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ARMY AL&T

MARCH–APRIL 2000

Transforming the Force

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FAREWELL FROM KEITH CHARLES DEPUTY DIRECTOR, ACQUISITION CAREER MANAGEMENT

To love what you do and feel that it matters - how could anything be more fun?

—Author Unknown

Five years ago, I accepted the role of Deputy Director, Acquisition Career Management (DDACM). At that time, I could not have predicted how challenging, how rewarding, and most of all, how much fun it would be.

I could not have predicted the challenge I would face, together with the first Army Acquisition Corps (AAC) Process Action Team, as we took our message on the road for the very first time. We spoke of our hopes and dreams for the Army Acquisition Corps and we were met by a sea of silence. We asked for your input but we didn't deserve it. You had already heard too many promises, and had seen too little progress. I could not have predicted the difficulty I would face in earning your trust, in convincing you that it was not too late to make a difference. The challenge to develop a vision statement that would address your concerns and describe our expectations for the future and to communicate that vision so that it could be shared and have meaning for each and every one of you.

I could not have predicted the challenge that I would face, together with the AAC Reengineering Team, in laying the foundation, drafting the plans, and building the structure that would make the AAC vision a reality. The challenge of capturing hundreds of your ideas, hundreds of possibilities, and weaving them into our vision while ensuring that you would never again hear us make a promise that we could not fulfill. The challenge of earning your trust through a series of successes and no false starts.

I could not have predicted the challenge I would face together with the Acquisition Career Management Office (ACMO), the Acquisition Management Branch (AMB) at PERSCOM, the Acquisition Career Management Advocates (ACMAs), and the Acquisition Workforce Support Specialists (AWSSs) in the field—the people who live and breathe the AAC vision every day—to make the Army's Acquisition Corps the ***best*** Acquisition Corps. The challenge of guiding a corps of officers pursuing a nontraditional Army career path through a period of downsizing and restructuring. The challenge of combining the diverse components of the AAC—civilian, active Army, Army Reserve, and National Guard—into one ***integrated*** corps. The challenge of allowing civilians and Reserve Component officers to compete for "best-qualified" command positions and to win; to prepare civilians as future leaders in an integrated AAC. The challenge of institutionalizing the accomplishments of the last five years into a structure that will maintain the Army Acquisition Corps as the ***best*** acquisition corps while at the same time ensuring we remain relevant to an Army in the midst of the Army Chief of Staff's new vision.

I could not have predicted how rewarding each of these challenges would be; the reward of finally earning your trust; of feeling your passion when you spoke about what was wrong with the AAC and how we could make it better; of capturing

your ideas and making them an integral part of the AAC vision and to then see you subscribe to that vision. To create an environment in which people at all levels are capable of becoming the leaders of the 21st century.

I could not have predicted how rewarding it would be to speak to literally tens of thousands of you, and to hear from you about how it was going. The reward of seeing our first AAC civilians selected and promoted as Product and Project Managers. The reward of knowing that for the first time all members of an ***integrated*** AAC have the ability to excel. And the reward of knowing that even when an initiative wasn't working, there was a structure in place to fix it—to ensure that success was achieved.

Five years ago I could not have predicted the reward I feel today as I watch our plans coming together. To know that while we surely have a long way to go, we are on a path to success and have the fuel to keep it going. Because the fuel for this effort is ***you***. And the energy that each of you provide to this effort will continue to push it forward.

And finally, I could not have predicted the fun. Whether I was telling you stories about NASA and the White House (over and over again ☺), speaking to hundreds of audiences, challenging you for AAC coins, or celebrating our 10th anniversary, I have enjoyed every day I have spent as DDACM. And that is why it is so hard for me to leave this position. But for the same reason that I hate to leave, I am secure in knowing that the AAC vision will go on. And that reason is you.

Nothing that has been accomplished with regard to the Army Acquisition Workforce (civilian, active Army, Army Reserve, or National Guard) would have been accomplished without you. You are the reason why today, at this moment, over 60 members of the Army Acquisition Workforce (AAW) are working to obtain a master's degree, and over 900 members of the AAW are receiving tuition assistance. You are the reason why 27 members of the Competitive Development Group have been promoted in the last 2½ years, and more than 16 members of the civilian and Reserve Component workforce have been selected to serve as Project and Product Managers.

For the last five years you and I have been on a journey, a journey to develop our workforce and to develop ourselves. And because of you, the journey we have taken for the last five years has made the Army Acquisition Corps the envy of the Air Force, the Navy, and the Fourth Estate.

Today, I begin a new journey in the Office of the Secretary of Defense (OSD) as Director, Acquisition, Technology and Logistics Workforce. And once again I have the opportunity for self-development. To, in Peter Drucker's words ***"... proceed along two parallel streams. One is improvement to do better with what you already know. The second is change—to do something different."*** To take what I know about the successes we have built in the Army and to drive change in OSD and the other Services. But I begin ***this*** journey knowing that the Army Acquisition Workforce is in good hands. Knowing that each of you, too, will continue along a path of self-development. Knowing that COL Roger Carter, Director, Acquisition Career Management Office, will serve as Acting DDACM with the same passion as I until a permanent DDACM can be recruited. And knowing that together—you, Roger, and the structure that we have put in place over the last five years—will continue to make the AAC vision a reality.

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COVER

Army Chief of Staff GEN Eric K. Shinseki's vision for transforming the force will impact virtually every segment of the Army's acquisition, logistics, and technology community.

OUR NEW TITLE

If by chance you quickly turned the cover of this magazine, you may not have noticed that it is now titled *Army AL&T* rather than *Army RD&A*. However, if you *did* notice the change but were confused, let me offer a brief explanation. Effective Feb. 16, 1999, the logistics missions and functions of the Assistant Secretary of the Army for Installations, Logistics and Environment were placed under the operational control of the Assistant Secretary of the Army for Research, Development and Acquisition (ASARDA). Commensurate with this action, the Office of the ASARDA was renamed the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT). As such, *Army RD&A* magazine, which falls under the purview of the ASAALT, is also now renamed.

I want to assure our loyal and long-established readership that the *Army AL&T* editorial staff fully intends to continue publishing the information you need to stay informed. So keep the good stuff coming and don't hesitate to contact us if you have a comment or a suggestion.

Harvey Bleicher
Editor-in-Chief
Army AL&T magazine

Transforming The Force . . .

THE CRITICAL ROLE OF ACQUISITION, LOGISTICS, AND TECHNOLOGY

Paul J. Hoeper, Assistant Secretary Of The Army
For
Acquisition, Logistics And Technology

For most of our lives, the Cold War held the world in a balance of terror. The United States has emerged from the Cold War as the world's single superpower. For the present, the threat of global war has receded. More countries are embracing democracy and free-market economics. Relationships with our key allies remain strong. For all this, the world remains a dangerous and complicated place.

In this environment, the United States will often be the single essential nation in international crises, from humanitarian assistance in natural disasters to ending international conflict. The role of the Army has broadened. Operations will vary both in scope—from preventing war to winning wars—and size—from small-scale contingencies to major theater wars. Military success has always been about getting decisive force to the critical location before an adversary can complicate the situation. Right now, we cannot do this across the full spectrum of potential operations. Our heavy forces need to be more deployable and our light forces need greater staying power.

Secretary of the Army Louis Caldera and Chief of Staff of the Army GEN Eric K. Shinseki have directed all of us to transform our Army—already the most respected Army in the world—into a strategically responsive force that is dominant across the full spectrum of operations. Our acquisition, technology, and logistics community will play a huge role in creating a force that is deployable, dominant, and sustainable.

Paul J. Hoeper

Strategic responsiveness means deploying, *anywhere in the world*, a brigade in 96 hours, a division in 120 hours, and five divisions in 30 days. If our Army is going to get there within these timeframes, everything a Brigade Combat Team needs must fit on a C-130: soldiers, fuel, ammunition, and vehicles. This means that all platforms must weigh less than 20 tons. We can design such vehicles, and we have some now. The challenge is to achieve the lethality and survivability essential to battlespace dominance.

Up to now, we have dominated by putting superbly trained soldiers together with platforms that individually overmatched the platforms of potential adversaries. For example, our Abrams tank is the finest in the world, and no other artillery system can match the emerging Crusader howitzer. While these systems will continue to be rele-

vant to the Army's future, neither will fit on a C-130. Where we are deploying over long distances and our adversaries are not, we are likely to find that we will not have overmatch *on an individual platform basis*. Instead, we will achieve an overall capability overmatch by training our soldiers to exploit the synergy of agile, survivable, and lethal platforms that are digitized and networked to provide interoperable situational awareness.

Designing a system of the right size and weight for a C-130 is fairly simple, but maintaining the needed lethality and survivability will be difficult. To achieve essential lethality, we are examining guns, missiles, and precision munitions in all combinations. We are also looking at the combinations of system attributes that can help keep our soldiers safe. We will probably incorporate a suite of subsystems that will include armor, threat sensors, and active protection into manned systems with inherently small silhouettes and high agility.

Reducing the logistics footprint is the other significant challenge. Two of the biggest drivers here are fuel and munitions. By exploiting technology, we will develop more fuel-efficient systems and replace tons of dumb munitions with fewer smart munitions. This way, we will be reducing the logistics burden and increasing operational capability at the same time. Improved energy efficiency will bring us the dual benefits of a reduced logistics footprint and greater operating range. Precision munitions will reduce the footprint while increasing weapon effectiveness and reducing collateral damage.

Logistics has always been an essential enabler of military success. If we are to achieve the responsive, deployable, agile, versatile, lethal, survivable, and sustainable force described in the Army vision, we will need to refine and accelerate the revolution in Army logistics. We must implement a highly efficient logistics command and control system that operates seamlessly from the industrial base to our deployed forces. We will significantly reduce the size of our deployed logistical footprint. In the future, if we don't need to deploy it, we won't need to move it, fuel it, protect it, or repair it. This will become possible, in part, because of our exceptional command, control, communications, and intelligence resources.

Advances in information, materiel, and weapon system technologies will make it possible for objective force units to achieve the same effect as today's forces with fewer, lighter, and more reliable systems.

Our goal is to transform today's Army into a force that is dominant across the full spectrum of operations—the objective force. Advances in information, materiel, and weapon system technologies will make it possible for objective force units to achieve the same effect as today's forces with fewer, lighter, and more reliable systems. This complete transformation will be accomplished in three phases: initial, interim, and objective. At present, the Army will field two initial Brigade Combat Teams at Fort Lewis, WA. These brigades will be used to validate an organizational and operational model for the interim force. Simultaneously, we will acquire the Interim Armored Vehicle and field it as the centerpiece of the interim force. The lessons we learn from the interim phase, along with future technologies, will be the building blocks for the final phase of our transformation to the objective force. We are already maturing the technologies that will lead to the revolutionary warfighting capabilities of our Future Combat System. The Army is collaborating with the Defense Advanced Research Projects Agency on this challenging endeavor. The Future Combat System will be the catalyst for the completion of the Army's transformation.

In a little more than a decade when our Nation calls on our soldiers to face new threats in faraway lands, they will be trained in the right doctrine with the right materiel and supported with the right processes. This will be possible because of our efforts right now, today. Transforming the Army requires focus, enormous energy, and our best cooperative efforts. As a team, we can make our vision of the future come true. The Army is depending on us. The Nation is depending on us. Today's second grader, who will grow up to be tomorrow's soldier on point for the Nation, is depending on us. It's time to "roll up our sleeves" and make the vision a reality.

This edition of *Army AL&T* features articles on our team's many contributions toward building the future force, one that is Persuasive in Peace, Invincible in War.

TRANSFORMING THE ARMY TO A FULL-SPECTRUM FORCE

MG Joseph M. Cosumano Jr.

Introduction

The Army is undergoing a radical transformation with an endstate of a more responsive, deployable, agile, versatile, lethal, survivable, and sustainable force that will be capable of responding to missions across the full spectrum of conflict. The objective of this transformation is to erase the distinction between heavy and light forces. This will make light forces more lethal, survivable, and tactically mobile, and heavy forces more strategically deployable and agile with a reduced logistical footprint. The Army's force development staff, working with the Army Training and Doctrine Command and the Army Forces Command, will assist this transformation by translating requirements into new programs and a new structure.

Why This Army, Why Now?

Our environment has changed, mandating that the Army change as well. While the Army remains unchallenged in major theater war operations, our ability to rapidly respond to small-scale contingency operations is tenuous. Consequently, how we conduct these types of operations will influence the Army's ability to deter and coerce potential adversaries. Transforming the Army into a force capable of dominating across the full spectrum of operations is not an option; it is a requirement.

Army Chief of Staff GEN Eric K. Shinseki said, "The spectrum of likely operations describes a need for land forces in joint, combined, and multinational formations for a variety of missions extending from humanitarian assistance and disaster relief to peacekeeping and peacemaking to major theater wars, including conflicts involving the potential use of weapons of mass destruction." An army capable of full-spectrum operations requires modernization, conversion, and transformation of its current structure to fulfill those missions. Additionally, the costs of operating the current Army legacy equipment are taking a larger portion of the total budget each year. If changes are not made in the Army soon, operation and maintenance costs alone could eventually grind us to a halt. The time to transform the Army is now. The changes being discussed in the halls of the Pentagon, throughout the Army, and among Defense contractors represent fresh thinking and seek to address the challenge ahead.

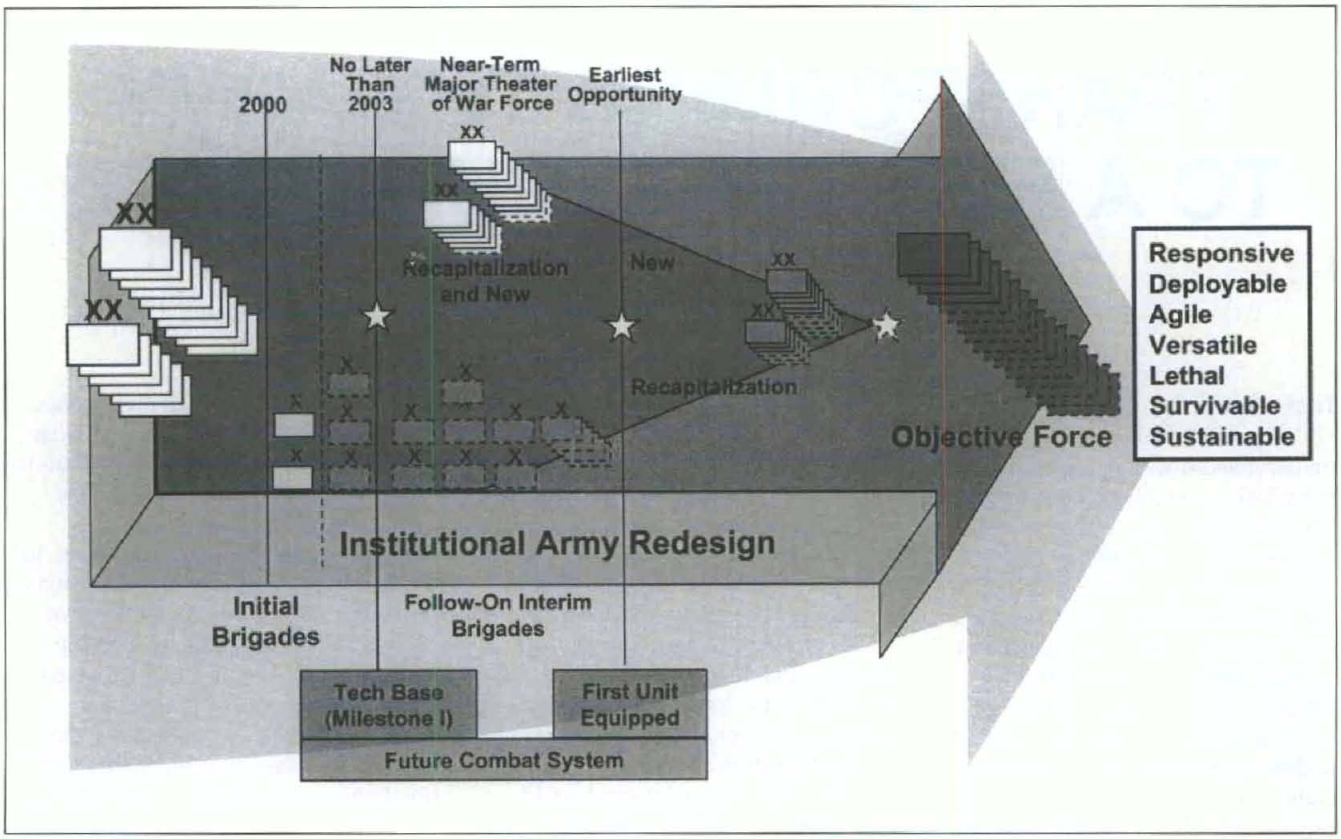
The Army must keep pace and, when possible, be out in front of change. We have evolved from a threat-based military to a capabilities- and knowledge-based military. A window of opportunity has opened during this period of diminished threat that allows us, rather than events, to drive the transformation process. We can design, test, field, train to standard, and shape the transformation force. This objective force must have the same lethality and survivability of the heavy force it will replace and the agility and transportability found in the interim-weight forces that can be transported by a C-130.

