior to future PM/command Boards, officers must take the time to personally "scrub" their Officer Record Brief (ORB) and microfiche to ensure that accurate information is conveyed to the board. The AMB will send preboard scrub packets to officers in the zone of consideration 90 days before the board convenes. These packets, consisting of an ORB, a microfiche request form, and a checklist, should be used to prepare files for the board. Although not a part of the preboard scrub packet, the photo is an important part of the board file and should be replaced if more than 3 years old. Attention to details—such as awards, branch, and insignia—makes a difference.

Captains and majors should seek career-broadening experiences to become competitive for early selection to a PM/AC assignment. Because of limited positions in the program offices, PERSCOM will continue to rotate captains and majors at 24 to 30 months to ensure a sufficient pool of experienced branch-qualified officers for future PM and AC assignments. Officers wanting to be competitive for contracting commands should seek contracting officer positions in pre- and postaward environments and contingency contracting officer assignments.

Civilians should also ensure that their application package is complete and contains all required documents. Special attention should be given to the accuracy of the data on the Acquisition Civilian Record Brief (ACRB). Dates of assignments on the ACRB should match dates on the *Civilian Qualification Record*, DA Form 2302. A "fresh" ACRB may be obtained from the local Acquisition Workforce Support Specialist (AWSS) (for Corps Eligibles) or Functional Acquisition Specialist (FAS) (for AAC members) and submitted with the application package. Any discrepancies in the record, such as missing evaluations, should be explained. Remember, the application package reflects an individual's career and defines their training, education, and experience to the board.

FY00 LTC/GS-14 PM/AC Selectees

Product Manager

Rank	Name	Branch	Career Field	PM
LTC	BARBER, WAYLAND P. III	OD	51	PM, Crusader Armaments
LTC	BROUSE, STEVEN M.	AD	51	PM, THAAD BMC3I
LTC	CARROLL, MAXWELL G. JR.	FA	51	PM, HIMARS
LTC	CHASTEEN, GREGORY T.	QM	51	PM, SARSS
LTC	CRIZER, SCOTT H.	FA	51	PM, AFATDS
LTC	CROWTHER, JAMES B.	MS	70D	PM, Medical Comm Sys
MAJ(P)	DEVER, DOUGLAS A.	FA	51	PM, MEADS
GS-14	DOOLOS, CATHERINE L.			PM, Defense Message Sys
LTC	EADY, DONALD P.	AD	51	PM, TOC
LTC	ECONOMY, ANAS T. III	AR	51	PM, THAAD Radar
LTC	EVELAND, GEORGE D. JR.	SC	51	PM, Global Pos Sys
LTC	FINEMORE, BRENT C.	OD	51	PM, Def Sat Comm Sys Term
LTC	FLOWERS, KENNETH	SC	51	PM, Manportable Sat Sys
LTC	GARCIA, DARY I.	TC	53	PM, TACCIMS
LTC	GARMAN, PATRICK J.	AV	51	PM, MELB
LTC	GAYLE, MICHAEL D.	AV	51	PM, SOF Mission Planner
LTC	GODDETTE, TIMOTHY G.	EN	51	PM, CE/MHE
LTC	GORE, GEORGE O.	AV	51	PM, GBCS
GS-13	GRAY, MYRA S.			PM, CHIM Sys
LTC	GREENE, WARREN O.	OD	51	PM, JTT/CIBS
LTC	GROVE, MICHAEL J.	EN	51	PM, Information Warfare
GS-13	JONES, SAMUEL M			PM, Syn Environ Adv Dist Sys
LTC	KIDD, SCOTT R.	AR	51	PM, Wolverine
LTC	KNUDSON, OLE A.	FA	51	PM, Crusader Munitions
LTC	KRAUSE, PAUL J.	OD	51	PM, Theater Targets
LTC	LANGHAUSER, CRAIG G.	AR	51	PM, Imp Bradley Acq Sys
LTC	LOSCHIAVO, PHILIP R.	AR(USAR)	51	PM, POL
LTC	MCNERNEY, CATHERINE A.	AV	53	PM, SIDPERS-3
LTC	MULLIN, EDWARD L.	AD	51	PM, PAC-3
LTC	NEUMANN, SUSAN B.	OD	51	PM, CSSCS
LTC	PAQUETTE, DEREK J.	AV	51	PM, Apache Modern
LTC	PENNYCUICK, RICHARD B.	AV	97	PM, Fire Control Radar
LTC	RALPH, JAMES R. III	SC	53	PM, ASAS
LTC	RAYMOND, WALTER R. JR.	AR	51	PM, TWV-Remanufacture
LTC	RIDER, MARK D.	FA	51	PM, BAT P3I
LTC	ROSS, CHRISTOPHER M.	CM	51	PM, Non-Stock Chem Disp
GS-13	SCOTTI, ANN F.			PM, Auto Ident Tech
LTC	SUTTON, BRIAN	FA	51	PM, Air Missile Def C2
LTC	VANFOSSON, MARION H.	AR	51	PM, Future Combat Sys
LTC	WALTERS, STEPHEN	AV	51	PM, Fixed Wing
LTC	WHEELER, KENNETH A.	IN	51	PM, Live Fire Tng Sys
LTC	WILLIAMS, CURTIS R.	FA	53	PM, Maneuver Cont Sys
LTC	YOUNG, CAROL R.	OD	51	PM, MPIM/SRAW