Increased Missions, Asymmetrical Threats, And Major Theater Wars

Now we have a very complicated threat mix that requires a capabilities-based force instead of a threat-based force. Instead of having a force that reacts, we need a force that can shape. During the past 7 years, the Army has been involved in more missions than in the previous 40 years. The Army is increasingly called on to conduct worldwide deterrence, engagement, and enlargement operations. Those actions include a range of missions: Kosovo, Bosnia, Hurricane Andrew, fighting fires, and assisting in flood-damaged areas. Despite this increased operational tempo, the Army continues to receive the same percentage of DOD total obligation authority as it received 40 years ago.

The Army's charter has not changed. The Chief of Staff calls it "a non-negotiable contract with America." We must still build and support a force that is capable of fighting and winning two nearly simultaneous major theater wars. The United States will remain engaged internationally, retaining its leadership in multinational defense arrangements and in promoting democratic values, free markets, and human rights. The future, however, will be even more complex, uncertain, and challenging than today.

There is a growing trend toward asymmetric challenges, such as information warfare, weapons of mass destruction, threats of chemical munitions, terrorism, missile strikes against the homeland, and covert attacks against commercial and financial infrastructures. Potential adversaries will seek nontraditional approaches to waging conflict against us. We must then be more innovative and determined to prevent them from gaining and exploiting us. The lack of a formidable military threat today does not discount the rise of a major military competitor in the future. While we do not anticipate a



threat in the near term, we must be prepared in the mid- and far term to respond to a currently unidentified opponent.

The Secretary of the Army and the Army Chief of Staff have articulated a clear Army vision that calls for soldiers on point for the Nation transforming this, the most respected Army in the world, into a strategically responsive force that is dominant across the full spectrum of operations; persuasive in peace, invincible in war. To quote directly from the vision statement, "The spectrum of likely operations describes a need for land forces in joint, combined, and multinational formations for a variety of missions extending from humanitarian assistance and disaster relief to peacekeeping and peacemaking to major theater wars, including conflicts involving the potential use of weapons of mass destruction. The Army will be responsive and dominant at every point on that spectrum."

According to the vision statement, to meet these operational requirements, the Army must move to a lighter, more strategically mobile force. This force must be capable of deploying a brigade via a C-130 to a contingency area in 96 hours and be fully prepared to conduct its mission. More significantly, we must have a trained and ready force that will be able to deploy one division anywhere in the world in 120 hours, and five divisions in 30 days. Our current equipment and force structure does not allow us to meet those standards.

The Transformation

The strategy is designed to ensure that we achieve the vision while maintaining the ability to conduct the warfight during the transformation. At the same time, we will convert the current force to a strategically responsive force. We will continue to modernize and recapitalize the III (U.S.) Corps, our counterattack corps, as a hedge to fight our Nation's wars. This will represent the best of our legacy force. Simultaneously, we will begin looking to industry and investing in technologies to create the objective force. We will transform the Army from its current Cold War organization and equipment into a force that better uses its full-spectrum capabilities in a more strategically deployable force. The newly organized force will be built around a common unit design and family of combat systems that are C-130 deployable. When we complete this effort, we will have developed the objective system that is deployable and enjoys the combat overmatch and survivability of the combat systems of today.

This is not a warfighting experiment! The transformation begins immediately with the stand up of the initial brigades at Fort Lewis, WA. Following the development of tactics, techniques, and procedures and new equipment testing and training, the interim brigades will be combat ready. Investments in today's technology and off-the-shelf equipment allow us to form surrogate units to stimulate doctrine development, organization design, and leadership training.

Ultimately, heavy and light forces will converge with similar capabilities in a family of systems on a common platform. When technology permits, the common platform will erase the line between light and heavy units. Throughout the process, transformation actions will ensure that today's light-force deployability is retained while providing it the lethality and mobility for decisive outcomes our heavy forces currently maintain.

Refocused research, development, and acquisition efforts will support this transformation. The ultimate goal is a family of combat systems that are C-130 deployable yet capable of fighting and surviving like the combat systems of today. This ultimate goal will allow us to significantly lighten the force without compromising combat capability. As an interim measure, creation of a new unit that is strategically deployable yet capable of sustained combat upon arrival in the theater of operations will begin the transformation. Organizational redesign and equipment enhancement will improve the lethality of light and early entry forces (see accompanying illustration).

Implementing the Army's transformation strategy will have far-reaching implications on the way the Army organizes, mans, equips, trains, supports, and fights in the 21st century. The Army's leadership is encouraging everyone to take part in thinking and discussing what eventually will help bring us to the objective force. Everything is open and on the table, and nothing precludes innovative ideas that can accelerate and reinforce these changes.

The Process

We will transform the Army over time. The initial force is two brigades that will stand up at Fort Lewis as soon as enough off-the-shelf equipment can be acquired to evaluate and refine the operations and organization concept. Concurrently, to outfit the interim brigades, we are beginning the acquisition process to bring in vehicles in the 20- to 25-ton weight class that will be C-130 deployable. Our intent is to field common equipment across common organizations to operate across the full spectrum of operations. This will include deployments to prevent, contain, stabilize, or terminate crises; deployments to stabilize and support operations to guarantee peace and protect forces; and deployments to major theater wars to fight as part of the division.

The near-term goal is to provide the necessary mobility, protection, firepower, and capacity to fight, survive, and conduct operations independently or as part of a combined arms team. We must be strategically deployable in all fixed-wing aircraft (C-130 and larger). We will immediately begin forming initial brigades using existing equipment. As interim vehicles become available, we will begin the transformation to interim brigades.

In the far term, the Future Combat System (FCS) will provide a common baseline capability for a mounted tactical force to conduct direct combat, deliver line-of-sight or near-line-of-sight munitions, perform reconnaissance, and transport soldiers and materiel. With minimum modification, the FCS will be capable of performing mobility and countermobility tasks; conducting maintenance, recovery, and resupply operations; supporting medical-specific operations; protecting the force from air and missile threats; and providing command and control functions to on-the-move forces. Multifunctional/multirole capabilities will minimize variants and maximize the benefits of commonality.

We are already on the path to FCS development. We are working with the Defense Advanced Research Projects Agency's cooperative program folks to develop technologies needed to create the family of systems that are lethal, mobile, and survivable. We have focused our science and technology (S&T) dollars (6.2 and 6.3) to leverage existing programs and experiences currently being researched by industry. The Army's S&T effort holds the key to the long-term transformation of the Army. The S&T community will tell us the realm of possibilities for achieving the future vision. In 2003, we will review our efforts and if ready to proceed, we will begin with a fast-paced program to meet the earliest first unit equipped possible.

Conclusion

The Army's transformation will not occur overnight. There are challenges to overcome, but we are committed to the vision and the strategy. We will recapitalize the legacy force while we begin transforming the Army with off-the-shelf technologies. The objective force is the endstate of our transformation. It is a future force—a common design applied to the entire Army that achieves the force characteristics as outlined in the Army vision. Once complete, the objective force will increase the Army's responsiveness, lethality, and endurance, providing the ability to dominate any threat in any environment.

MG JOSEPH M. COSUMANO JR. is the Assistant Deputy Chief of Staff for Operations and Plans for Force Development, HQDA. He holds B.S and M.S. degrees in industrial technology from Northwestern State College of Natchitoches, LA. Cosumano is a distinguished graduate of the Army Aviation School and the Air Command and Staff College. Additionally, he is a graduate of the Defense Systems Management College and the Industrial College of the Armed Forces.

DEFENSE SCIENCE BOARD VIEWS ON ARMY TRANSFORMATION FOR 21ST CENTURY WARFARE

Donald C. Latham

Introduction

Although it appears to be a contradiction in terms, transition remains an enduring state of affairs. The demands for U.S. military involvement continue to intensify and diversify more than ever. However, some constants still remain. One of these constants is that the ultimate objective of military operations is to influence human behavior. While air and sea power are absolutely essential to meet this objective, there is no substitute for effective ground forces. These forces can respond rapidly and potently to the demands that have characterized the last decade of this century and will certainly characterize the next.

America's Army leadership clearly understands the future demand for ground-force capabilities. This is not at issue. The issue is how to begin the transformation to achieve those capabilities. Strong inhibitors include the daily demand for the capabilities of current forces, the need for near perfection in meeting those demands, and the natural reluctance to take current risks to ensure future capabilities. Still, whatever the current demand, there is an urgent need to start the transformation now. This article provides insight into how to transform the Army's vision into 21st century force capabilities.

Defining, Fostering, And Focusing Transformation

Transformation is a process driving fundamental change in how an enterprise performs its business. This article focuses on transformation within the context of military operations. While the Army itself must manage enterprise transformation, it must be carried out with careful consideration of joint responsibilities in support of Joint Vision 2010 and beyond.

During the 1998 Defense Science Board Summer Study on "Joint Operations Superiority in the 21st Century: Integrating Capabilities Underwriting Joint Vision 2010 and Beyond," the Defense Science Board (DSB) identified one overarching operational challenge. That challenge is to project effective, joint multidimensional combat power in the first hours of conflict, flowing without interruption into continuous combat operations across any spectrum of conflict.

The 1998 Summer Study also identified wide-ranging enabling initiatives to support successful development of the rapid deployment operational capability. Some of these operational and technology enablers are shown in Figure 1.

The theme of joint rapid response operations capability was further developed during the recently completed 1999 DSB Summer Study, "21st Century Defense Technology Strategies." This theme emphasizes and transforms evolving Service concepts of rapid response into a joint interdependent focus while interfacing with coalition forces. The DSB found that to enable Joint Vision 2010 and beyond, developing a full-spectrum (space, air, land, and sea) joint rapid-response operations capability was a useful framework to transform existing and developing Service initiatives.

A joint rapid-response operations capability, as both a warfighting capability and strategic deterrent, is critical for the DOD. A rapid-response capability can

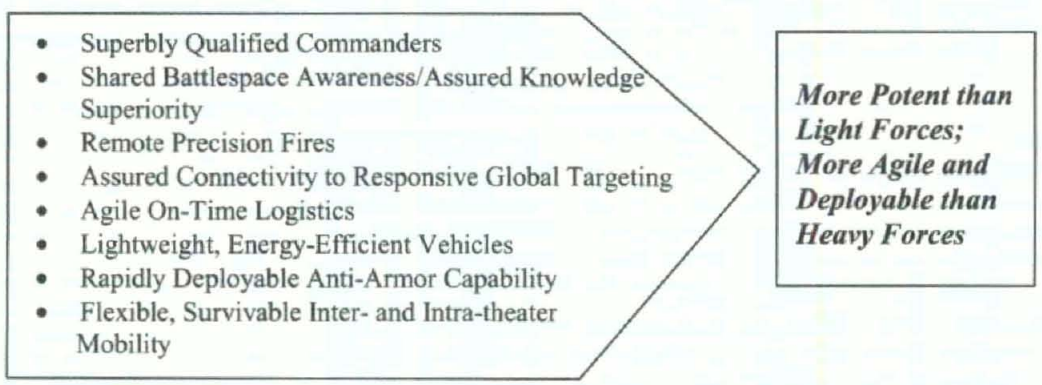


Figure 1.
Operational and technology enablers

Figure 2.

provide a stabilizing influence prior to conflict and help shape the strategic environment. During the pre-conflict phase of an operation, this force capability can buy U.S. command authorities critical time for negotiations, analysis, and assessments. Such a force could deter and dissuade adversaries from commencing operations and could also empower other crisis resolution tools, including diplomatic, economic, and political responses.

The rapid-response operations concept is dependent on forces that provide rapid response with offensive combat power but minimum footprint in theater, and is designed for efficient logistics support. These forces will also be used in conjunction with forward-deployed U.S. and coalition forces. The objective is to defend and take the offense early, both important factors in securing early conflict resolution and termination.

Several parameters are essential to support this concept of operations. These parameters are also key to achieving the desired goals of deterrence, stability in the pre-conflict environment, and rapid and decisive resolution if conflict occurs. The rapid-response capability requires forces that can:

- Effectively move into the theater of operations in 24 to 96 hours using both military and commercial air- and sealift assets;
- Enter immediately into combat operations upon deployment;
- Operate independently of large vulnerable overseas bases and ports by achieving assured access to those theater locations that are uncertain—in location and time—to the enemy;
- Move rapidly by air and land throughout the theater of operations to ensure a high degree of battlespace mobility;
- Provide increased lethality for early deployment elements of the force, employing combined arms capability of both organic and precision remote fires;
- Operate in a manner that achieves full coalition integration in all phases of the operation;
- Gain access to improved intelligence and joint interoperable command and control using the Integrated Information Infrastructure;
- Deploy both overt and covert sensor systems, some of which are deployed before forces are committed;
- Use tailored logistics support to ensure operation and logistic functions are fully integrated elements in force execution (opergistics); and
- Maximize survivability of all forces throughout all phases of operations.

In several years, development of the joint rapid-response operations capability will lead to the creation of Joint Rapid Response Operations Forces (J-ROFs) that differ dramatically from today's light or heavy ground forces. The J-ROF concept calls for a modular, building-block-type capability that will provide the Army with a flexible set of force concepts and capabilities that can be reconfigured as required. *Flexibility is essential because force requirements demanded by the future*

strategic environment cannot be met by a one-size-fits-all force. As the Army and Joint Forces Command (JFC) experiments with, trains, and builds J-ROFs to deal with various types of contingencies, new force concepts and capabilities will evolve. Some of the evolving force characteristics will include speed of command and engagement, rapid response time to crisis, agile maneuverability, enlarged engagement envelope, rich sensing capability, endurance, robustness, overwhelming lethality, and staying power.

Army Transformation

Army transformation requires several key enablers. These include strategic agility, information for decision superiority, force protection, closely integrated logistics and operations, combat modeling and simulation, distributed force lethality, focused new technologies, and innovative training capabilities. The following three enablers are briefly discussed below: technologies enabling new capabilities, strategic agility, and information for decision superiority.

Technologies Enabling New Capabilities

Information, information processing, and communication networks—collectively, an integrated information infrastructure—are the core of every aspect of military activity. Figure 2 on Page 9 depicts the relationship between such an infrastructure and several primary areas of military activity. The integrated information infrastructure is necessary to achieve information and decision superiority and to enable effective command, control, communications, and computer (C4) networks that are linked to other networks of intelligence, surveillance, and reconnaissance (ISR) systems.

This integrated information infrastructure is described in considerable detail in the *DSB 1999 Summer Study Final Report*, published in November 1999 (unclassified). The report describes a fully integrated joint C4ISR system with global connectivity, enabling assured information to every level of combat operations and supporting forces.

The DSB suggests that the Army strongly focus its transformation initiatives on developing organic C4ISR systems, especially for battalion forces and below. The command, control, and communications architecture should be capable of supporting distributed, highly mobile forces. The architecture should also be highly automated; permit both horizontal and vertical real-time force planning and execution collaboration; enable the use of wireless sensor networks, electronic tags, and robotic vehicles (air and land); and contain decision support tools to allow rapid combat decisionmaking. With a C4ISR system as described, the Army will be able to develop future ground combat systems that are agile, robust, and lethal across the conflict spectrum.

Strategic Agility

Achieving strategic agility involves changing major event timelines. Many important movement and support issues also need to be resolved. Solving these concerns alone will not address strategic agility challenges unless the *characteristics* of U.S. forces change as well.

What this means is that from the outset, the Army must design strategic agility into future forces. In many systems fielded today, the primary development focus was on the "performance parameters" most applicable to operations. Considerations of interoperability and interface with the command and control system are often after-the-fact issues. In future systems, features such as deployability, C4ISR interfaces, logistics, cost, and force survivability *all* become performance parameters. The Army should no longer treat operations as something supported by logistics. Rather, operations and logistics must work as a single entity and provide capabilities in the battlespace. They are inseparable elements. The term opergistics was coined to convey this concept of totally integrated operations and logistics.

Information For Decision Superiority

Decision superiority is the ability to use information and experience to make battlespace decisions faster and better than any adversary, ensuring a continuing and overwhelming pace and effectiveness of operations. If adversaries, potential and otherwise, believe the U.S. military is consistently able to use decision superiority to achieve execution superiority, the Nation will have a useful strategic deterrent in addition to a superior conflict capability. Decision superiority is a central enabler for achieving U.S. military dominance in future crises. However, decision superiority is also a potential vulnerability because it depends on C4ISR resources that an adversary might disrupt.

To achieve information superiority is to ensure a speed of command, pace of operations, and level of operational efficiency and effectiveness that no adversary can manage, regardless of available information resources. Decision superiority comes from the ability to leverage the quantity and type of information available about the battlespace and the forces within it—both friendly and hostile. More timely and better-informed decisions will create an operational tempo with which the enemy is unable to cope. Thus, information superiority will lead to decision superiority, and ultimately, to execution superiority.

Enhancing And Accelerating Transformation

In focusing on transforming the Army, the following initiatives should be considered:

- Enlarge the existing Army vision beyond platform-centric considerations by adopting a vision strongly focused on a comprehensive, overarching, global network-centric C4ISR system. Every individual soldier, sensor, weapon, or platform is an active node in the global network.
- Endorse the vision and recommendations of the *Report of the Senior Advisory Group to the Army and DARPA on Future Ground Combat Systems* (FGCS) dated Sept. 22, 1999, and the 1999 Army Science Board report *Strategic Maneuver* dated July 1999.
- Endorse and support the recommendations in the *Report of the Defense Science Board Task Force on DoD Warfighting Transformation* dated September 1999.
- Assist JFC in upcoming experiments, such as Millennium Challenge (which the Army is vigorously supporting), and other potential JFC initiatives such as the DSB-recommended Joint Rapid Response Operations Force development.
- Budget for critical technology developments leading to significant new operational capability, as identified in the Senior Advisory Group FGCS, Army Science Board, and Defense Science Board reports.

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THE ARMY SCIENCE BOARD'S ROLE IN TRANSFORMING THE ARMY

Michael J. Bayer

Introduction

Historically, the Army has been in a constant state of transformation. The Army has always led the Nation and the world in developing or adapting new innovative weapon systems, breakthrough production techniques, and enlightened social change. But today's information age presents the Army with an unprecedented challenge. The dominant source of relevant innovation will forever remain external to the Army, and the necessary pace of change will present a unique challenge to the Army's evolved internal structures and processes. The Army's response must be one of flexibility and continual transformation to remain relevant to the Nation's calling.

To this end, the Army Science Board (ASB) is committed to providing assistance and counsel to the Army and DOD leadership. An ASB FY00 study, the third in a series on the future of land force operations, will provide advice on transforming the Army for the 2015 timeframe, as well as inform the leadership of high-payoff technologies and trends in science and engineering. The study also will provide insight on actions that leaders might take to better position the Army for the future.

The history of technology is the history of war, and the future of war is the future of technology. Consider the enormous changes in technology that have occurred. As recently as 10 years ago, the World Wide Web—a subelement of the Internet—was little more than a curiosity used by techies to send short messages or share scientific information. (Incidentally, DOD's Defense Advanced Research Projects Agency (DARPA) created the Internet and is often referred to as the "father" of the Internet). Few could foresee the explosive growth of the medium—the billions of dollars in sales over the Internet this past Christmas, or the hundreds of billions of dollars invested in "dot.com" companies in 1999, which fueled the stock market's growth. Consider as well the rapid and enormous technology-driven changes in space technology. This arena has evolved in only a few years from being predominantly used by the world's military organizations to a business opportunity for commercial entities and multinational corporations.

The civilian community (news media, investors, and private interest groups) can now purchase, via the Web, satellite imagery of a quality that until recently was beyond the technical capability of only a few governments. The implications for future military operations, such as the Army's ability to surprise on the battlefield, are going to be more consequential.

The world's standard of living and global security are more dependent than ever on existing information-age technologies and those yet to be discovered. In the industrial age, the only constant was change. In the information age, the only constant might just be surprise.

The Army Science Board will focus on providing advice on the "art-of-the-future" with its FY00 study *Technical and Tactical Opportunities for Revolutionary Advances in Rapidly Deployable Joint Ground Forces in the 2015-2025 Era*. Identifying future enabling technologies emerging from this global commercial marketplace is central to this study. The board selected 2015-2025 as the maturity midpoint of the Army weapon systems currently in long-lead-time development. As in the past, this study also will suggest a path forward for today's Army to achieve this future.

Several precedents exist for this type of deep analysis. At the close of World War II, Chief of Staff of the U.S. Army Air Forces GEN Henry H. "Hap" Arnold wanted to know the anticipated shape of air power in 5, 10, and 65 years. He asked that a survey be conducted of scientific and technological advances to project likely trends as a guide to Army Air Force weapon systems development. This led to a 1946 report, *Where We Stand*, prepared for the Air Force Scientific Advisory Group. The report provided projections considered fundamental for future research and development planning. These projections included the possibility of supersonic flight; unmanned aerodynamic systems capable of delivering weapon payloads at ranges up to several thousand miles; target-seeking anti-aircraft missiles; the need for supersonic offensive systems to penetrate the new anti-aircraft systems; systems for perfect communication between fighters and ground control stations; and all-weather navigation systems. All these projections were realized within a generation.

The ASB will make assessments of technological trends in the coming decades that Army weapon systems developers should consider. One of the concepts to be assessed includes making the Army units of 2015-2020 more nimble, lethal, and survivable in close combat, while being sustained more efficiently and economically. During this timeframe, technology might enable the Army to use its weapon systems collaboratively in an ensemble approach rather than in the current platform-centric approach. Requirements might be better developed for unit capabilities rather than solely for platforms. Features and functionality may be separated and assigned to manned and unmanned entities that incorporate specific warfighting sensors. Likewise, weapon systems platforms might have to manage robotic "attachments."

Sensors and robots linked with lightweight forces are also expected to significantly enhance unit capabilities. As a result, the manner and methods of distributing sensor data will be paramount to battlefield success. Examples of near-term technological opportunities for acquiring key data through sensors include unmanned aerial vehicle deployments and beyond-line-of-sight and line-of-sight opportunities. However, the Army must begin establishing methodologies for connectivity to accomplish this. These methodologies will assist in steering members during their study deliberations.

The ASB will "attack" the challenge holistically, building on the studies completed in 1998 and 1999. FY98 studies, *Concepts and Technologies for the Army After 2010* and *Prioritizing Army Space Needs*, served as a foundation for FY99 efforts.

In the FY98 study, *Prioritizing Army Space Needs*, the ASB analyzed current Army space uses and needs for future space systems to ensure adequate support for Army XXI and the Army After Next. The study highlighted the importance of space products for the Army warfighter and recommended more active Army participation in the planning and execution of future U.S. space systems. The study provided numerous assessments and recommendations in the areas of organization and personnel, national space systems, commercial space capabilities, and non-space systems. The study also outlined time-sensitive organization and process

recommendations and time-sensitive program opportunities that required the immediate attention of Army leaders.

That report's companion study, *Concepts and Technologies for the Army Beyond 2010,* recommended a series of ongoing commercial and non-Army DOD developments that could materially benefit the Army. Creation of an Army Investment Council comprised of senior general officers was recommended as a means to select and focus attention on developments deemed most adaptable and affordable. A topic this council might consider is whether the Army could require future deployments to rely on traditional or innovative commercial airlift and sealift at great cost savings and increased flexibility. This strategy could include the employment of Reserve components to generate, receive, and sustain these forces to rapidly and affordably project power in the most modern forms possible by leveraging the continuing strength and world-class performance of the private sector.

Likewise, two FY99 studies provide the foundation for FY00 efforts. *Enabling Rapid and Decisive Strategic Maneuver for the Army After 2010* concluded that rapid and decisive strategic maneuver is attainable in the near future. Specific study recommendations included the following:

- Improve deployment planning and scheduling tools by increasing Army participation in DARPA advanced logistics project (ALP) development, and fund Army programs (e.g., Global Combat Support System-Army, Combat Service Support Control System) to integrate ALP architecture;
- Reduce sustainment requirements by further developing split-based support options and establishing more efficient systems of material packaging, handling, and intermodal distribution;
- Maximize deployment and sustainment throughput by leveraging all possible commercial-lift capability through strategic partnering with global service companies; and
- Increase early entry force lethality by experimenting with available equipment and recommending needed procurements within 12 months.

The follow-up FY99 study, *Full-Spectrum Protection for 2025-Era Ground Platforms,* focused on technologies for the Future Combat Vehicle (FCV) and the Future Ground Combat System (FGCS). The study recommended that a 20-ton FCV would make the early entry forces more survivable, agile, and lethal. While the study cautioned that the FCV is not a replacement for the M1, it suggested that the Army's ground system of tomorrow will benefit from technologies identified elsewhere in the study.

These prior initiatives led directly into the FY00 study *Technical and Tactical Opportunities for Revolutionary Advances in Rapidly Deployable Joint Ground Forces in the 2015-2025 Era.* The ASB will perform one overarching summer study in 2000, composed of four parallel investigations leading to an integrated set of recommendations. A discussion of the work that will be performed by each of the four investigative teams follows.

Team 1 has the goal of achieving rapidly deployable forces with dominant maneuver supported by precision fires. It will examine areas that offer the greatest payoff for rapid force deployment and that retain the traditional capabilities associated with heavy forces in the defensive phase, along with a revolutionary increase in offensive capabilities over traditional light forces. In addition, the team will consider the feasibility of synchronizing the requirements for the FGCS and the Joint Tactical Rotorcraft to provide revolutionary tactical theater mobility and increased strategic mobility. This team will also assess the potential capabilities of robotic air and ground vehicles, both for reconnaissance and attack. Finally, the team will propose a suite of smart munitions and sensor combinations for direct and indirect fire forces that is cost-effective and provides the most decisive outcome in expected scenarios.

The goal of Team 2 will be to provide forces with a support and sustainment capability with significantly reduced logistic burden. Specific opportunities include providing forces with significantly improved mechanical reliability, simplified battlefield maintenance and repair, significantly smaller fuel and ammunition tonnage requirements, and improved battlefield medical support. In addition, the team will assess advanced power plants that reduce the fuel consumption by at least 25 percent per horsepower delivered, and the logistic implications of the alternative families of smart munitions that are generated by Team 1. Team 2 will also analyze the tremendous developments in telemedicine.

Team 3 will assess sustaining information dominance through an advanced "central nervous system" that meets the needs of our forces and denies basic information to threat forces. En route mission planning will be critical in the future. Team 3 will examine capabilities that provide digital map location and terrain elevation data to support the needs of ground maneuver commanders and precision fire employment. The team will also examine other capabilities that yield superior situational awareness of friendly and threat forces, provide instant critical logistic asset status and location, and detect theater missile threats, including the location and tracking of any weapons of mass destruction.

Team 3 will also assess the suite of national and theater sensors that provides data and information, and the technological opportunities to provide necessary bandwidth for the force's data, voice, and video.

Team 4 will ensure that deployed forces have the capability to train to peak effectiveness within the theater of operations. This team will assess opportunities for providing embedded training devices for crew, team, and small-unit training, and the ability to deliver training to the theater using distance learning. The team will also assess the ability to provide "mission rehearsal" capabilities as required and the ability to permit staff and command training with sensitive intelligence products.

Conclusion

As in the FY98 and FY99 studies, this FY00 effort might also yield practical near-term insights and opportunities while other research and analysis efforts are underway throughout the Training and Doctrine Command, the Army Materiel Command, and other Army facilities. Army leaders are expected to receive guidelines for prioritizing our limited resources. Ultimately, all of these efforts will result in the most combat-effective, lethal, and cost-efficient rapid deployable joint ground force for the 2015-2025 period and beyond.

The Army Science Board is excited and pleased to participate in the Army leadership's look into the future. The ASB will continue its 46-year tradition of providing reasoned, sound, and independent technical advice to the Army for the year 2000 and beyond.

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Science And Technology . . .

ACCELERATING THE PACE OF TRANSFORMATION

Dr. A. Michael Andrews II and Dr. Thomas Killion

Introduction

Secretary of the Army Louis Caldera and Chief of Staff of the Army (CSA) GEN Eric K. Shinseki have jointly articulated a vision to transform the Army. The CSA's intent is to make heavy forces more strategically responsive and light forces more lethal and survivable. As stated in the vision, "We will provide to the Nation an array of deployable, agile, versatile, lethal, survivable, and sustainable formations, which are affordable and capable of reversing the conditions of human suffering and resolving conflicts decisively." The result is to be a force that is responsive and dominant at every point on the spectrum of operations.

Achieving this vision demands a focused science and technology (S&T) community response. Shinseki highlighted this in his testimony to the House Armed Services Committee on Oct. 21, 1999. As he stated, "... the Science and Technology community is *the key to the long-term transformation of The Army* into the 21st Century." (italics added) In addition, "... the Science and Technology folks need to tell us what is in the realm of possibilities to build a projection force for the long-term transformation of The Army."

The Army S&T community has organized to successfully enable the new Army vision. We have sharpened our program focus and tuned our investment strategy to accelerate the fielding of capabilities to implement the vision. The total community—our in-house laboratories and centers, other government agencies such as the Defense Advanced Research Projects Agency (DARPA) and the Department of Energy, and our innovative private sector partners—are all involved in a cooperative effort to deliver the best ideas and innovations to our soldiers.

S&T Response To The Army Vision

The highest priority S&T initiative enabling the new vision is the Future Combat System (FCS) Program. The FCS will be a fighting ensemble of capabilities that meets the weight constraints for C-130 transportability (i.e., 20-ton class). It will also consist of land combat platforms tailored to address the ground combat and mobility requirements highlighted by GEN Shinseki. The program goal is to create combat capabilities that can enter production in 2010 and be fielded in a brigade-sized unit as early as 2012.

A notional concept for the FCS "system of systems" is illustrated in Figure 1 on Page 14. At a minimum, the system must provide the Army with combat overmatch against foreseeable enemies on the battlefield. Lethality overmatch will be achieved through combinations of direct and indirect fire and nonlethal technologies. A new paradigm for system survivability will exploit active and passive protection technologies; a seamless Tactical Internet to provide reliable, comprehensive situational awareness; and unsurpassed battlefield speed and agility. The FCS will use common, modular components and potentially a common chassis for a multifunctional tactical force to deliver both line-of-sight and beyond-line-of-sight munitions, perform reconnaissance (including nuclear/biological/chemical reconnaissance), and transport infantry.

Unmanned vehicles will be employed to significantly enhance the effectiveness of manned systems. Unmanned aerial vehicles (UAVs) will enhance the ability of our forces to see before being seen. Unmanned ground vehicles (UGVs) will reduce the risk to soldiers for some missions, alleviate personnel requirements for selected support functions, and increase strategic and tactical mobility through weight and size reductions. To reduce risk, a balanced approach will be taken during UGV development. Both lower risk follower UGVs, such as resupply vehicles for support functions, and higher risk autonomous systems,

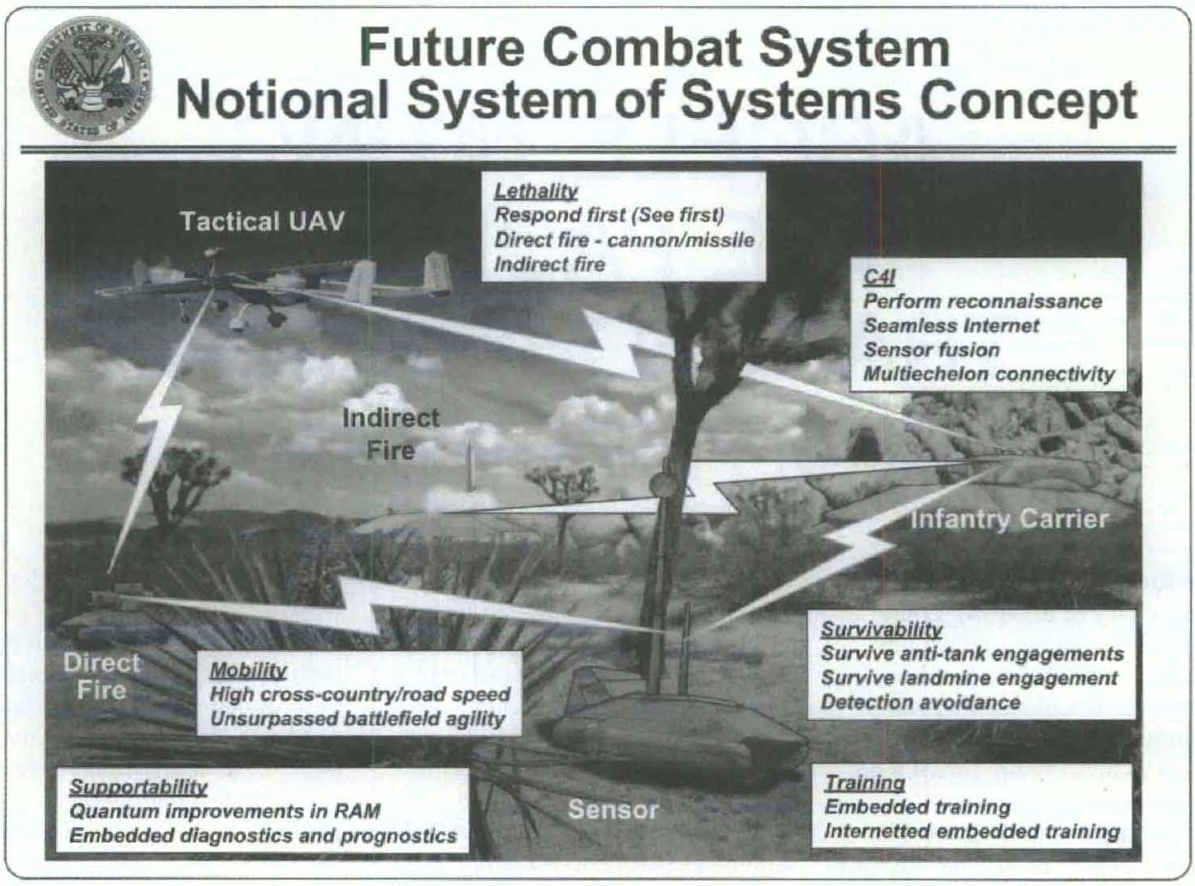

Figure 1.