Acquisition Command

Rank	Name	Branch	Career Field	PM
LTC	BESCH, THOMAS M.	IN	97	Cdr, DCMC Baltimore
LTC	BILLINGTON, ROBERT B.	IN	97	Cdr, DCMC Syracuse
LTC	BOOTH, ANN L.	FA	97	Cdr, DCMC Korea
LTC	DOYLE, NORBERT S. JR.	IN	97	Cdr, DCMC Lockheed Martin
LTC	FLEMING, MICHAEL B.	OD	97	Cdr, DCMC Kuwait
LTC	GALLAGHER, DANIEL J.	OD	97	Cdr, DCMC United Def
LTC	GRUBB, SUSAN K.	OD	97	Cdr, DCMC Stew & Steven
LTC	KING, MARYSE J.	OD	51	Cdr, DCMC Milwaukee
LTC	STOLESON, MICHELLE D.	OD	51	Cdr, Mat Test Cen Yuma
LTC	SULLIVAN, CHRISTOPHER C.	AV	51	Cdr, Air Worth Test Cen
LTC	TURNER, HENRY C. JR.	QM	51	Cdr, Kwajalein Missile Range
LTC	WOMACK, JOHN H.	AR	97	Cdr, DCMC Texas Instr

FY99 Experimental Test Pilot Board

One of the responsibilities of PERSCOM'S Acquisition Management Branch (AMB) is the Army's Experimental Test Pilot (XP) Program. This program is used to train selected Active duty Army aviators to become qualified experimental test pilots.

The FY99 XP Board convened Feb. 8-10, 1999, and selected the following individuals as the best qualified commissioned and warrant officers for the program:

CW3 Nolan Beck	CPT Dwight Robinson
CW3 Alan Davis	MAJ Bradford Snowden
MAJ Christian Grinsell	CPT Brian Thompson
MAJ Patrick Mason	CW4 John Wade
MAJ Joseph Nagel	

Commissioned officers selected for the program are automatically awarded Functional Area 51 (Research, Development and Acquisition) and are integrated into the Army Acquisition Corps. Warrant officers selected for the program will continue to be managed by the Warrant Officer Division at PERSCOM. All selectees will attend an 11-month test pilot program at the U.S. Naval Test Pilot School (USNTPS) in Patuxent River, MD. These officers may also be required to spend 12 to 18 months at a civilian educational institution pursuing an aeronautical engineering degree prior to entering the USNTPS.

After completing USNTPS, the test pilots will be assigned to an initial utilization tour as an experimental test pilot. Further utilization assignments will be in consonance with the officer's designated functional area specialty and the needs of the Army. Officer utilization in research, development, and acquisition positions may be as experimental test pilots or in positions affecting the type, design, and configuration of Army aircraft. Because of the Army's high-dollar investment in honing the experimental test pilot's experience and skill, their utilization and professional development is closely monitored by the AMB.

Application packets from officers desiring to compete before the FY99 Test Pilot Board were prescreened by the AMB to ensure the criteria stated in MILPER Message 99-005 was met. Applications that failed to meet the criteria were returned to the officers with a letter that noted the lack of qualifications. The letter also included a recommendation to reapply after the minimum requirements are met.

Examples of the minimum qualifications are 700 required flight hours for commissioned officers, 1,000 for warrant officers; 12 months time on station on convening of the board; and educational degree programs that include above average grades in college algebra, calculus, differential equations, and physics (or mechanics). The MILPER message stated that commissioned officers were required to have a baccalaureate degree in an engineering or other hard science program and that warrant officers must have an associate's degree.

Board members meticulously reviewed the application packets. Educational degrees, Instructor Pilot/Senior Instructor Pilot (IP/SIP) recommendations, flight hours, and officers with pilot-in-command hours were weighted accordingly. Board members relied heavily on the IP/SIP comments regarding an officer's flying ability. Current IP/SIP recommendations clearly addressing the officer's flying ability and potential helped strengthen the applicant's packet and enhanced their chances for selection.

The next XP Board is tentatively scheduled for February 2000. Interested applicants should review the MILPER message announcing the FY00 XP Board (to be released in September 1999) to verify they meet the minimum requirements. Commissioned officers interested in applying should contact CPT Eric Glenn at (703) 325-2800 or DSN 221-2800, or by e-mail at **glenne@hoffman.army.mil**. Warrant officers should contact CW3 Randy Grunow at (703) 325-5251 or DSN 221-5251, or by e-mail at **grunowr@hoffman.army.mil**.

FY00 Congressional Fellowship Program

Headquarters, Department of the Army (HQDA), has announced details of the Congressional Fellowship Program for FY00. The Congressional Fellowship Program is designed to provide congressional training to top Army officers. Fellows are typically given responsibility for drafting legislation, arranging congressional hearings, writing speeches and floor statements, and briefing congressional members for committee deliberations and floor debate.

The Acquisition Management Branch will be nominating Army Acquisition Corps officers for application to the FY00 Congressional Fellowship Program. Interested officers should submit a memorandum requesting consideration (endorsed by their first field-grade or civilian-equivalent supervisor), no later than Sept. 1, 1999, to the Commander, U.S. Total Army Personnel Command, ATTN: TAPC-OPB-E (MAJ John Masterson), 200 Stovall Street, Alexandria, VA 22332-0411.

An internal Acquisition Corps board will select officers to be considered by the Army Congressional Fellowship Board in December 1999. Minimum requirements for consideration are as follows:

- Have no more than 19 years active federal service,
- Be a major or lieutenant colonel,
- Be Military Education Level B (Command and General Staff College graduate),
- Be available for a 2-year utilization tour following the fellowship,
- Be branch qualified at current rank,
- Have no adverse actions pending,
- Meet height and weight standards in accordance with AR 600-9, and
- Receive career branch approval.

The Congressional Fellowship Program begins with an August-December 2000 HQDA orientation and attendance at the Force Integration Course, followed by a January-December 2001 assignment as a staff assistant to a member of Congress. The officer will incur an Active duty obligation, and within 5 years of completing the program, must serve a utilization tour (meaning that they will hold a job that requires knowledge of congressional activities).

FY00 White House Fellowship Program

The President's Commission on White House Fellows annually selects exceptionally promising individuals to serve as White House Fellows. The White House Fellowship Program provides an opportunity for soldiers to receive unique and valuable training and firsthand experience in the process of governing the nation. Fellows write speeches, help draft and review proposed legislation, answer congressional inquiries, chair meetings, conduct briefings, and assist high-level government officials.