Glossary

C4I—Command, Control, Communications, Computers, and Intelligence

RAM—Reliability, Availability, and Maintainability

ATD—Advanced Technology Demonstration

MOSAIC—Multifunctional On-The-Move Secure Adaptive Integrated Communications

RSTA—Reconnaissance, Surveillance, and Target Acquisition

such as robotic scouts for selected combat functions, will be evaluated.

FCS concept development is underway. Studies by DARPA and the Army have explored reasonable options available for meeting the stated program requirements. These studies have indicated that with the development of a network-centric, distributed combat capability, the Army can provide a more lethal, survivable, mobile, and supportable fighting force than is currently available with existing heavy or light forces. An individual platform within the FCS ensemble might not have the total armor protection of current heavy systems, but it will be possible to create an FCS system of systems that meets the survivability needs of the maneuver force.

A 1999 Army Science Board (ASB) study evaluated the concept of a 20-ton Future Combat Vehicle (FCV) (the previous nomenclature for the FCS platform construct). The study indicated that "an FCV force would provide a significant new capability to the early entry force … but, an FCV is not a tank in the classic sense, and an FCV-based force will not be able to fight like a traditional mechanized force. It [the FCV-based force] will have to rely on innovative operational concepts." The ASB characterized the FCV concept as *challenging but believable.*

The FCS concept development effort will exploit technologies from the ongoing Future Scout and Cavalry System (FSCS) Program. FSCS is a cooperative program between the United States and the United Kingdom. Many of the technologies demonstrated in the FSCS Program may be used to reduce risk

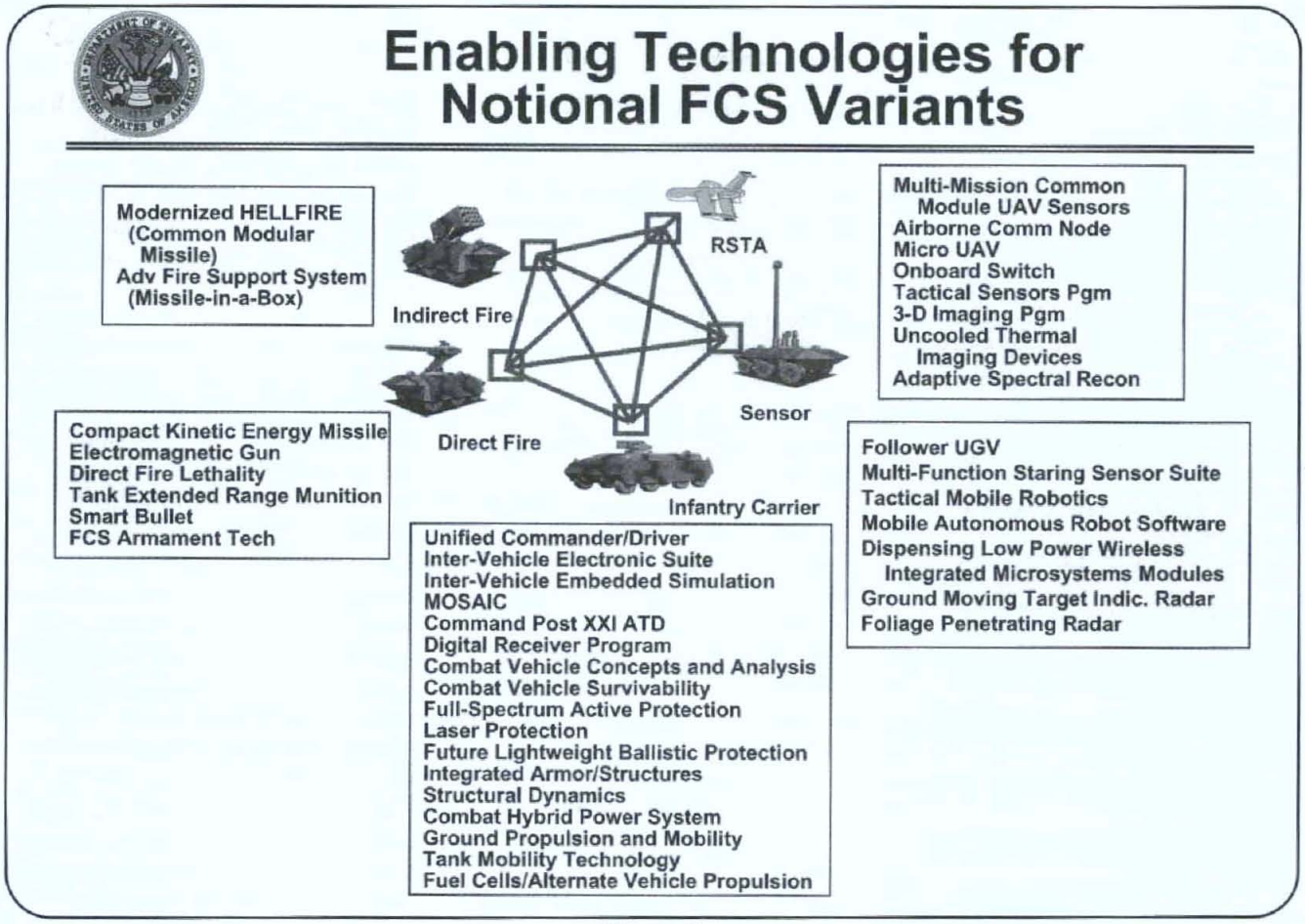

Figure 2.

and speed development of the FCS. The following three categories include examples of this technology:

- **Survivability**—signature management, defensive aids suite, lightweight composite protection, compartmented crew cockpit;
- **Lethality**—medium-caliber weapon, advanced fire control; and
- **Mobility**—electric/conventional drive, advanced suspension systems, steel/synthetic band track.

FCS concept and technology development will continue until FY03. The Army is in partnership with DARPA to mature the highest payoff innovations required by FCS. An Army Program Manager, LTC Marion Van Fosson, is assigned to DARPA to integrate DARPA's efforts on FCS. In addition to pursuing technology development, DARPA will provide incentives to industry for developing the best design concepts. The Army is sharing responsibility with DARPA for achieving the essential technology maturation relevant to FCS components, as illustrated in Figure 2. DARPA and the Army are pursuing four major thrusts that will address many of the technologies identified in the figure:

- Robotics,
- Mobile command and control (C2),
- Networked fires, and
- Organic, 3-D targeting.

FY03 is a critical year when decisions will be made regarding the readiness of the relevant component technologies to enter into a set of parallel technology demonstrations. These prototyping efforts will demonstrate the synergistic functionality of multiple FCS variants. They will focus on the integration challenges associated with combining these technologies into functional systems, thus demonstrating their operational potential and technical maturity in aggregate. The goal of these efforts is to achieve sufficient risk reduction and technological maturity to allow us to then transition directly into engineering and manufacturing development (EMD), obviating the need for a formal 6.4 program definition and risk-reduction phase.

In FY06, the FCS Program will accomplish a Milestone I/II review and formally enter into EMD. The FCS Program Manager will then accomplish all necessary acquisition milestones en route to a first unit

The Chief of Staff of the Army has thrown down the gauntlet, charging the S&T community with leading the transformation of the Army into the 21st century. We have accepted the challenge and are employing all the resources at our disposal to meet it.

equip (FUE) date in late FY12. To capture technologies that did not meet the relevant technology readiness criteria at the time of the FY03 decision point, the S&T community will continue their efforts in concert with the EMD Program to support potential Block 1 upgrades.

Beyond the FCS Program, the Army S&T community has additional initiatives to achieve the new vision. A missile modernization strategy has been initiated that addresses near-, mid-, and far-term requirements for ground, aviation, and deep-fire systems. In the area of tactical mobility, we are investigating the joint transport rotorcraft concept. We are also developing the next generation of technologies for the dismounted soldier to increase survivability and sustainability and enhance lethality.

Finally, we are aggressively continuing our efforts to use external, critical examinations of the S&T Program to refine our investment strategy. We are using independent review teams (IRTs) focused on specific technology applications to identify new opportunities, recommend appropriate levels of investment, and develop leveraging strategies. These IRTs and other external reviews aid us in strengthening and focusing our programs.

Conclusion

In summary, the Army S&T Program is boldly responding to the challenges of the new Army vision. We are focusing on those investments that support it, and moving out smartly on the Future Combat System Program—our highest priority S&T program. To have an agile and innovative program, we are seeking and responding to independent, external examinations of the program. The CSA has thrown down the gauntlet, charging the S&T community with leading the transformation of the Army into the 21st century. We have accepted the challenge and are employing all the resources at our disposal to meet it. We can and will provide the necessary technology to make the Army a full-spectrum force for the future.

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TRANSFORMING LOGISTICS TO SUPPORT THE ARMY CHIEF OF STAFF'S VISION

Eric A. Orsini and COL Glenn J. Harrold

As the Army prepares for the 2001 Quadrennial Defense Review (QDR), Congress has mandated that the forthcoming QDR address a broad range of issues to energize DOD to deal with the four basic shortcomings of recent Defense reviews. These shortcomings are the nature of theater wars and how the United States should fight them; the realistic state of force readiness; the relationship between theater wars and continuing contingencies; and providing sufficient funding to maintain the required forces. The U.S. Armed Forces' capability to fight two nearly simultaneous major theater wars (MTWs) is the basis of recent reviews.

Unfortunately, the gap between strategy and resources has become increasingly quantifiable and obvious. This has resulted in tunnel vision that limits the Army to focus solely on conventional-type warfare, thus ignoring the realities of more complex and unconventional operations such as those in the Balkans. Additionally, it has hindered the Army's consideration of the ramifications of the transformation in the conduct of war brought about by a revolution in military affairs.

The preparedness of Army units has declined from the high states of readiness that the Army enjoyed in 1991 prior to Operation Desert Storm. In addition, overseas deployments in support of current contingency operations seriously challenge the Army's ability to assemble the large formations required for an MTW. For example, during FY99, the Army averaged more than 27,000 soldiers deployed in more than 50 countries on any given day. A reality check occurred when more than 6 weeks were required to move more than 5,000 troops to Albania for Task Force Hawk. We now must move beyond a conventional, monolithic threat to an asymmetric, adaptive, and varied threat while posturing our forces to meet the demands of the 21st century battlefield.

Chief of Staff of the Army GEN Eric K. Shinseki laid out the Army vision that will ensure the Army's relevance in the new millennium. New Brigade Combat Teams will allow quicker response to crises than today's heavy forces.

The time to make changes is now, and the new Army vision provides us the opportunity to make these changes. Implementation of a single stock fund will change how the Army does business by significantly reducing suboptimization. We are fundamentally changing our business process by merging wholesale and retail elements into a single, nationally managed fund. This sets the stage for change. Key to our success is having the necessary enablers, communication systems, and technology that will allow us to seamlessly transform our combat support and combat services support for the Army of the future. Only then can we enhance strategic mobility, reduce the logistics footprint in the area of operations, and transform the institutional Army.

To address the deployment vision, we need to enhance deployment and mobility capabilities, reduce Army and theater logistic requirements, and establish an Armywide logistics provider.

To enhance deployment, the logistics community must identify and fix initial- and interim-force packages for deployment with Strategic Configured Loads (SCLs), Combat Configured Loads (CCLs), and Unit Basic Loads (UBLs) identified for time-phased force and deployment data. To accomplish this, we must develop the intermediate support base (ISB) doctrine and structure that can operate in the joint environment; and build airlift, sealift, and pre-positioned unit sets and stocks (configured for the full spectrum of contingency operations). We must improve deployment planning tool usage (e.g., Transportation Coordinator's Automated Information for Movements System II, Joint Forces Requirements Generator II, and Movement Tracking System). Finally, we must improve our CONUS and OCONUS power projection infrastructure and establish links with industrial transportation firms.

We now must move beyond a conventional, monolithic threat to an asymmetric, adaptive, and varied threat while posturing our forces to meet the demands of the 21st century battlefield.

We are fundamentally changing our business process by merging wholesale and retail elements into a single, nationally managed fund.

We can reduce Army and theater logistics requirements while enabling effective and sustained operations. However, there are many initiatives the warfighter, logistician, and industry must take. We need to update our planning factors and allocation rules and validate Army support to other Services requirements. Science and technology must give us increased probability of kill. This and the use of common calibers will significantly reduce our ammunition needs (see article by PEO, Ground Combat and Support Systems on Page 20). We will make Strategic and Combat Configured Loads the norm across units. Moving to a 20-ton combat vehicle, common chassis, and ultra-reliable systems allows us to reduce spares and fuel consumption and increase the mean-time-between failures. Logistics vehicles with onboard upload and download capabilities reduce the need for material handling equipment on the battlefield as well as reduce handling. Split-based and reachback capabilities give the logistician the ability to use information technology to perform support functions without having to actually deploy those units. Contractor leveraging and host-nation support will also allow us to maximize in-theater assets, reducing the demand on lift. These factors will allow us to build on the Joint Vision 2010 and the revolution in military logistics.

Some key factors that will allow us to reduce requirements and enhance deployment are as follows:

- Identify and prepare ISB candidates in each area of operations. (Commander-in-chief involvement is crucial to this.)
- Move Army materiel toward the theater upon initial threat increase.
- Don't perform in the area of operations what we can do at the ISB or through the use of split-based/reachback capabilities.
- Don't perform in the area of operations with the military what we can via contract/echelons above corps (EAC) at the ISB.
- Don't stock anything in the area of operations that we can deliver via battlefield distribution.

The Armywide logistics provider will foster a wide spectrum of enhancements, such as eliminating "stovepiped" EAC organizations and processes. Commanders will go to one organization for all combat service support. In addition to the provider's own inherent capabilities, the Armywide logistics provider will serve as an integrator and coordinator with other organizations, industry, and joint Services. This provider will initially focus efforts with a seamless logistics command and control for EAC and, perhaps in the future, for echelons above division to optimize purchase, repair, stocking, and distribution decisions.

The Armywide logistics provider will also allow the workload to be sized according to National Maintenance Management Program requirements. Contracting management will be integrated and optimized throughout the Army and focus on reducing life-cycle costs. We will continue to use innovative, proven commercial practices such as prime vendor support, the single stock fund, and the National Maintenance Management Program. We can exploit technology and ensure our equipment is modernized by reducing acquisition time and life-cycle costs, by recapitalizing legacy systems, and by maximizing the use of off-the-shelf items for near-term needs.

Conclusion

The redesign of the institutional Army is being conducted through functional area assessments and focuses on more effective tactical force support. Major objectives are privatizing noncore functions and consolidating and re-engineering logistics functions under an Armywide logistics provider.

We can meet the Army vision, but we must be aware of the following facts:

- We don't have all the answers and specifics yet.
- We are clearly moving out on the redesign path.
- We need the entire Army's help to achieve the Army vision.

A task force was established to map the Army's combat service and combat service support transformation and is composed of MG Charles S. Mahan Jr., Chief of Staff, Army Materiel Command; MG Charles C. Cannon Jr., Acting Army Deputy Chief of Staff for Logistics; MG Joseph M. Cosumano Jr., Assistant Army Deputy Chief of Staff for Operations, Plans and Force Development; MG Robert J. St. Onge, Director, Strategy, Plans and Policy, Office of the Army Deputy Chief of Staff for Operations and Plans (ODCSOPS); and BG Raymond T. Odierno, Director, Force Programs, ODCSOPS.

Questions or concerns regarding the Army's combat support and combat service support transformation should be directed to the Office of the Deputy Assistant Secretary of the Army for Logistics at (703) 695-6869 or to **glenn.harrold@sarda.army.mil**.

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INTRODUCTION TO COMBAT VEHICLES, FIRE SUPPORT, AND AMMUNITION

The Program Executive Officer for Ground Combat and Support Systems (PEO, GCSS) and the Commanding General of the Tank-automotive and Armaments Command (CG, TACOM) have the mission of transforming the Army's combat vehicles, fire support platforms, and associated ammunition. Their coordinated effort to achieve this mission specifically gives the PEO, GCSS responsibility for making the existing and future fleet of vehicles and stocks of ammunition more strategically deployable with greater lethality. Simultaneously, the CG, TACOM is responsible for acquiring and developing materiel for the initial and intermediate Brigade Combat Teams. The two articles that follow (the first begins on Page 20, the second begins on Page 22) describe this delineation of effort and the processes to achieve the objective force defined by the Secretary of the Army and the Army Chief of Staff.

PEO, GCSS: RESPONSIVENESS IN ACQUISITION

MG John F. Michitsch

Introduction

As Chief of Staff of the Army (CSA), GEN Eric K. Shinseki set into motion an unprecedented transformation of the Army. Stated transformation goals demand that the Army apply several key principles to combat vehicles: reduce the logistical footprint to increase force mobility, increase lethality through precision munitions, and enhance survivability through passive and active measures.

The Program Executive Office for Ground Combat and Support Systems (PEO, GCSS) is meeting the CSA's intent by applying these principles to both fielded and future systems. Our overarching goal, in partnership with industry, is to design, procure, and support the best equipment for our soldiers—within affordable costs. Our parallel strategies to achieve this goal and respond to the CSA's vision are to update the systems in our motor pools and modify development programs to make systems more deployable.

Modernizing Legacy Ground Combat Systems

Heavy forces will remain our Nation's primary land combat power instrument in any major theater of war (MTW). However, as the CSA has stated, "It takes significant effort and cost to sustain them." PEO, GCSS manages the Army's principal maneuver systems, many of which will remain in the inventory past 2015. Our premier ground combat systems are aging. Thus, equipping our soldiers with the best weapons the Army can afford means that we must sustain capabilities while reducing ownership costs. PEO, GCSS is taking a three-pronged approach to hone the Army's world-class capabilities and attack cost through horizontal technology integration (HTI), recapitalizing weapon systems, and pursuing the increased lethality of precision munitions.

Horizontal Technology Integration

HTI, the first approach to cut costs, affords opportunities to reduce logistics burdens and insert updated capabilities into today's systems. A key HTI example is the initiative to develop a common engine for both the Abrams and Crusader. This initiative calls for use of common components, fuel efficiencies, and advanced materials to reduce system costs. Objectives include a fourfold increase in the mean time between replacement, a 15-percent to 20-percent mobility improvement, and a 30-percent to 35-percent fuel consumption reduction for Abrams; plus a 3-ton Crusader weight reduction.

PEO, GCSS is pioneering a common electronic architecture to ensure the most efficient integration of future, shared technologies across the spectrum of ground combat systems. This architecture will be defined by common interfaces and standards. Improvements to one weapon system will be easily transported to other systems while significantly reducing overall software maintenance costs for minimal added development.

Recapitalization

Recapitalization, the second cost-cutting approach, updates older systems to eliminate component obsolescence, reduce costs, and/or improve performance to maintain system overmatch. Two systems managed by PEO, GCSS, the Abrams and Bradley, are both actively being recapitalized.

Although the Army has ceased building new tanks, the Abrams tank fleet is still being modernized with a number of coordinated initiatives. These initiatives include continuous technology refreshment for older M1A1s; Abrams integrated management, which rebuilds the oldest M1 tanks to create M1A1D (digital) tanks; and the M1A2 system enhancement package. The aggregate effect of these initiatives is to incorporate the latest technologies, such as built-in diagnostics, situational awareness, and commonality, with the Army's digitization network.

The centerpiece of Abrams recapitalization is the Engine Re-Power Program, a two-phased strategy to reduce the operations and sustainment costs of the tank by replacing the AGT 1500 turbine engine. This program will replace a dated engine, responsible for 64 percent of the total ownership cost, by leveraging Comanche helicopter turbine engine technology. Phase I will challenge the equipment manufacturer to re-engineer the engine overhaul process and improve field support. This will sustain the fleet until the Phase II common engine described earlier replaces the AGT 1500 engine.

Bradley recapitalization seeks to significantly reduce logistical demands by exploiting investments made in fielded systems and pursuing a common, medium chassis for several Army system requirements. Like Abrams, Bradley recapitalization will result in the newest, most capable systems using older vehicles. For example, older vehicles remanufactured to the Bradley A3 configuration include upgrades such as second generation forward looking infrared, enhanced diagnostics, and an advanced digital architecture.

The Bradley Family of Vehicles meets numerous Army requirements with a common chassis. In addition to the Infantry and Cavalry Fighting Vehicles, other variants include the Bradley Fire Support Team and the Multiple Launch Rocket System carrier, the Bradley Linebacker air defense system, and the Command and Control Vehicle. The Bradley Engineer Squad Vehicle, proposed as the replacement for M113s, is a prime example of maximizing commonality and reducing the logistical footprint, thus simplifying task force support.

Precision Munitions

The third cost-cutting approach is reducing ammunition requirements. The precise, efficient application of lethal effects with sophisticated munitions achieves the same result as firing many conventional rounds at a fraction of the bulk. The Project Manager for Tank and Medium-Caliber Armament Systems (PM, TMAS) (for direct fire weapons) and the Project Manager for Artillery Munitions Systems (PM, ARMS) (for field artillery weapons) are developing and applying the most advanced munitions technologies available. These technologies have direct application to objective-force requirements.

PM, TMAS will conduct the post-Milestone I development of the line-of-sight/non-line-of-sight Tank Extended Range Munition for use with our most modern Abrams variants and potential application to future platforms. This fire-and-forget munition increases the task force commander's area of influence sevenfold and is scalable to smaller cannons such as 105mm, a possible candidate caliber for the interim-force assault gun.

PM, ARMS is working diligently to produce artillery munitions that kill faster with fewer volleys for future full-spectrum operations. The 155mm M898 Sense and Destroy Armor (SADARM) and Product Improved SADARM (SADARM/PI) are the artillery's first fire-and-forget smart munitions capable of defeating all current and projected future threats. During the most recent tests, SADARM fired 30 rounds and produced 35 hits on armor targets. It would take approximately six to eight Dual Purpose Improved Conventional Munition (DPICM) projectiles to have the same results as a single SADARM round. SADARM is in low-rate initial production and available now.

The XM982 Excalibur provides the artillery with a fire-and-forget munition family capable of killing targets at extended ranges out to 37-plus km for current systems and 47-plus km for Crusader. A modular design allows the use of a variety of sophisticated warheads, including DPICM, SADARM/PI, and Unitary "bunker-buster" warheads, to afford the commander a full suite of capabilities. Excalibur is scheduled for production in FY06.

Adjusting Developmental Programs

PEO, GCSS stands ready to support the Army's transformation by adjusting existing programs, assuming responsibility for the Future Scout and Cavalry System scheduled for fielding in FY01, and accepting follow-on program management responsibilities as directed. In addition to systems focused on MTW operation, the Family of Interim Armored Vehicles (FIAV) and the Joint Lightweight 155mm Howitzer (JLW-155) are PEO, GCSS-managed systems already complementary to the CSA's vision for the mobile Brigade Combat Team. Actions are also underway to change the Crusader's design to conform to present deployment requirements.

FIAV And JLW-155 – On Target For Objective Force

The FIAV has become a model for the common chassis concept, leveraging commercial practices to replace the Army's aging medium truck fleet with a true 21st-century truck. FIAV maximizes the use of commercial components and manufacturing practices for a chassis that supports 14 variants, including the chassis for the High Mobility Artillery Rocket System. FIAV exceeds 80-percent parts commonality across the fleet while consistently exceeding a 96-percent readiness rate. All FIAV models are height reducible for air transport by C-130, and three models are airdrop capable.

The XM777 is the joint U.S. Marine Corps (USMC)/Army 155mm towed lightweight artillery system that will meet or exceed all capabilities of the current M198 155mm Howitzer with weight reduced from 16,000 to 9,000 pounds. This system is highly deployable—transportable by the CH-47D, CH-53D/E, and C-130, as well as by the USMC's new MV-22. The XM777 will transform Army-towed fire support by incorporating the Towed Artillery Digitization System with inertial navigation, Global Positioning System backup, situational awareness, and an advanced direct fire sight.

Crusader

To comply with the new Army vision, the current Crusader design must be adjusted to improve deployability. This is being achieved through comprehensive design modifications to incorporate a new engine, lighter materials, add-on armor, and doctrinal changes. However, there will be no compromise to the key performance parameters.

PM, Crusader will leverage a substantial program investment in modeling and simulation to efficiently change the current design to achieve a weight goal of 38 to 42 tons for the self-propelled howitzer (SPH). This application of Simulation and Modeling for Acquisition, Requirements and Training allows the agile redesign of the Crusader prior to fabricating the first prototype. The bottom line is that redesign will double Crusader's deployability with the C-5B capable of transporting two SPH vehicles.

Crusader not only answers a critical fire support requirement, it hosts the most advanced ground combat vehicle technologies in the world. A sample of technologies being proven on Crusader includes an advanced crew cockpit, real-time electronics, advanced automation and digitization, composite structures, weapon system automation, a cooled cannon with unprecedented rates of fire, advanced integrated electronics/software, and detection and hit avoidance. These and other technologies are keystones to advance the state-of-the-art for application to current systems and ensure technology availability for future combat systems of all classes and functions.

Summary

The PEO, GCSS family of programs consistently demonstrates excellence through aggressive application of innovation and acquisition reforms; a resident world-class, technical workforce; and the imaginative exercise of the full line authority of the Army Acquisition Executive. PEO, GCSS is maintaining our Army's supremacy in ground combat systems and is poised for the Army's 21st century transformation.

MG JOHN F. MICHITSCH is Program Executive Officer for Ground Combat and Support Systems. He holds an M.S. in foreign language and literature from Case Western Reserve University and a B.A. in foreign language and literature from the University of Dayton. In addition, he attended the Army Command and General Staff College and the Industrial College of the Armed Forces.

EQUIPPING THE BRIGADE COMBAT TEAM

MG John S. Caldwell Jr. and
COL Donald F. Schenk

Introduction

Responsibility for acquiring the materiel needed to outfit the Brigade Combat Team was assigned to the U.S. Army Materiel Command (AMC) in late October 1999, just weeks after the Army leadership announced its vision for the future. AMC tasked the U.S. Army Tank-automotive and Armaments Command (TACOM) to lead an all-inclusive materiel development effort involving all AMC major subordinate commands; each of the supporting research, development and engineering centers; the Army Research Laboratory; and the full host of project and product managers in AMC and within the program executive officer community to participate in this crucial effort.

Transforming The Force

TACOM immediately began work with the U.S. Army Training and Doctrine Command (TRADOC) in several significant areas. First, it joined TRADOC's Integrated Concept Team as a full partner in planning the effort to transform the Army. Second, it began development of a program and acquisition strategy that would be used to develop, produce, field, and support the equipment needed to outfit the initial brigades at Fort Lewis, WA, and the follow-on interim brigades at other locations. Third, TACOM worked closely with the Mounted Maneuver Battlespace Battle Lab at Fort Knox, KY, to develop the technical inspection, safety certification, and technology insertion needs to make the Platform Performance Demonstration the most valuable market survey possible. (See discussion on the demonstration below.) Finally, TACOM supported several aspects of the nation-to-nation loan of vehicles to the United States by ensuring appropriate logistics support to include spare parts, maintenance, and operator training. An important part of this was the detailed engineering work needed to ensure critical government-furnished equipment—especially communications items—could be installed and operated in platforms of foreign origin.

Initial Brigades

To form the initial brigades at Fort Lewis, TACOM established a Materiel Developer Cell in January 2000 as an adjunct to the staff of the TRADOC Deputy Commanding General-Transformation. This cell, under the leadership of the Assistant Program Manager, Brigade Combat Team, orchestrates contract actions needed to support borrowed equipment. In addition, the cell oversees redistribution of materiel and displacement of equipment that does not fit the Operational and Organizational Plan (O&O Plan), and coordinates and executes actions to put relevant command and control and other hardware and software into systems for the initial brigades. Concurrently, TACOM has established a Logistics Center of Excellence at Fort Lewis as part of its effort to re-engineer the institutional Army.

Equipping the initial brigades at Fort Lewis has been a joint effort of TRADOC, the U.S. Army Forces Command, and AMC. To achieve the desired endstate—combat-capable brigades organized in accordance with the O&O Plan—requires major items from multiple sources. Some equipment simply did not fit the O&O Plan or the Table of Organization and Equipment based on the O&O Plan; therefore, it was declared excess to the brigade. Some equipment was redistributed at Fort Lewis, while still other pieces of equipment (some new, some displaced) were directed by the Army to fill necessary shortages as a result of ongoing reorganization. Finally, a limited number of surrogate items—for use in O&O Plan refinement and development of tactics and doctrine—were obtained through nation-to-nation agreements. Supporting each of these components of the initial brigades is a core mission of the Office of the Deputy for Systems Acquisition and Life Cycle Management at TACOM.

Interim Brigades

Concurrent with organizing the initial brigades, TACOM put acquisition of the interim brigades on a fast track. Requirements generation by TRADOC concluded after 4 months with approval of a Mission Needs Statement and Operational Requirements Document (ORD) for the Interim Armored Vehicle (IAV).

Critical to the refinement and approval of the ORD were activities conducted during the Platform Performance Demonstration in December 1999 and January 2000 at Fort Knox. The Platform Performance Demonstration was an innovative hands-on market survey to determine the state of the possible in materiel systems envisioned for the interim brigades.

Concurrently, and most important, the demonstration allowed finalization of the IAV ORD. This innovative market survey was used to make the Army an informed requirements writer and buyer with full understanding of what is achievable in the near- to midterm. The various systems brought to Fort Knox for assessment allowed those responsible for ORD development to incorporate realistic expectations into the IAV ORD so that the product oper-

ates at the threshold level of performance, while allowing for growth to the objective level of performance.

By design, nothing about the Platform Performance Demonstration was associated with an ongoing acquisition because the actual acquisition did not begin until ORD approval. The Platform Performance Demonstration facilitated ORD development in a unique and innovative manner.

The program approach detailed in the solicitation for the interim brigades was developed almost in parallel with the ORD. As finalized, it focused on providing the appropriate capability called for in the O&O Plan and IAV ORD, which envisioned at least 12 IAV variants to equip the interim brigades.

As a result of formal and informal market surveys, it became clear that some materiel solutions to the ORD were almost immediately available, while others required formal development to ensure suitability, supportability, and effectiveness. In no case was a "kluge-of-systems" solution to the requirement embraced for expediency or as an excuse to quickly field hardware. Any approach short of deliberate source selection, with definitive and prioritized criteria focused on total life-cycle cost, would result in unacceptable support burdens.

Source Selection Criteria

In the next several months, the source selection for the interim brigades' IAVs will begin. The solicitation approach is consistent with traditional procedures in that offerors are expected to propose a materiel solution and logistics concept. What is unique is the requirement to submit a sample of materiel with the proposal so that vehicles themselves can be assessed for operational capability, ease of maintenance, and ease of integration with existing and future technologies. Submission of a bid sample is a requirement of the formal evaluation of each proposal as part of the source selection.

Additionally, every effort during source selection will ensure materiel solutions provide the correct balance of current capability, logistics deployment, and support requirements, and the capability to integrate new technology. The critical balance of these considerations will guide all efforts to select the source (or sources) of vehicles for the interim brigades.

The source selection(s) will be based on the following minimum criteria: ability to achieve schedule with a family (or families) of vehicles that fulfill the key performance parameters of the ORD, ability to incorporate a variety of technologies under separate development throughout the Army, and significant reduction in cost of ownership and logistics burden to the employing warfighter. These latter concepts may be the more significant discriminators in the actual source selection because they represent not only evolutionary growth in warfighting capability, but also deliberate reduction in support requirements for the Army. These are necessary attributes of the objective force envisioned in 2010 and beyond and the clear end-state envisioned by the Army vision.

Conclusion

In doing its part to transform the Army, TACOM encouraged early and continuous dialog with all who would like to participate in this exciting effort. For example, beginning in October 1999, TACOM deliberately sought to educate industry on this critical program when it hosted a briefing on the O&O Plan given by the Commanding General of the U.S. Army Armor Center and School. Subsequently, high-level discussions were conducted with key industry officials at the November 1999 meeting of the Industrial Committee of Tank and Automotive Producers. In December 1999, a full day was devoted to informing and sharing concepts at a focused Industry Day chaired by the AMC Commanding General. On Dec. 30, 1999, TACOM posted the draft Request For Proposal to its Web site for all interested parties to review and offer comment. Every effort was pursued to educate, inform, and engage in deliberate discourse with offerors from the United States and abroad to meet requirements envisioned by this new warfighting concept for the Brigade Combat Team.

MG JOHN S. CALDWELL JR. is TACOM Commanding General. He is a graduate of the U.S. Military Academy and the Georgia Institute of Technology. Former key acquisition assignments include Deputy Chief of Staff (Research, Development and Acquisition) at AMC; Director, Army Digitization Office; Assistant Deputy for Systems Management, Office of the Assistant Secretary of the Army for Research, Development and Acquisition; and Project Manager, Abrams Tank System. He is also a graduate of the Industrial College of the Armed Forces and has completed the Program Manager's Course at the Defense Systems Management College.