The Acquisition Management Branch will nominate Army Acquisition Corps officers for application to the FY00 White House Fellowship Program. To be considered, officers must meet the following eligibility criteria:

- Be a U.S. citizen,
- Have no more than 19 years active federal service,
- Be a major or lieutenant colonel,

CAREER DEVELOPMENT UPDATE

- Be Military Education Level B (Command and General Staff College graduate),
- Be available for a 2-year utilization tour following the fellowship,
- Be branch qualified at current rank,
- Have no adverse actions pending,
- Meet height and weight standards in accordance with AR 600-9,
- Have a graduate degree, and
- Receive career branch approval.

Eligible officers desiring to compete must request consideration. Interested officers should submit a memorandum, endorsed by their first field-grade or civilian-equivalent supervisor, no later than Nov. 4, 1999, to: Commander, U.S. Total Army Personnel Command, ATTN: TAPC-OPB-E (MAJ John Masterson), 200 Stovall Street, Alexandria, VA 22332-0411.

The dates of the fellowship are September 2000-August 2001, followed by a utilization assignment that begins September 2001.

An internal Acquisition Corps board will select officers to be considered for recommendation by PERSCOM for submission to the White House Commission. The White House Commission will select regional finalists during the February-June 2000 timeframe.

BOOKS

The Project Management Institute: Project Management Handbook

Edited by Jeffrey K. Pinto, Jossey-Bass, 1998.

Reviewed by LTC Kenneth H. Rose (USA, Ret.), a Project Manager with the Waste Policy Institute in San Antonio, TX, and a former member of the Army Acquisition Corps.

Contemporary concepts of project management reflect a more integrated approach than those of times past. Embracing this new view, *The Project Management Institute: Project Management Handbook*, edited by Jeffrey K. Pinto, is the vanguard of a body of literature that will surely follow.

Pinto's text is indeed a fundamentally new approach to presenting a project management handbook. Its four-part structure of basics, techniques, people, and integration is a bold break from the collections of essentially stand-alone topics that are characteristic of previous handbooks.

The book gets off to a strong start in Part I with a comprehensive discussion of key issues in project management. Elements such as configuration management, preplanned product improvements, and integrated logistics support will be familiar to military readers. New areas of interest include integrating training in project operations and refining industry metrics for quantifying performance improvements.

One of the most insightful chapters addresses "black boxes" in project management; that is, the areas of pre- and postproject activity that are often less understood than the intervening project operations. The chapter suggests that projects begin with conceptualization and decoupling and end with learning and recoupling. It provides a framework for linking these four elements across the life of the project.

Part II begins with a solid foundation on scope management that leads into a discussion of alternate financial means for selecting and evaluating projects. Risk management receives complete coverage that includes methodologies for application in practice.

Several chapters discuss the interaction of work breakdown structures (WBS) with network tools such as Program Evaluation Review Technique (PERT) and Critical Path Method (CPM) in planning and scheduling. The text focuses on understanding these tools, not just the how-to of their application. An abbreviated WBS model that moves the work package, the basic element of project execution, toward the top of the hierarchy is suggested as more applicable to small projects than the six-level DOD model. PERT and CPM are considered in great detail, from their basic attributes and differences down to the method of calculating and using values within the network. Part II concludes appropriately with guidance for closing out a project.

Part III is the unique contribution of this text, discussing the many aspects of human resources in project management. A practical view of power and politics is followed by extensive coverage of team building, cross-functional cooperation, leadership, and motivation. The chapter on negotiation is critical, considering that many projects are performed through matrix organizations in which leaders have limited directive authority and must depend on willful cooperation of others. A chapter on conflict management gets to the heart of an issue that has great power for improving project performance, but is often misunderstood as unpleasant and a negative indicator of managerial performance.

Part IV presents integrative issues, including a prescription of 10 critical success factors. A highly informative discussion of four typical failures in project management provides a strong finish for the book. In a clearly iconoclastic view, the author suggests that both CPM and earned value management fail the project manager in their own failure to consider rework in their internal calculations. The author points out the dangers of adding people late in a project to gain earlier completion. And he candidly condemns the practice of adding managerial pressure in an effort to meet the schedule. Pinto closes Part IV with a view of project management as the key to success in the markets and economies of tomorrow's world.

Project Management Handbook is something of an educational sandwich. It has a strong start, a strong finish, and a middle that is chock-full of useful information. Because of its integrated approach, the reader would be well advised to start here, then fill in with augmenting detail from other sources under the "handbook" name.

Correction

Because of a commercial printing error, some of the data at the top left side of Table 3 on Page 45 of the May-June 1999 issue of *Army RD&A* are incorrect. In the category "Promotions to GS-14," the "as of" date should be *April 27, 1999*, and the figures that follow should read *11 (44%)* and *3 (12%)*. We apologize for this error.

What Best Practices Do You Employ To Fully Identify And Evaluate The Elements Of Overhead Costs And Reduce Their Negative Impact On Your Programs?