COL DONALD F. SCHENK is Program Manager, Brigade Combat Team at TACOM. He is a graduate of Western Maryland College and Central Michigan University. Schenk has led program management offices at TACOM continuously since 1992 as Product Manager, M1A2; Director, Weapons Systems Management; and Project Manager, Combat Mobility Systems before assuming his current duties in January 2000. He is also a graduate of the Army War College and has completed the Program Manager's Course at the Defense Systems Management College.

INTRODUCTION TO AVIATION

Dr. Kenneth J. Oscar, Deputy Assistant Secretary of the Army for Procurement, overheard a discussion in the halls of the Pentagon. That discussion focused on the Army's need for a combat system with the all-terrain mobility of a tracked vehicle, weight and deployability of a wheeled vehicle, and lethality greater than an Abrams tank. Oscar interjected, "The Army already has that capability. It is called Army aviation." His response is indicative of the limitless potential that Army aviation brings to the objective force. Army aviation initiatives to achieve full-spectrum dominance are described in the following articles by the Program Executive Officer for Aviation (beginning on Page 25) and the Deputy for Systems Acquisition for the U.S. Army Aviation and Missile Command, which begins on Page 28.

ARMY AVIATION:

MAKING TRANSFORMATION A REALITY

LTC John Burke and
MG James R. Snider

Introduction

Army aviation is a core functional area in combat and combat support battlefield operations. Aviation resources are available to the battlefield commander at all echelons to execute the complete range of Army missions and achieve full-spectrum dominance. If the electronic link among forces is command, control, communications, computers, and intelligence (C4I), then the maneuver link is Army aviation. The close and direct relationship between Army aviation and the ground combat soldier is well documented in numerous accounts of decisive battles where infantry and aviation were used for mutual support and maneuvering. Combining ground and air capability produces a formidable force with greatly magnified effects.

Joint Vision 2010 And The Army Chief Of Staff's Vision

Joint Vision 2010 (JV 2010) postulates that the Nation must be ready to fight and win across a wide range of warfare situations involving terrorism, weapons of mass destruction, military operations other than war, transnational threats, information security, and major theater warfare. JV 2010 focuses on integrating joint capabilities, closing seams between Service competencies, and developing and fielding breakthrough warfighting capabilities. Furthermore, the foundation of JV 2010 rests on quality forces consisting of our people, first-rate equipment, training and readiness, and leader development.

Execution of this vision requires an array of versatile, agile, lethal, survivable, and sustainable forces. We must obtain strategic responsiveness when and where needed through force projection from CONUS or any other location. Deploying a warfighting division in 5 days will require equipped combat and service support units to overcome unimproved roads, hostile terrain, and difficult geography.

The ability to move forces from stability to support operations and, if needed, into hostilities and back, is the essence of an aviation unit. Cross-coordination from higher to lower, left to right, compels the Army to rely on future digitization that can surpass the traditional line-of-sight radio and communicate in three dimensions over the horizon. Making light forces more potent while increasing the agility and nimbleness of heavy forces is achievable by combining Scout and reconnaissance aircraft with the "big stick" of attack and transport helicopters.

As Army aviation moves from "mass as a center of gravity" to "maneuver and deploy," its existing platforms already support low-observable systems, ballistic protection, long-range acquisition and targeting, early attack, and higher first-round kills. We have shifted to an acquisition process in which a system, from research and development to production and life-cycle management, is fielded as a total system, including human factors and training. We are moving heavily, and for some components even exclusively, toward use of commercial items and away from "build to print." The interaction of the Army aviation community with commercial aircraft practices, communications and computers, materials, and flight dynamics ensures the infusion of new technologies into our systems. We ensure our technological overmatch through the remanufacture and upgrade of our platforms, such as the Apache to Apache Longbow and the CH-47D Chinook to a CH-47F improved Cargo Helicopter. New systems such as the Comanche and the Joint Transport Rotorcraft will add next generation technologies into the standard Army force.

Full-Spectrum Dominance

The aviation assets that support full-spectrum dominance through the year 2010 are currently found in the UH-60 for utility missions and in the Apache Longbow for total warfare (see the article by BG(P) Armbruster and LTC Hazelwood that begins on Page 28). Without prudent upgrades such as the service life extension of the CH-47D to the CH-47F and a similar upgrade of the Army's workhorse aircraft, the Black Hawk, our already strained system readiness will become increasingly stressed. All systems undergoing a true upgrade will include requisite digitization for performance and interoperability through software and communication systems modifications. Aviation plays a unique role in combating weapons of mass destruction, where advanced sensors like the Longbow Fire Control Radar and the Radio Frequency

With full life-cycle support responsibility, the PMs aggressively conduct research and development efforts as well as seek operations and support improvements as the systems are designed, developed, procured, and fielded.

HELLFIRE Missile work effectively against deep threats while air defense radar deter less capable weapon systems. More broadly, transport aircraft such as the Black Hawk and Chinook allow the combat commander to insert and sustain precision formations that shape and influence the operation.

Enabling Capabilities

The Vietnam War, peacekeeping operations, Desert Storm, and the current operation in Kosovo all underscore the need to deploy a warfighting division on the ground in 5 days. Enabling capabilities include the early entry of Apache Longbows, Comanche Attack/Recon, Black Hawks, CH-47 Chinooks, and C4I systems such as the Army Airborne Command and Control System (A2C2S).

A forward command post with highly lethal assets provides a versatile anticipatory base for the remainder of the force. These systems, used in conjunction with an unmanned sensor such as the Tactical Unmanned Aerial Vehicle, provide sustained long-range reconnaissance or deep-attack capability out to 200 kilometers for up to 4 hours. Additionally, the force package can tailor quantities and location of transport, attack, and recon aircraft to suit the mission need.

Reducing Deployment Times

The division commander must possess an inherent flexibility to reduce deployment and redeployment times. The CH-47F "fat boy" is a cargo helicopter modified to deliver thousands of gallons of fuel in forward refueling points in support of ground or air forces. Primary weapon systems like the Apache Longbow and Comanche are clearly the weapon systems of choice in the attack or Scout role. However, the improved Black Hawk (with digitization capabilities) and the improved cargo helicopter offer genuine versatility. With these types of aviation assets, the force can train for all missions across the spectrum of operations.

Improving Survivability

The interactivity of the program executive officer (PEO)-managed weapon systems with the Unmanned Aerial Vehicle and the Black Hawk creates a more survivable force for the aviation commander and the tactical ground forces. Using the Global Positioning System (GPS), non-line-of-sight radios, future joint tactical data radios, Embedded Battle Command, and the Aviation Mission Planning System, each aviation platform will operate with relative autonomy, yet be digitally connected to other equipment and formations. The Longbow HELLFIRE missile, with its fire-and-forget capability, is employed on the Apache Longbow and Comanche. The Longbow millimeter wave radar coupled with a digital aircraft and the Longbow HELLFIRE missile is the world's most lethal combat system. PEO, Aviation is working with the Army Training and Doctrine Command (TRADOC) to improve the targeting system and extend the range of the missile, thereby reducing the net weight while improving performance, in some cases by 50 percent.

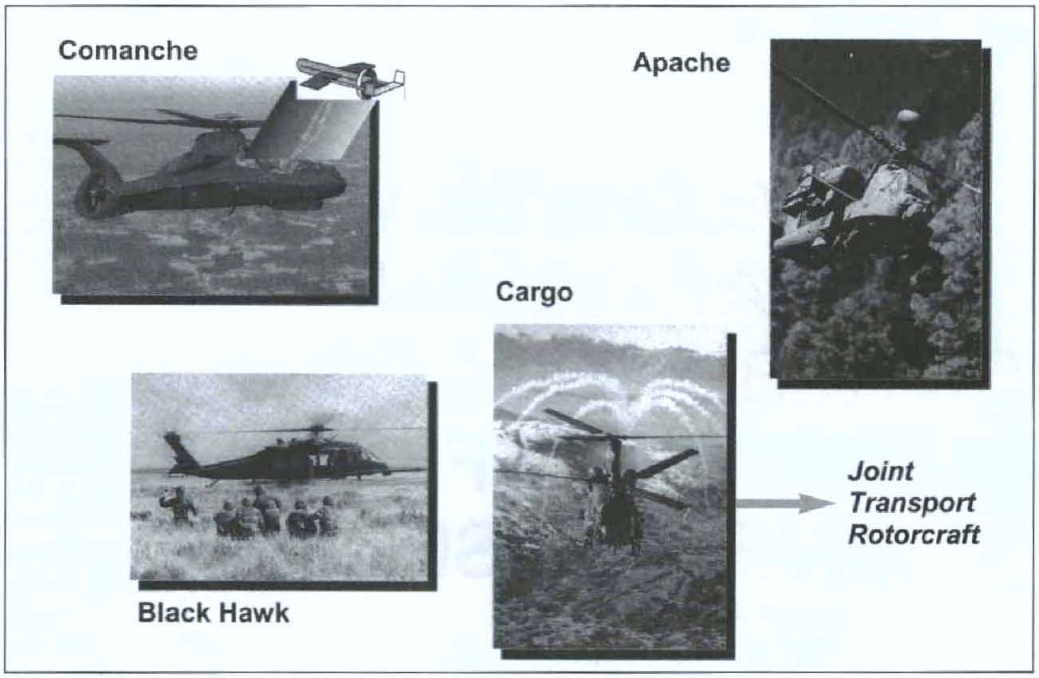
Enhancing Support Efforts

A core staff of logisticians, engineers, and business and program managers is vital to each of the project managers within PEO, Aviation. These staff elements work in interlocking product teams with Army agencies such as the U.S. Army Materiel Command, TRADOC, U.S. Army Forces Command, the Eighth U.S. Army, and U.S. Army Europe. They also interact with other Services, U.S. government agencies, and international customers.

With full life-cycle support responsibility, the PMs aggressively conduct research and development efforts as well as seek operations and support improvements as the systems are designed, developed, procured, and fielded. The use of Alpha contracting for the key multiyear Apache and Fire Control Radar procurements enabled the Army to realize stable long-term production and support, including seamless support to the fielded units through performance-based contracting and warranties. PEO, Aviation has and will make a sizable investment in operator and maintenance trainers to provide initial entry training and sustainment training around the world. We use the knowledge gained in Apache training systems to reduce the procurement cost of trainers in the CH-47F and the Comanche.

Enabling Technologies

As a low-observable, low-acoustical, rotary-wing aircraft, Comanche provides technological overmatch through active and passive measures. These include radar cross-section reduction, infrared signature reduction, sensor fusion, night target acquisition range, advanced engines, Link 16 communications, advanced materials, and onboard diagnostics. In our Aviation Electronic Combat Project Office,



Army Aviation Assets

emerging and future systems such as the Embedded Battle Command, improved GPS, Joint Tactical Radio System, and the non-line-of-sight radio are selected for all platforms.

As the Apache Longbow enters its second multiyear procurement, we expect to incorporate the following features: fire control radar combat and technology overmatch, second generation forward looking infrared optics, improved rotor and drivetrain systems for cost and performance enhancements, color digital mapping, fully adaptive algorithms, and wavelet technology.

Aircrew integrated systems will provide beneficial assets such as the Digital Source Collector (DSC) on the improved Black Hawk and CH-47F. The DSC will gather and analyze data on history and trends to enhance maintenance operations, aircrew training, human performance, aircraft system/subsystem monitoring, and aircraft accident prevention and investigation. The Air Warrior provides microclimatic cooling to allow operators to sustain 100-degree heat with 50-degree humidity as well as reduce the 57 pounds of crew equipment weight.

Aviation Platform Force Mix

The TRADOC-approved Aviation Modernization Plan shows a force mix of four principal platforms: Utility (Black Hawk), Transport (CH-47F), Scout/Reconnaissance (Comanche), and Attack (Apache Longbow). These four primary platforms fulfill the vision of the Chief of Staff of the Army (CSA) and allow for systematic technology improvements for many years. Air Warrior applies communications interoperability through GPS, Joint Tactical Data Radio, Link 16, Embedded Battle Command, and A2C2S. Maintenance and operator trainers provide technology and interoperability. With the development of the Joint Transport Rotorcraft, we will add a common transport aircraft for the Army, Navy, and Marine Corps and further enhance the relevance and effectiveness of Army aviation.

Conclusion

The Army aviation community brings 50 years of rotary-wing contributions to Army operations. We've made a huge financial and operational investment in current platforms and sensor and communication systems and will upgrade core platforms such as the Black Hawk and CH-47. Emerging and future systems such as the Comanche, Joint Transport Rotorcraft, and the Advanced Threat Infrared Countermeasures/Common Missile Warning System should ensure a balance of versatility, responsiveness, full-spectrum dominance, and sustainment for the Army. Aviation is essential to the realization of the CSA's vision. PEO, Aviation and its products fully support the CSA's stated and implied missions now and in the future.

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AMCOM DSA'S INITIATIVES AND CONTRIBUTIONS TO THE ARMY CHIEF OF STAFF'S VISION

BG(P) Robert E. Armbruster and
LTC Donald A. Hazelwood

Introduction

Chief of Staff of the Army (CSA) GEN Erik K. Shinseki has set forth a vision for the future that requires systems to be responsive, deployable, lethal, survivable, and sustainable. His vision requires strategically deployable, light, and lethal forces with a reduced logistics footprint. The materiel developer's challenge in achieving this vision is being addressed by the U.S. Army Aviation and Missile Command's (AMCOM's) Deputy for Systems Acquisition (DSA). The Office of the DSA is transforming today's systems into those that will be relevant to fulfilling the CSA's vision.

DSA Contributions

The Office of the DSA is one of the Army's key materiel solution providers. Within AMCOM, the Office of the DSA works with industry and other partners to develop, acquire, field, and sustain aviation equipment and missiles; test, measurement, and diagnostic equipment; and unmanned ground vehicle (UGV) systems. Four distinct product lines within the DSA's mission area illustrate the DSA's initiatives and contributions to meet the CSA's vision. Two of the products are aviation-related, one is a missile system, and the last is a UGV system.

Black Hawk

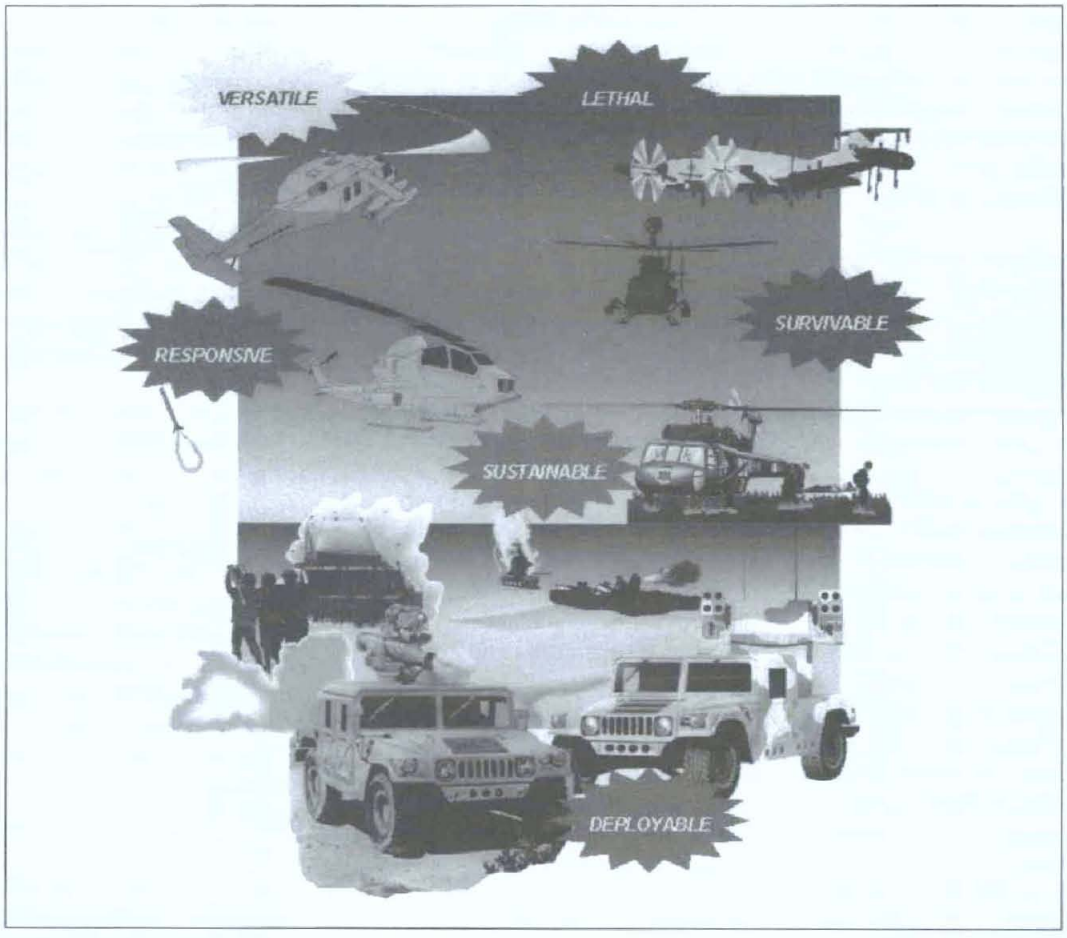
The Army UH-60 Black Hawk mission is to project and sustain the force by providing air assault, air movement, general support, command and control, and medical evacuation capabilities. Fielded in 1978, the UH-60 was designed to meet Cold War requirements but is being adapted today to meet the Army's projected operational needs. The UH-60 fleet executes 42 percent of the Army's rotary-wing flying hours and is the primary utility helicopter for U.S. forces. Because the projection and sustainment of the transformed force remains a requirement for the foreseeable future, utility helicopters will continue to be a necessity for responsive, deployable, and versatile forces.