COL Paul S. Izzo
Project Manager
Bradley Fighting Vehicle
Systems Project Office
Warren, MI

The end of the Cold War and the decline of U.S. Defense spending have moved innovative cost-reduction approaches to the forefront of the product manager's (PM's) management strategy. Because competition for funds is more fierce than ever, affordability is key to initial program approval and continued program support. Working in close coordination with the prime contractor, other supporting PMs, and government-furnished equipment suppliers, the Bradley Program Manager has identified trade-offs and cost-saving initiatives to deliver the best value to the U.S. Army. The following are examples of practices used by the Bradley PM to identify and evaluate the elements of costs and reduce their impact on programs:

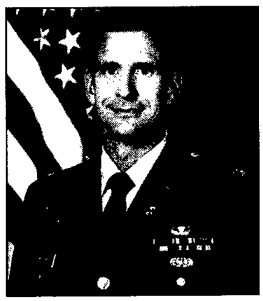
- Formed a Cost Analysis Integrated Process Team to review and evaluate scope of work with the sole intent of trading off contract scope without degrading performance.
- Identified commonality of components to ensure consideration of technology transfer from other programs to the various PM-managed vehicle systems and major subcomponents to the maximum extent.
- Identified existing contract requirements that contained warranties and conducted an assessment of cost versus expected benefit.
- Assessed the criteria for multiyear procurements (MYPs) and identified two MYP contracts for the FY00 budget submission.
- Identified commonality of spares for concurrent procurement with vehicle end item to gain savings through more economical buys.
- Conducted trade studies and analysis to secure a well-defined database of existing technology that could be successfully applied against the minimum mission requirements for a major program.
- Held government cost account managers (CAMs) accountable for evaluating and reporting the cost and schedule performance of their respective accounts. Provided CAMs electronic access to performance data, which motivates close communication with their contractor counterparts and helps to identify non-value-added effort and cost.
- Identified ways to enhance employee development and minimize impact on productivity. Purchased video teleconferencing equipment and implemented the first Distance Learning Course for the Program Executive Office, Ground Combat and Support Systems.
- Extensively employed the Alpha contracting process to ensure a joint understanding of requirements and contract scope. This integrated process involving United Defense Limited Partnership (UDLP), the Defense Contract Audit Agency, the Defense Contract Management Command (DCMC), the PM Bradley, and the U.S. Army Tank-automotive and Armaments Command (TACOM) Acquisition Center identifies and evaluates direct labor hours and other direct costs while eliminating little or no-value added tasks. It also allows an immediate adjustment for configuration changes and modifications to quantity and acquisition strategy resulting from budget fluctuations.

The PM continues to pursue acquisition reform ideas with the prime contractor where significant cost savings and avoidance have been coordinated and implemented as follows:

- Reducing government oversight and eliminating duplicate oversight activities. At the first Acquisition Reform Week award ceremony, the Defense Logistics Agency recognized the UDLP/TACOM/DCMC Team for supplier mentoring in FY98. This award was presented in recognition of soliciting reform ideas from the supplier base and using select suppliers to assist in implementing these ideas.

• Restructuring the organization to consolidate multiple functions (such as pricing and contracts between locations), developing and using resources more efficiently, and eliminating "stovepiped" emphasis in work structure.

• Continuing to reduce the number of manufacturing facilities; consolidating the York, PA, production site; and reducing major infrastructures in all headcount areas in response to a 46-percent drop in sales from 1989 to 1999. Establishing more common processes at the York manufacturing facility to influence product quality and cost.



COL James R. Moran
Project Manager
Abrams Tank System
Warren, MI

Recently, we participated in a cost-reduction effort in support of the Egyptian co-production of the Abrams M1A1 tank. As part of this overall production and support effort, a manufacturing technical assistance (MTA) contract was awarded to an Army tank contractor (ATC) who had a subcontract with their subsidiary. The subsidiary provided engineering support to the Egyptian workers who assembled the M1A1 tank in-country.

At the request of our customer, we obtained the MTA contract proposal from the government buyer and reviewed the cost sheets. In the process, we discovered that the subsidiary was charging general and administrative (G&A) expenses and that the ATC was charging G&A expenses on top of the subsidiary dollar amount.

When we pointed out this duplicate cost item, the ATC offered to reorganize and merge with their subsidiary, thereby reducing the contract price 11 percent and saving the Egyptian Tank Program $21 million.

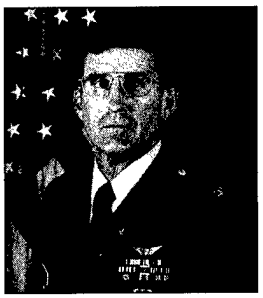
COL Howard T. Bramblett
Project Manager
Apache Project Office
Program Executive Office, Aviation
Redstone Arsenal, AL

In the Apache Project Management Office, we employ best practices as the optimum method of performing our business operations. We continue to expand the use of integrated product teams to reduce project overhead cost. Therefore, our best practices on controlling the impact of overhead flow directly out of our continuous use of teams and information sharing. We have streamlined our organizational operation by using teams to regularly review our matrix support and service support contractor needs and the structure of our normal office operations. We concentrate on the details of "does an overhead element add value" to our weapon system and "what does this value cost?"

The most recent recognizable best practice is probably the Alpha contracting process. This process hinges on open, direct communication and trust between the government and the contractor in developing a better acquisition package and negotiating a contract in a more timely manner. Alpha contracting depends on highly motivated government and contractor experts passing information not normally shared in the past to streamline the acquisition process. Those of us involved with the Apache Program use smaller teams of experts to more quickly resolve contract issues. Apache's proposed Prime Vendor Support contract was prepared and negotiated in record time using the Alpha contracting process. We anticipate a similar success for the Apache Multi-Year II purchase of 298 additional D model helicopters.

Like everyone else in business, the Apache Project Manager (PM) is taking advantage of electronic commerce to target and reduce administrative overhead costs. Our teams increasingly employ teleconferencing, which eleminates the time lost in air terminals traveling to conferences and meetings. Individuals are reducing paper documents through the use of electronic contracting and by coordinating almost every type of administrative business effort via e-mail. We have even implemented an electronic file system. Every day, I see more electronic documents and less hard-copy correspondence. "Electronic information" is superior because it is delivered faster, is more accurate, and has wider distribution. This improvement in communication permits our organization to more quickly locate issues, evaluate corrective actions, and then implement those actions.