To fulfill the CSA's vision, the UH-60 fleet will be digitized and modernized to provide increased lift, range, and survivability; reduce operations and sustainment (O&S) costs; and improve reliability and maintainability. To stay within budgetary constraints, a tiered, evolutionary modernization approach has been adopted that will result in a UH-60L+ initially derived from recapitalized, modernized UH-60As in concert with mission equipment packages (MEPs) and kits. This L+ will provide the baseline utility helicopter configuration. For example, future medical evacuation aircraft will use the common UH-60L+ platform with a dedicated medical MEP. The L+ will meet all of the emerging UH-60X Operational Requirements Document needs except for increased lift and extended range, which will require a new common engine.

The common engine, now a science and technology objective, will ultimately be dropped into the L+ to create UH-60X, (hence the tiered approach strategy), achieving a significant reduction in fuel consumption and a marked increase in power-to-weight ratio over current production engines. The improved L+ and X versions of the existing UH-60 Black Hawk utility helicopter will be more responsive, agile, versatile, survivable, and sustainable without forfeiting current deployability characteristics. This system will be capable of meeting operational requirements beginning in 2005 and extending beyond 2025, and will establish commonality and horizontal technology integration opportunities within the Army and with the other Services.

Standardizing aircraft configurations will reduce O&S costs, improve readiness rates, and reduce the logistics footprint. Another asset, the utility helicopters-managed Knowledge Asset Management Network (KAMNET), a 1999 Integrated Logistics Support Achievement of the Year Award winner, now provides a centralized data source for safety information, upcoming modifications, technical and readiness information on the Black Hawk, and is a first step toward logistics automation.

Black Hawk's contributions to the CSA's vision come not only through platform and KAMNET capabilities, but also by leveraging air traffic control (ATC) improvements.



The Office of the AMCOM DSA is focusing on a number of key initiatives to improve systems under its purview.

Air Traffic Control

ATC allows our leaders to provide early-entry forces capable of joint operations with other Services and nations, and provides landing and navigation assistance free of fixed-forward bases. ATC systems reduce the possibility of fratricide and improve overall aviation force protection, thereby increasing survivability. The Office of the DSA provides the Army with two new ATC systems to accomplish this objective: the Air Traffic Navigation, Integration and Coordination System (ATNAVICS); and the Tactical Airspace Integration System (TAIS).

ATNAVICS is a High Mobility Multipurpose Wheeled Vehicle (HMMWV)-based, ground control approach radar system that easily and rapidly deploys air traffic services, troops, and equipment to remote locations without operational airport control and landing systems. Using state-of-the-art, digitally integrated radar and navigation systems, this evolutionary ATC enhancement provides the power and projection force with a rugged, rapid, dependable C-130-deployable tactical radar system.

TAIS, the Army's airborne command and control system, is a revolutionary new design that gives the ground commander the ability to manage assigned airspace in the near-real time. TAIS' mission to "deconflict" congested airspace is customized to satisfy current and evolving Army requirements.

Both ATNAVICS and TAIS will be in our soldiers' hands within the next few years, improving our force deployability. ATNAVICS has been approved for full production (Milestone III) and will be fielded in FY01. TAIS will be fielded in FY00 to support the First Digitized Division. These systems offer the commander an enormous increase in capability and will contribute significantly to the achievement of the CSA's vision by increasing deployability, survivability, and versatility.

Short Range Air Defense (SHORAD)

SHORAD systems include missiles, radar, and command and control systems. Stinger, a combat-tested system, is now in its fourth generation. Stinger missiles have been launched from wheeled vehicles (Avenger, based on a HMMWV), tracked platforms (Linebacker, based on a Bradley), light armored vehicles, helicopters, and by

individual soldiers. Stinger missiles defeat fixed- and rotary-wing aircraft, unmanned aerial vehicles, and cruise missiles. This demonstrated versatility provides a broad array of options in the design of the future force. This capability is as deployable as the force it supports.

The Sentinel radar provides the commander a three-dimensional view of the battlefield, providing the SHORAD gunners with direct targeting data. This coupling of systems provides a true sensor-to-shooter capability resulting in a more responsive and more lethal system.

Readiness rates on SHORAD systems are high with minimal maintenance. The Stinger missile is a "wooden round" requiring no maintenance. The Sentinel radar has demonstrated high reliability with just two levels of maintenance. In short, SHORAD systems are proven to be dependable and sustainable, and will provide the Army's maneuver forces with unequaled air defense protection into the 21st century with a minimum logistics footprint.

In addition to SHORAD systems, advanced short-range air defense concepts that enhance the defensive capabilities of the maneuver force are actively being explored. These concepts include directed energy weapons and ground-launched advanced medium-range air-to-air missiles from a variety of platforms. Along with aviation and missile systems, other DSA systems, exemplified by the UGVs, make significant contributions to the CSA's vision.

Unmanned Ground Vehicles

The Unmanned Ground Vehicle is a U.S. Army/U.S. Marine Corps effort. UGVs contain field robotic components and systems that will save lives, reduce soldier exposure during hazardous operations, and reduce mission time with increased operational tempo. Currently, the Mini Flail and M60 Panther are being used by our soldiers in Kosovo and Bosnia in the dangerous duties of surveillance and mine clearing.

Initial UGV fielding will consist of modular designs that feature open architecture and standardized message protocols to allow evolutionary technology improvements. Currently in development, the Standardized Robotic System (SRS) is a kit that can be integrated into any existing military vehicle. Heavy emphasis is on standardization of parts during initial development. The first application of the SRS will be on the D7G dozer, T3 dozer, the Deployable Universal Combat Earthmover, and the M9 Armored Combat Earthmover. All of the kits for these applications will contain about 85 percent common parts to increase dependability and sustainability. The goal is to field a family of robotic systems, including manportable devices, that provide the commander versatile operational capabilities and improved survivability.

Robotic capabilities will evolve from basic man-in-the-loop teleoperation to supervised autonomy involving simple preplanned missions with little human intervention. The ultimate objective is autonomous, complex, and preplanned missions using obstacle detection and avoidance navigation systems. Compliance with the Army Joint Technical Architecture will ensure data from robotic systems and sensors will be integrated into the digital battlefield to extend the commander's view and reach. Eliminating the need for personnel and required protective armor in the vehicle will allow vehicles to be smaller, faster, and lighter. Multiple platforms under the control of one soldier will result in a significant force multiplier.

Currently, the lead UGV effort is in the engineering, manufacturing, and development phase with fielding scheduled for FY02. A midlife upgrade in 2007/8 and a final upgrade in 2015 are planned. A reduction in the logistics footprint will be obtained by extensive use of standardized controls and common components to minimize parts stockage. Embedded training and diagnostics will also allow lowest level of repair, thereby enhancing sustainability.

Conclusion

The Office of the AMCOM DSA is responding aggressively to the challenge of the CSA's vision by focusing on those investments that increase the Army's responsiveness, deployability, agility, lethality, and survivability, while reducing the logistics footprint. The Office of the AMCOM DSA is taking today's first-rate systems and leveraging their capabilities to ensure relevance to the transformed force.

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INTRODUCTION TO INFORMATION DOMINANCE

As the Army proceeds with transforming the force, many objectives will change to achieve full-spectrum capabilities. However, one truism will remain: we will maintain information dominance over any potential adversary. The Program Executive Officer for Intelligence, Electronic Warfare and Sensors; the Communications-Electronics Command's Deputy for Systems Acquisition; and the Program Executive Officer for Standard Army Management Information Systems are building the network of systems and capabilities to ensure the Army dominates information flow to continually work within our potential adversaries' decision-cycle time. The following three articles, beginning on Page 32, highlight their efforts to achieve this capability.

ACHIEVING FULL-SPECTRUM DOMINANCE USING INTEROPERABLE SENSOR CAPABILITIES

MAJ(P) Newman Shufflebarger
and Michael E. Ryan

Introduction

As the Army faces the challenges of optimizing the force for strategic responsiveness, the Program Executive Office for Intelligence, Electronic Warfare and Sensors (PEO, IEW&S) is ready for the future. Our mission is to field state-of-the-art interoperable sensors that enable the land component commander to control time, space, and the environment. Our core competency for sensors responsibility is on track with the key tenets of Army Chief of Staff (CSA) Eric K. Shinseki's vision: responsiveness, deployability, agility, versatility, lethality, survivability, and sustainability. In fact, sensors are vital to this vision. Regardless of the force structure, PEO, IEW&S plays a significant role in providing relevant sensor technologies that make the U.S. Army the premier force on the modern battlefield.

Our sensor capabilities span both the full electromagnetic and military spectrum: from radio frequencies to the visible light spectrum, and echelons above corps (EAC) to the individual soldier. Given the thrust of the CSA's vision, the Army's Common Ground Station (CGS) and the Tactical Unmanned Aerial Vehicle (TUAV) have emerged as two of the more significant programs that will address the Army's future needs.

CGS, as a key centerpiece of the "now" battle, provides near-real-time imagery and intelligence data from a multitude of sources, thus effectively establishing a "sensor grid" by which the warfighter can effectively shape the battlespace. Fielding of the CGS began in 1999, providing a significant leap in capability from brigade level to EAC.

Development of the TUAV was recently initiated and, starting in 2002, production will begin to provide the brigade commander with a dominant airborne "eye" for reconnaissance, surveillance, and target acquisition (RSTA) of key areas and threats that were previously unattainable. This sensor versatility across the Army's platforms at all echelons will prove invaluable as the Army transforms itself for the 21st century.

Fielding Interoperable Sensor Capabilities

The Army's transformation represents a sharp departure from existing concepts and is embodied in the Brigade Combat Team (BCT). While more deployable, the BCT is also more vulnerable. To compensate for these inherent survivability limitations, a unique RSTA organization is being introduced. The requirements include reachback linkages across echelons and other Services for information, intelligence, joint effects, force protection, and sustainment. The organization requires command, control, communications, computers, and intelligence packages that are scalable and have the necessary "hooks" for augmentation.

PEO, IEW&S is working on the concept of a sensor grid architecture that provides near-real-time, relevant information about the battlefield. Using a mix of interoperable ground and airborne intelligence, surveillance, and reconnaissance sensors and platforms is the key to providing enhanced situational awareness and achieving information dominance given time and battlespace constraints. CGS is a prime example, with sensor connectivity to Joint Surveillance Target Attack Radar System E-8 aircraft, unmanned aerial vehicles (UAVs), Guardrail Common Sensor (GRCS), Airborne Reconnaissance Low (ARL), U2, Apache Longbow, and intelligence data via the Joint Tactical Terminal. Enhancements to CGS will allow for an exchange of red and blue force data and battlefield geometry with Army Battle Command Systems, thus providing a truly common operational picture. A transit case version of CGS, the Joint Service Work Station, provides all of the functionality of CGS but with a much smaller deployment footprint.

Extending Commanders' 'Eyes' And 'Ears'

Tactical ground commanders' requirements for "over-the-hill" RSTA with increased "standoff" capabilities have grown significantly more important with the BCT concept. Systems that provide the eyes and ears and, ultimately, the enhanced situational understanding of the battlefield without placing soldiers at undue risk are essential. An organic capability is required at the brigade level, one that will increase the brigade's effectiveness and yet, at the same time, not adversely affect the unit's deployability requirements.

The TUAV brigade-level asset will provide deployable, near-real-time RSTA information to the BCT, light divisions, and armored cavalry regiments. The TUAV will provide a minimum range of 50 kilometers with 4 hours endurance and an objective range of 200 kilometers. As demonstrated with the successful deployment and operation of the RQ-5A Hunter UAV in the Balkans in 1999, TUAV will become a true combat multiplier in the future.

The Prophet System, for the first time, will allow the Military Intelligence Brigade to provide the BCT, division, or armored cavalry regiment commander with his own ears on the battlefield that can move with the scouts, in convoys, or in any other mobile operation offering force protection as far forward as required. By the end of 2000, the Program Manager for Prophet will deliver an "electronic-mapping" capability that

includes the ability to intercept radio transmissions, determine their line of bearing, monitor the transmissions and, if directed, deny their access by jamming.

Further requirements are being considered to add eyes to the Prophet (ground) resulting in a multi-intelligence (INT) suite. This upgrade would incorporate ground surveillance radar and acoustical sensors such as the Remotely Monitored Battlefield Sensor System, thus further increasing deployability while reducing the logistical footprint.

The BCT

BCT requirements include centralized and decentralized operations characterized by rapid mobility, precision fires, maneuver, and decisive engagement. Operations must be conducted over extended distances and against various types of threats. The BCT must be fully capable of directing, receiving, processing, and integrating data from higher echelons, including joint, coalition, and national assets.

For traditional eyes-on capability, the force requires state-of-the-art night vision sensors that complement the ears portion of the RSTA organization. The ability to see the enemy during the day and night and in marginal weather is paramount. Image intensification (I2) devices for the individual soldier not only enhance the ability of the initial BCT to fight, but truly allow the brigade to "own the night."

The Second Generation Forward Looking Infrared (SGF) Systems are candidates for integration on the family of Interim Armored Vehicles planned for the BCT. The Long Range Advanced Scout Surveillance System, which also uses SGF, is a prime candidate for the Reconnaissance or "Recce" Vehicle that will provide the BCT RSTA Squadron with real-time acquisition, detection, recognition, and far-target location information while remaining outside the threat's acquisition and engagement ranges.

CGS brings a tremendous capability to the BCT and also provides a reachback capability to higher echelons and joint forces. The TUAV provides unprecedented situational awareness for the commander. It will shape the battlefield and prove to be a true force multiplier without placing soldiers in direct and indirect fire ranges. The Prophet provides the tactical commander with an enhanced capability for situational awareness, electronic intelligence preparation of the battlefield, battlespace visualization, target development, and force protection. An example of responsive operations is the rapid terrain visualization advanced concept technology demonstration, which can provide special, task, and strike force commanders very high-resolution digital topographic data of a 90 by 90 kilometer area of interest in only 72 hours.

The BCT's operations will reach over extended distances on a nonlinear battlefield, inevitably introducing the "fog of war" resulting in a potential increase in fratricide. PEO, IEW&S is the lead office within the Army for developing the architecture for combat identification. The development of the Battlefield Combat Identification System (BCIS) and Combat Identification for the Dismounted Soldier will greatly enhance the survivability of our force. BCIS will be integrated on 26 different Army vehicles in 2000, and its focus is to provide reliable, accurate target identification systems that support engagement decisions and reduce fratricide.

Reducing Logistical Footprints

To meet the CSA's vision on strategic responsiveness, the Army's key challenge is to provide assets capable of rapid inter- and intratheater deployment. Our strategy of miniaturization and elimination of redundancy across our product line is at the forefront of our daily business. Our payload efforts for the TUAV will result in cross-use of sensor technology for many platforms, both ground and air.

Currently, within the intelligence electronic warfare (IEW) and command, control, communications, and intelligence (C3I) arenas, there are numerous unique ground-station solutions with the possibility of combining multiple IEW, C3I, and UAV ground stations into a single Common Tactical Ground Station (CTGS). This approach can save valuable resources, eliminate redundancy, and significantly decrease deployability and logistical footprints. A CTGS will enhance multiple cross-cueing of sensors and reduce sensor-to-shooter timelines.

Sensor Investment Strategy

For the future ground combat soldier, we are focused on higher fidelity detectors and sensor image fusion of I2 and thermal forward looking infrared devices for target acquisition. We will also be focused on furthering combat identification technologies for the dismounted soldier.

Sensor investment strategies for airborne platforms include TUAV payload development and the next generation multi-INT aircraft. The TUAV will be fielded with a basic electro-optic/infrared sensor payload with the ability to incorporate future multimission sensor payloads. This includes Synthetic Aperture Radar and Moving Target Indicator, laser designation and rangefinding, communications relay, signals intelligence, and more, allowing the brigade commander to tailor the system as the mission dictates. Likewise, evolution and migration of the communication, electronic, and imagery intelligence technologies developed separately under GRCS and ARL platforms will migrate into a single platform, the Aerial Common Sensor. The underlying acquisition strategy for these programs is to leverage and adapt commercial technology and miniaturization while maintaining affordability.