Thus, the best practices employed by the PM to identify and reduce overhead costs and their negative impact are found in the dedicated workforce that produces, oversees, and controls weapon system production and support. The Apache team understands that there really isn't a single answer, but rather a need to continuously focus on the details of daily operations. Best practices involve knowledge of the value of a dollar, understanding the need for financial controls, and realizing that cost avoidance permits use of funds for the most important programs, such as providing a better product to the warfighter at a reasonable cost.



COL Thomas M. Harrison
Project Manager
Utility Helicopters
Redstone Arsenal, AL

As part of the ongoing efforts to control cost, the Utility Helicopters Project Manager's Office recently initiated a new process for internal operating budgets. This new process is an attempt to push both budgeting and execution responsibilities down to the lowest management level to gain maximum visibility of all project manager operating expenses.

Each assistant project manager and division chief is now responsible for managing his or her portion of the budget. Through the execution year, expenses are accumulated at the product line level. Then, at monthly reviews with the project manager and quarterly reviews with the performing activities, evaluations are made by comparing accomplishment of goals to expenditure of funds. During these reviews, unfavorable trends can be caught early on. Additionally, these frequent reviews allow visibility needed to initiate any redirection of funds to accommodate changes in the program.

While this is not a process that will show any great savings in overhead and support costs, it seeks best value. By empowering the first-line managers to execute their own support budgets, we ensure active management of these scarce resources. Frequent reviews provide an early detection of negative trends. And the visibility down to task level requires each effort to stand on its own as to its relative worth to the program. We feel this level of management is necessary to ensure that all support dollars are optimally used and the program receives all the support it needs and pays for.

From The Acquisition Reform Office . . .

Natick Implements Standard Procurement System

The Natick Contracting Division, Army Materiel Command (AMC) Acquisition Center, Soldier Biological and Chemical Command, implemented the Standard Procurement System (SPS) version 4.1 on Feb. 26, 1999, achieving full operational capability ahead of schedule. This accomplishment marks the first operational use of Electronic Data Interchange and Electronic Data Access (EDI/EDA) at a DOD site. All users for both of our legacy procurement systems, Standard Army Automated Contracting System (SAACONS) and Procurement Automated Data Document (PADDS), are trained on SPS, and all new procurement actions that would have been awarded through SAACONS are now being issued through SPS.

The success of this effort is the result of an informed, supportive, and trained workforce prior to implementation; onsite support by the contractor during and after implementation; and senior management support, direction, and enforcement. In addition, teaming among the Natick Contracting Division, the contractor, and the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology was a key factor contributing to the success of this effort.

Natick became the first Army agency to automate the process of sending Requests For Quotes from the Procurement Desktop Defense to the AMC Army Single Face to Industry (ASFI) Web application. ASFI is an Army-endorsed initiative that allows bids to be sent electronically to businesses that are not EDI capable.

Now, the primary challenges are to replace PADDS with SPS and implement an automated purchase request generation system that interfaces with SPS. The Natick Contracting Division is jointly researching these efforts with the SPS contractor. Additionally, the Natick Contracting Division is working on several EDI/EDA issues regarding the editing and translation of data outside the SPS software.

Point of contact for this article is MAJ Sean O'Day, (508) 233-5160, DSN: 256-5160.

Cruze Cites Need For Acquisition Center University

Marlene Cruze, Executive Director for the U.S. Army Aviation and Missile Command (AMCOM) Acquisition Center, in step with the military community, views "training the force" as mission critical. She strongly suggests that initiatives such as downsizing, rightsizing, and Base Realignment and Closure have adversely impacted many traditional training methods. "Time away from the desk," increased training costs, and lack of travel funds have put many Defense Acquisition University (DAU) and Army Logistics Management College (ALMC) courses out of reach. One could readily conclude that this is a perfect formula for CHARTED FAILURE. That is, everyone but Marlene Cruze.

Not surprisingly, Cruze sees all AMCOM Acquisition Center employees as candidates for training, regardless of their grade. Says Cruze: "It's my job to do the most with the resources allocated, and that means training each employee up to their potential; that's not a goal, that's a survival mandate. The acquisition process has been on a Z-train for some time now; these evolutions are revolving sc quickly that I am generally concerned that my managers are losin touch [with] where the rubber meets the road."

To remedy this, Cruze has proposed to the AMCOM Acquisitio Center Board of Directors the creation of an Acquisition Cente University (ACU), which would consolidate much of the AMCOM Acquisition Center's training requirements under her agency' management. Management would decide who goes to what class when, and who gets the priority seat, all without waiting in the queue. Although not in conflict with either the DAU or ALMC, the ACU would fulfill training requirements with in-house resources.

ACU instructors would be tasked to ensure that training is relevan to the workplace, and that every training candidate is "honestly" evaluated for strengths and critical shortfalls.

According to Cruze, "We've set the ACU galley on battle speed anc there is no turning back. Anything and everything is a candidate fo rework. If the lesson plan is faulty, fix it; if the instructor has difficult conveying the subject matter, find another instructor ASAP. If a anytime the ACU loses the training proactive edge, slam on the breaks and fix it on the spot."

Is it worth the effort? Absolutely; the need for relevant workplac training is universal and without question, and the payoffs are potentially unlimited. Establishing the ACU will enable the AMCOM Acquisition Center to maximize employee empowerment, develop a focused practical training program, and hone a corps of well rounded, multifunctional specialists; all of which will then be forgec into an efficient, effective, customer-focused workforce. Not only is Cruze's ACU a win/win for AMCOM, but without much of a stretch the ACU could easily become a major catalyst for significant proces innovations and exchange of ideas.

Point of contact for this article is Dr. Rex Conners, (256) 955-7089

Cost Reduction/Technical Excellence Program

The U.S. Army Kwajalein Atoll (USAKA)/Kwajalein Missile Range (KMR) conducts strategic national and theater missile system testing and sensor system research and developmen testing. Operating as a major range and test facility, it alsc conducts space operations in support of the U.S. Space Command and NASA.

In fulfilling its mission to provide contracting services to the USAKA/KMR, the USAKA Contract Team manages four service contracts valued at approximately $1.2 billion. These contract provide life support for an island population of approximately 3,000 people. In addition to logistics support (installation level) and test range operation, maintenance, and engineering; these contracts provide meteorological, security, and law enforcemen services. The team also provides advice and assistance in the development of contract requirements.

In an effort to identify potential cost savings, the USAKA Team devised an incentive program called Cost Reduction/Technical Excellence (CR/TE). This incentive program was implemented via modifications to the USAKA Logistics Support Contract (LSC) and the Integrated Range Engineering (IRE) contracts beginning in FY98.

The CR/TE Program provides for the payment of a fee fo sustained cost reductions in accordance with guidelines se forth in a special contract provision. The program incentive encourages the contractor to provide proposals for fundamental changes in the way operations are performed. Greater efficiency in performing these operations ultimately results in cost reductions. Cost reductions must result in contract savings and cannot result from a "cost avoidance." Efficiency is defined as "a cost reduction or improvement to a current process or planned

effort that results in the process, product, or service to be performed at a lesser cost. The improvement must result in a quantifiable dollar savings to the contract, and the quality and timeliness of the process, product, or service must not be compromised."

The savings from government-approved and contractor-implemented changes are shared equally between the contractor and the government. The contractor submits proposals for cost savings as they are identified, along with supporting rationale. The government then evaluates and accepts or denies the proposals. The actual savings are evaluated at the end of each fiscal year to determine the contractor/government savings share during the period. Subsequently, the contract is modified to provide the additional fee as a result of the contractor/government cost savings.

Contractor-validated cost savings for the FY98 LSC and IRE contracts were $201,752 and $55,366, respectively. The total savings were $257,118, half of which was shared by the contractor in the form of a special fee earned.

The innovative CR/TE Program is termed "forward thinking" and is indicative of acquisition reform policy. The status quo of using only "traditional," Federal Acquisition Regulations (FAR)-defined contract incentives has been improved through the use of this new and improved system of cost savings.

Point of contact for this article is Beverly R. Fowler, (256) 955-1605.

NEWS BRIEFS

INSCOM Adopts Paperless Contracting

Officials at the U.S. Army Intelligence and Security Command (INSCOM) cut to the chase April 12 by cutting a ceremonial ribbon and introducing paperless contracting. INSCOM is the first major Army command to achieve full operational status with DOD Standard Procurement System (SPS) version 4.1 and Acquiline version 4.1 (customer requests) databases.

With the transition came an immediate "fix" to more than 100 contracting problems, according to Jan Shadowens, Principal Assistant Responsible for Contracting. "We had issues that other commands never experience and still reduced the paperwork shuffle," said Shadowens. "On unclassified actions, solicitations can be issued, replied to, and awarded using e-mail."

Dr. Kenneth J. Oscar, Deputy Assistant Secretary of the Army for Procurement; MG Robert W. Noonan Jr., INSCOM Commander; and Robert J. Horvath, INSCOM Team Chief for Hardware/Software; cut the ceremonial ribbon at INSCOM as part of an Armywide shift to paperless contracting by the year 2000.

Oscar congratulated INSCOM on being the first major Army command to implement seamless electronic contracting. The value of the program, he said, lies not so much in its cost effectiveness, but that it will keep improving the system for getting products and services to soldiers.

"The Army's threat has radically changed. At the same time, technology has exploded. We need to get technology to the soldier. We do that through contracting. Incredible things are happening because [contracting] is now paperless," Oscar explained.

Praising the effort, Noonan said, "Partnering with industry continues to enhance our operational readiness."

Personnel in the INSCOM contracting office took 14 months to prepare for the SPS Program and 4 months to implement it. They received the program's concurrent software, Acquiline, and trained its users in less than 2 months. INSCOM officials plan to install Acquiline at its major subordinate commands, providing a direct electronic contracting connection with headquarters.

DOD's SPS Program uses the Procurement Desktop-Defense system as its standard software. According to Horvath, that software can be tailored to each of DOD's 1,000 sites worldwide. It also includes preimplementation planning, process improvement consulting, software development, and user training.

Acquiline is a Web-based software package that allows customers to submit procurement requests electronically to the Procurement Desktop-Defense database. Users only need access to a web browser and the Internet to complete the transaction. Officials plan to interface Acquiline with supply systems and financial databases, known as SARRS and STANFINS respectively.

"Interconnectivity allows people to work together and share energy," said Oscar. "We're at the beginning of a new industrial revolution."

The preceding article was written by Shirley K. Startzman, a public affairs specialist at INSCOM HQ.

DTIC Offers Free Use Of Secure STINET

To increase customer awareness and facilitate access to its holdings, the Defense Technical Information Center (DTIC) is offering its Secure STINET, a valuable Internet resource, free to DOD agencies and military Services (including military schools) until November 1999.

Secure STINET provides access to the following:

- Citations since 1985 to the unclassified portion of DTIC's Technical Reports collection, which detail the results of completed Defense-sponsored research, development, test, and evaluation and studies and analyses efforts. Citations to limited documents are also included. DTIC's Technical Reports collection encompasses areas associated with Defense research such as military science, aeronautics, missile technology, space technology, navigation, and nuclear science. It also contains information on biology, chemistry, energy, environmental sciences, oceanography, computer sciences, sociology, logistics, and human factors engineering. In addition, the collection includes DOD directives and instructions and the Defense Federal Acquisition Regulation Support document.
- Last 5 years of active full-text Technical Effort and Management System summaries of planned, ongoing, terminated, and completed research and development and

studies efforts.

- Full text of the latest unclassified, unlimited documents added to DTIC's Technical Reports collection—ready for downloading.
- Access to the British Library's *inside Web* and Canada Institute of Scientific and Technical Information's SwetScan and document delivery service. These services allow subscribers to search and retrieve from thousands of international journal articles and conference papers.
- Language translator.

For more information, contact Pat Tillery at (703) 767-8267, DSN 427-8267, or 1-800-225-3842 (menu selection 2, option 3), or via e-mail at **bcporder@dtic.mil** or **ptillery@dtic.mil**.

Total Ownership Cost Reduction Program

In a recent Defense Systems Affordability Council (DSAC) publication titled *Into the 21st Century*, Dr. Jacques Gansler, the Under Secretary of Defense for Acquisition and Technology outlined the following three top-level goals for improving the process of equipment modernization throughout DOD:

- Field high-quality Defense products quickly; support them responsively.
- Lower the total ownership cost of Defense products.
- Reduce the overhead cost of the acquisition and logistics infrastructure.

This strategic guidance lends much needed impetus to ongoing Army efforts to salvage scarce dollars from the weapons system operations and support cost funding (which increases steadily as equipment ages). These dollars will be reinvested in modernization programs that will enhance weapons system lethality, mobility, and readiness.

The Army program that implements this effort is known as Total Ownership Cost Reduction (TOCR). Recently, the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT) created a special directorate to provide dedicated leadership, guidance, and coordination for the myriad of ongoing TOCR initiatives and ensure that the Army stays in sync with other DSAC TOCR efforts throughout DOD.

The ASAALT TOCR Directorate is headed by an Army colonel, and its staff will focus on helping the Army to find long-term solutions for optimizing allocation of Army modernization and sustainment resources. The TOCR Office will coordinate the efforts of a DA-level Working Integrated Project Team (colonel level) and a Senior Steering Group (two-star level), both chartered for the exclusive purpose of considering DA-level TOCR initiatives and eliminating institutional TOCR inhibitors.

ATC Wins Praise

COL Kenneth R. Dobeck, Project Manager for the Family of Medium Tactical Vehicles (FMTV), hosted an awards ceremony at Aberdeen Test Center (ATC) late last year to honor test personnel for technical excellence. Test engineers, technicians, drivers, mechanics, data collectors, logistics technicians, and other test personnel were recognized for their important roles in the high-profile technical test effort to isolate and fix a persistent problem with the FMTV driveline/powertrain system.

"Without people, without a team of people working together the way you did, we could not have solved the FMTV powertrain problem in just 7 months. It was an incredible effort, and I thank you all from the bottom of my heart," said Dobeck at the ceremony.

The problem was first discovered in the field. Reports indicated that a number of FMTV flywheel housings were cracking. In separate but related incidents, rear driveshafts on several 2-ton, or Light Medium Tactical Vehicles, cargo variants failed, resulting in loss of vehicular control. Because of driveshaft failures, a safety-of-use message was issued restricting paved FMTV operations to below 30 mph. The Army had to fix the problem before proceeding with a full-rate production contract.

Dobeck contacted ATC Auto Core Director John Sobczyk, who assigned the project to ATC Test Director Marty Bindel. Bindel, together with award-winning Engineering Technicians Kerry North and Bob Schoffstall, began assembling a test team and making assignments. They set up 12-hour shifts to meet the ambitious development schedule and consulted with members of the ATC Automotive Test Team on how to instrument the test vehicles to capture essential strain and acceleration data. Working "torture tests" around the clock with instrumentation and data processing contractors, ATC members solved the drivetrain problem through a material change in the flywheel housing (nodular iron replacing gray iron), material change in the U-joint thrust washers (nylon replacing steel), and a redesign of the driveshafts.

After presenting each member of the ATC team with a certificate and an FMTV coin at the commemoration, Dobeck emphasized that what he found particularly valuable in his dealings with ATC was honesty.

"I trusted your answers to my questions," he said, "and I took your answers with confidence to the highest levels of the Army.

"Your outstanding technical performance with the FMTV drivetrain test, your commitment to the task, and your honesty throughout the test are several reasons that I'll be spending money here for years to come. We're not stopping now. No way. We intend to make the FMTV an even better tactical truck than it is now," he added.

ATC Commander COL Andrew G. Ellis concluded the ceremony by thanking Dobeck for his high confidence in ATC.

The preceding article was written by Lena Goodman, Public Affairs Specialist at the U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD.

PERSONNEL

Coburn Takes Over As AMC Commanding General

GEN John G. Coburn has assumed new duties as the Commanding General (CG), U.S. Army Materiel Command (AMC), Alexandria VA. He previously served as Army Deputy Chief of Staff for Logistics.

With more than 35 years of Active commissioned service, Coburn has held positions as Deputy Commanding General, AMC; CG, U.S. Army Ordnance Center/ Commandant, U.S. Army Ordnance School, Aberdeen Proving Ground, MD; and Deputy Chief of Staff for Logistics, U.S. Army Europe and Seventh Army, Germany.

Coburn has a J.D. degree from the University of Missouri, an M.A. in political science from the University of Kansas, and a B.S. in education from Eastern Michigan University. He has also completed the Industrial College of the Armed Forces, the Army Command and General Staff College, the Ordnance Officer Advanced Course, and the Infantry Officer Basic Course.

His military honors include the Defense Distinguished Service Medal, the Distinguished Service Medal, the Legion of Merit with Oak Leaf Cluster (OLC), the Bronze Star Medal with OLC, the Meritorious Service Medal with four OLCs, the Joint Service Commendation Medal, the Army Achievement Medal, and the Army Commendation Medal.

CONFERENCES

Army Operations Research Symposium

The 38th annual U.S. Army Operations Research Symposium (AORS XXXVIII) will be held Oct. 19-20, 1999, at Fort Lee, VA. A social and registration will be held the evening of Oct. 18. Approximately 200 government, academic, and industrial leaders are expected to participate. Attendance is by invitation only.

This year's theme is "Reshaping Army OR for the 21st Century Operational Challenge." Concurrent special sessions will cover force development, modernization, and requirements; command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) and information warfare; logistic systems; manpower, personnel, and training systems; joint and combined operational analysis; advances in modeling and simulation; and test, evaluation, and experimentation support to Army modernization. In addition to these special sessions, the Army Logistics Management College (ALMC) will conduct two tutorials the afternoon of Oct. 18 covering data mining and OR modeling in spreadsheets.

The symposium will allow an exchange of information and experiences on significant Army analyses, with a view to enhancing these efforts and, in general, broadening the perspective of the analysis community. Papers are being solicited that address the session topics listed above.

The U.S. Army Materiel Systems Analysis Activity, directed by David Shaffer, is responsible for the overall planning and conduct of AORS XXXVIII. Co-hosts are the U.S. Army Combined Arms Support Command and Fort Lee, commanded by MG Daniel G. Brown; and ALMC, commanded by COL Samuel H. Jones III.

For additional information, contact Glenna Tingle, DSN 298-5358 or (410) 278-5358; Jayne Lyons, DSN 298-6614 or (410) 278-6614; AORS e-mail at **aors38@arl.mil**; or the AORS website at **http://amsaa-web.arl.mil/aors**.

Workshop On Total Cost Of Ownership Reduction Initiatives

The U.S. Army Aviation and Missile Command (AMCOM) Systems Engineering and Production Directorate will host the Workshop on Total Cost of Ownership Reduction Initiatives on July 27-28, 1999, at the Sparkman Center, Redstone Arsenal, AL. The objective of this workshop is to review research progress in life-cycle system engineering to support the reduction of total cost of ownership in advanced aviation and missile systems.

Workshop presentations will focus on the various initiatives established by the DOD, Department of the Army, and AMCOM to assist project managers in achieving reduced ownership costs. Specific examples of successes will also be discussed. Potential topics include value engineering; operating and support cost reduction; diminishing manufacturing sources and material shortages; dual-use applications; modernization through spares; standardization and commercialization; and reliability, maintainability, and sustainability.

There is no charge for this workshop, and contractor participation is encouraged. For additional information, contact the Total Cost of Ownership Reduction Initiatives Workshop Hotline at (256) 890-6343 extension 223; or visit the workshop's website at: **http://smaplab.ri.uah.edu/tcow/**.

ACQUISITION CIVILIAN RECORD BRIEF

As of May 1, 1999, you will no longer receive a birth month mailing of your ACRB.

STEP 1 **Access ACRB, Go To:**
https://rda.rdaisa.sarda.army.mil/ACRB

STEP 2 **Click on "Continue"**

STEP 3 **Read Information, Then Click on "Continue"**

STEP 4 **Read Instructions, Then Complete Logon Information**
You can only review or print your ACRB

STEP 5 **Click on "Submit Query"**

STEP 6 **Create your Password, click on "Set this as my password and continue"**

STEP 7 **Review your ACRB, Then Print if changes are to be made**
Annotate changes on ACRB, sign and send to AWSS or FAS

REFERENCES

Army DAU Mandatory Training Program
(Policies/information/schedules/rosters/vacancies)
http://www.sarda.army.mil/rdaisa/atrrs/aaedau.htm
Defense Acquisition University Home Page
(Catalog/Fulfillment/Certification Requirements)
http://www.acq.osd.mil/dau
Acq Education, Training and Experience Catalog
(Course/Program Listing; Applying/Procedures)
http://dacm.sarda.army.mil/careerdevelopment0

Acquisition Workforce Support Specialists

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AUTOMATED INDIVIDUAL DEVELOPMENT PLAN

STEP 1 **Review/Update Your ACRB**
https://rda.rdaisa.sarda.army.mil/ACRB
When creating the IDP, some information is transferred from the ACRB to the IDP

STEP 2 **Go to the Automated IDP Located at**
https://rda.rdaisa.sarda.army.mil/idp/idpprod/idpstart.htm

STEP 3 **Scroll Down and Download Users Manual**
This will give you step-by-step process to create your IDP

STEP 4 **Individuals click on Review/Update IDP**
Supervisors click on Supervisor Module
This is where supervisors create their profile

STEP 5 **Click on TIPS**
Useful Information on logging into the system

STEP 6 **After Completing Logon Information, Click on Submit**

STEP 7 **Click on Objectives to start establishing your IDP**

DAU Applications Using The Automated IDP
https//rda.rdaisa.sarda.army.mil/idp/idpprod/idpstart.htm

Individual Development Plan Policies
http://dacm.sarda.army.mil/policy

Planning for Career Development
http://dacm.sarda.army.mil/careerdevelopment

Updating Your Acquisition Civilian Record Brief (ACRB)

To make a correction, line through the entire data in error and **PRINT** clearly the correct information, using the ACRB directions as a guide. The directions are located at the home page address provided in the upper left corner of your ACRB. You may want to include short comments about the change you are requesting. After you read and understand the "false statement" clause, sign in the lower left block of the ACRB. You are thus certifying the accuracy of the form and all its markups. Mail this signed copy to (no FAX accepted)

Commander USARDAISA
P.O. Box 4
Radford, VA 24141-0411

Only signed ACRBs will be processed. Army Acquisition Workforce members (usually GS-13 and below) requiring assistance with their ACRB should contact their Acquisition Workforce Support Specialist (AWSS), and Army Acquisition Corps members (usually GS-14 and above) should contact their Functional Acquisition Specialist (FAS).

Functional Acquisition Specialists

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Bruce Dahm	D, E, G, L, R, T	703-325-6137
Leon McCray	H, S (A-K)	703-325-4267

A: Program Management
C: Contracting
D: Industrial/ Contract Property Management
E: Purchasing
G: Manufacturing and Production
H: Quality Assurance
K: Business, Cost Estimating and Financial Management
L: Acquisition Logistics
R: Communications-Computer Systems
S: Systems Planning, Research, Developmen and Engineering
T: Test and Evaluation