Conclusion

The vision and transformation of our Army has been clearly articulated from the senior leadership—project lethal forces with increased capabilities while increasing deployability and reducing logistical footprint. The push toward a BCT quickens our ability to get to the fight but introduces vulnerability to those deployed forces. Maintaining information dominance using state-of-the-art sensors is the mission of PEO, IEW&S. Our sensor suites, from EAC down to the individual soldier, will maintain the lethality and survivability capabilities otherwise lost when transitioning from a heavier force to a lighter one, allowing the commander to stand off from harm's way and conduct decisive operations the first time, every time.

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From Power Projection Base To Battlespace . . .

C4I SYSTEMS IN THE 21ST CENTURY

COL(P) Michael R. Mazzucchi

"... Our logistical footprints for deployed forces are unacceptably large ... we must develop a vibrant capability for reach back communications and intelligence so that we can begin to aggressively reduce the size of our deployed support footprints ... we will prioritize solutions which optimize smaller, lighter, more lethal yet more reliable ... and more survivable options ..."

—Army Chief of Staff GEN Eric K. Shinseki Address to Association of United States Army (AUSA), Oct. 12, 1999

Introduction

In Chief of Staff of the Army (CSA) GEN Eric K. Shinseki's address at the Eisenhower Luncheon at the 1999 AUSA Annual Meeting, he unveiled a dramatic vision for a lethal, mobile, and survivable medium-weight brigade (now being called the Brigade Combat Team (BCT))—a vision that has energized combat and materiel developers spanning the warfighting and peacekeeping spectrums. The challenge is to satisfy the CSA's schedule, given as he said, the world's current "environment for extremism and the drive to acquire asymmetric capabilities and weapons of mass destruction."

Shinseki called on the Army to "jump start this process by investing in today's 'off-the-shelf' equipment." The U.S. Army Communications-Electronics Command (CECOM) has been for the past 30 years and will continue to be a leader in commercial off-the-shelf (COTS) acquisiton.

The project managers at the CECOM Systems Management Center (SMC), under the direction of the Deputy for Systems Acquisition (DSA), execute CECOM's part in realizing GEN Shinseki's requirement for "a vibrant capability for reach back communications" and "solutions which optimize smaller, lighter, more lethal yet more reliable ... and more survivable options... ."

While the DSA/SMC manages a myriad of programs, this article addresses only those CECOM programs poised to contribute today to the CSA's vision of a rapidly deployable, mobile BCT.

Project The Force

CECOM's project managers have programs in place to support split base operations, contingencies, and emergencies—from the Pentagon ... to commander-in-chief (CINC) headquarters ... to the power projection bases ... to the BCT in the battlespace.

Access To The Sustaining Base. The amount of data the Army needs to transport has grown exponentially. The Project Manager, Defense Communications and Army Transmission Systems (PM, DCATS) links the global headquarters of the Army, the joint Services, and the CINCs to the battlespace; providing long-haul connectivity via fixed satellite terminals, microwave links, or fiberoptic or copper cable; regardless of distance, terrain, or other impediments.

The Heavy and Medium Satellite Terminal Modernization Program is replacing existing equipment with state-of-the-art hardware, thus reducing operations and maintenance costs while extending terminal life 15 years. The Defense Information Systems Network-Europe Microwave Project, under PM, DCATS, is upgrading the existing 26 megabits-per-second Digital European Backbone with state-of-the-art 155 megabits-per-second synchronized optical network (SONET) microwave radios.

Renovating The Pentagon. For the Pentagon to continue to function into the 21st century, renovation is essential. Its information infrastructure must be updated to serve as the nerve center for command and control of the U.S. Armed Services.

In addition to the massive construction effort, the Pentagon renovation will provide collocated Service operation centers, modern telecommunications support facilities, and an information infrastructure capable of meeting telecommunications needs well into the 21st century. The Project Manager, Information Management and Telecommunications Pentagon Renovation (PM, IM&TPR) is providing intensive, centralized project management of this effort. The Pentagon Engineering Office of CECOM's Information Systems Engineering Command is providing engineering support.

The renovated Pentagon will include a 30,000-line telephone switch, common-user systems such as e-mail and administrative telephone service, collocated automatic data processing facilities, an information infrastructure of fiberoptic and copper cable, and a common-user telecommunications backbone. This backbone will provide interoperability between legacy, renovation, DOD, and commercial networks; be secure, scalable, upgradable, and flexible; not degrade current user network capabilities; and be standards-based.

CINC C4I Capabilities. The Command Center Upgrades/Special Projects Office (CCU/SPO) manages the engineering, acquisition, and integration for special proj-

ects to upgrade command, control, communications, computers, and intelligence (C4I) operations and systems at Army and CINC command centers and other C4I-intensive facilities. In these upgrades, CCU/SPO integrates multiple C4I technical disciplines such as data (local area networks (LANs), servers, and processors); voice (secure/non-secure telephone and radio); audio/video distribution; and briefing display systems.

Current projects include the U.S. Army South and Special Operations Command relocations, in which CCU/SPO is engineering, installing, and testing C4I systems to support the commands as they relocate from Panama to Puerto Rico.

Modernizing The Power Projection Bases. Whether deployed on the battlefield (in a split-base operation), or in garrison, the BCT will require seamless access to power projection base information systems, in addition to increased presence of image processing for intelligence, maneuver control, and logistics support of all kinds, including telemaintenance and telemedicine. That's where the Project Manager, Defense Communications and Army Switched Systems (PM, DCASS) and the Army's Installation Information Infrastructure Modernization Program (I3MP) come into play. I3MP is a comprehensive, synchronized installation information technology infrastructure program to provide robust, secure command and control/combat service support reachback communications designed for network-centric warfighters.

For instance, I3MP's Common User Installation Transport Network (CUITN) delivers real-time, high-volume data connectivity to power projection installation assets that the BCT commander can access from any battlefield via tactical satellite and other gateways. With its robust and configurable information infrastructure, CUITN leverages existing infrastructure dollar investments to provide the BCT bandwidth on demand.

Protect The Force

Our project managers have programs in place to help protect and increase the survivability of BCTs in a variety of conventional and asymmetric warfare environments, and even to decrease the logistics footprint.

A steel rain's gonna fall … on enemy artillery batteries that dare to fire on BCTs, thanks to the family of Firefinder weapon-locating radars developed and fielded by the Product Manager, Firefinder. In Bosnia, Firefinder has been used to deter the use of indirect fire weapons, detecting small arms sniper locations so successfully that soldiers dubbed Firefinder "the sniper hunter." Where the Army goes, Firefinder goes, providing force protection for survivability.

The AN/TPQ-36 and AN/TPQ-37 radars, currently fielded with the Active duty Army, locate mortars, artillery, and rockets and have the high level of mobility required by BCT commanders. The recent transition to High Mobility Multipurpose Wheeled Vehicles (HMMWVs) enhances mobility of both radars. They are now C-130 roll-on, roll-off capable. The AN/TPQ-36 is also UH-60 transportable, and its crew size has been reduced from eight to six.

Every team needs a good "shortstop," and the BCT is no exception. A key piece to the force protection puzzle, the Shortstop Electronic Protection System, is a radio frequency proximity fuse countermeasure. It can be used to protect high-value targets such as buildings, vehicles, and personnel.

What's Your Position? The Global Positioning System (GPS) has become a mainstay for nearly all military operations and weapon systems, and will be key to the BCT in showing users their exact position on the Earth—in any weather, anytime, anywhere. GPS provides real-time, precise position, velocity and time, multiple stored waypoints, range and azimuth, and precise timing for communication networks.

The Product Manager, Global Positioning System (PM, GPS) is responsible for all user equipment in the Joint Services GPS Program. Starting in 2002, the BCT foot soldier will probably use the Defense Advanced GPS Receiver (DAGR). New features will include a graphical user interface, enhanced navigation and cryptographic features, all in-view capability (allowing users to select the best satellites available at a given time), faster acquisition time, and enhanced antennas and filters to resist jamming and spoofing. The DAGR will weigh less than 2 pounds (the current unit weighs 2.75 pounds); fit into a battle dress uniform pocket; use small, readily available AA batteries; and be usable in either hand.

Safe At Home … And In The Field. The BCT will face security threats on and off the battlefield, from both conventional and asymmetric warfare. The Product Manager, Physical Security Equipment (PM, PSE) does surveys and fields physical security equipment for the Army, joint Services, and other government agencies. PM, PSE is responsible for interior physical security equipment, command and control systems, security lighting, force protection systems, tactical security equipment, barriers, and interior and exterior robotic systems.

An example of a COTS item is the Personnel Alerting System (PAS), which will immediately alert BCT personnel of specific danger (i.e., explosive, chemical, and biological agents). Although centrally controlled, PAS will allow for remote activation by guard personnel and will be usable in desert, tropical, urban, and other environments.

Power The Force

Mobile Power For The BCT. Electric power, provided primarily by mobile generators in the battlespace, will be the lifeline of the BCT. Without it, the technical wizardry of modern warfare—weapon systems; command, control, communications, and intelligence systems; and logistics support systems—are of little use.

The Project Manager, Mobile Electric Power (PM, MEP) manages a coordinated inter-Service effort to develop, acquire, and support DOD's mobile electric power generators. This includes establishing and maintaining a DOD standard family of mobile electric power generators, from 0.5-kw portable generators to 920-kw prime power-generating systems. Compared to the aging military standard generators they're replacing, new Tactical Quiet Generators are smaller; lighter; quieter; more reliable; use less fuel; are all diesel/JP-8 powered (supporting the DOD "one fuel on the battlefield" policy); electromagnetic interference and nuclear, biological, and chemical protected; and require less maintenance.

The Future Is The Past

As GEN Shinseki unveiled his vision for the objective force this past October, he noted, "we will enable our divisions to dominate … by providing them the agility and versatility to transport from one point on the spectrum to another with least loss of momentum." Though the technology we'll use to accomplish this is new, the strategy is possibly the oldest in warfare. As master strategist Sun Tzu said in the year 500 B.C.E.: "*Rapidity is the essence of war; take advantage of the enemy's unreadiness, make your way by unguarded routes and attack unguarded spots.*"

Isn't that, essentially, the capability we're seeking to provide the 21st century Army through the Brigade Combat Team?

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PEO, STAMIS . . .

TRANSFORMING THE ARMY THROUGH IMPROVED INFORMATION MANAGEMENT SYSTEMS

Introduction

The business of the Program Executive Office for Standard Army Management Information Systems (PEO, STAMIS) is the business of the U.S. Army. Our systems touch every soldier, every day, regardless of their location or mission. We are, therefore, directly involved in achieving the Army's vision. The information management systems we acquire and field assist in accessing, training, and tracking Army personnel; providing and maintaining warfighting equipment; and planning the movement of supplies and other assets.

Personnel Management

PEO, STAMIS supports the Army Chief of Staff's vision and goals of recruiting the best people, sustaining the force, and providing the best training. Some of the resources used by PEO, STAMIS to achieve this support are the Army Recruiting Information Support System, an automated recruiting management information system; the Standard Installation/Division Personnel System (SIDPERS-3), an automated personnel management system that provides decisionmaking data to commanders; and The Army Distance Learning Program (TADLP), which provides training courses when and where necessary. Detailed information on SIDPERS-3 and TADLP is provided later in this article.

Strategic Dominance

The Army provides strategic dominance across the entire spectrum of operations. From the Global Combat Support System-Army (GCSS-Army) to the Movement Tracking System (MTS) and Automatic Identification Technology (AIT) Program, PEO, STAMIS assists in enabling the revolution in military logistics (RML) with total asset visibility (TAV) and combat service support (CSS) management at crucial points in the Army's logistics pipeline. With these systems, we support the warfighter at the home-station installation, during deployment, and in mission operations throughout the world.

Technology Process

The Army will jump-start the technology process. Information systems acquired by PEO, STAMIS rely on commercial off-the-shelf technology (COTS). This strategy supports open-market competition to both obtain the best value and implement the latest technology. Using COTS technologies with our information systems reduces proprietary considerations and expensive maintenance of one-of-a-kind concepts.

Joint Computer-Aided Acquisition and Logistics Support (JCALS) assists PEO, STAMIS and other DOD agencies with program management automation services for system acquisition and related operations. JCALS provides support for distributed data environments, electronic documentation for technical manuals, digital exchange of logistics and technical data, and streamlined acquisition management processes.

GCSS-Army

As a flagship PEO, STAMIS program, the GCSS-Army is the primary business and tactical enabler for the Army's CSS mission area and constitutes the Army's portion of the DOD GCSS. GCSS-Army is an integrated, modular, interactive CSS management system that supports Army objectives and requirements for common CSS information systems.

Focusing on distribution-based logistics, the guiding principle for GCSS-Army is to provide an RML framework for business changes in CSS logistics management. GCSS-Army presents a common look-and-feel information system for the warfighter and assists in providing the right logistics, at the right place, at the right time. This entails a fusion of various information sources and logistics management concepts to provide the commander with decreased CSS response times, tailored logistics, and enhanced control of all CSS assets.

GCSS-Army is based on a parallel, spiral development concept with incremental phases of system functionality. The tier I tactical logistics system replaces legacy systems with six modular elements: supply/property, maintenance, ammunition, supply support, integrated materiel management, and management. The tier II system affects wholesale and retail integration, while the tier III system will provide full-operational capability and interfaces to CSS management systems for the joint Services, national sustaining base, and allied forces.

Movement Tracking

MTS will provide the capability to track the Army's CSS vehicle locations, communicate with vehicle operators, and redirect vehicular movements based on situational requirements. MTS uses commercial satellite technology for communications and data linkage between vehicle operators and ground-based control stations. This provides the commander with vehicle and cargo assets positioning information, two-way messaging, and color map displays. MTS is a critical link to TAV and in-transit visibility. Additionally, in conjunction with other RML initiatives, MTS assists in ensuring critical assets are located and mission-ready at a prescribed place and time.

The AIT Program provides for the acquisition and implementation of enabling devices that facilitate the data collection of materiel assets status. AIT devices collect and retrieve source data for use in issuing, shipping, and inventorying assets, and for other logistical procedures. AIT items also include memory devices and use both portable and wireless technologies. AIT equipment will reduce manpower requirements needed to control assets and increase supply transaction effectiveness.

TC-AIMS II

As a PEO, STAMIS joint Services program, the Transportation Coordinators'-Automated Information Movements System II (TC-AIMS II) provides systems management and transportation control to support rapid strategic mobility of personnel and materiel assets. This system facilitates all phases of military transportation operations, including planning, staging, embarkation, in-transit, debarkation, and battlefield integration.

TC-AIMS II will be used by command and control headquarters, transportation management units, deploying mission units, and as an integral sector of the Defense Transportation System and Global Transportation Network operations. This single system is capable of supporting transportation operations for individual Services or all joint/combined forces. TC-AIMS II assists with the achievement of RML and Army vision objectives for total assets visibility.

SIDPERS-3

SIDPERS-3 is the centerpiece of the Army personnel community's automation efforts and provides a medium for business change to meet the Army vision of accurate and detailed personnel information. SIDPERS-3 data are used by the personnel management community for individual and strength accounting and by medical, finance, logistics, and transportation agencies for use in deployment and sustainment support. For example, TC-AIMS II uses SIDPERS-3 personnel accounting information to develop transportation manifest rosters. In addition, medical agencies use SIDPERS-3 data to develop patient rosters, and finance agencies use SIDPERS-3 data in creating personnel pay databases. A change of personnel information in any of these systems will also change the affiliated agencies' database information. Improved personnel services enhance soldier and unit morale, while improving the commander's decisionmaking process concerning personnel assets.

TADLP

This program provides a versatile and deployable training system through the application of existing and emerging distributive learning technologies. TADLP will deliver timely training services for individual, collective, and self-development instruction for soldiers, civilians, and units at their locations.

PEO, STAMIS will develop and field TADLP digital training facilities and support training access centers, while the Army's Training and Doctrine Command is developing specific military occupational specialty courseware modules and teleconferencing instruction. TADLP supports the Army's vision for strategic dominance with responsive, versatile, trained, and deployable soldiers.

MC4 Program

The Medical Communications for Combat Casualty Care (MC4) Program is designed to integrate medical information systems to provide visibility of the Army soldier's medical record and health care data from the sustaining base to the battlefield. MC4 provides the ability for a seamless information interchange among medical care providers, medical diagnosticians, and medical-related automation systems. MC4 will integrate the Army Medical Department's business functions with communication and information system technologies and applications at all echelons of medical support, including the Army implementation of the Joint Services' Theater Medical Information Program.

DMS-Army

The Defense Message System-Army (DMS-Army) Program provides an integrated, worldwide, modernized, and secure command and control messaging capability for all Army agencies. This program is the Army's contribution to the joint Services' DMS Program and will provide seamless, reliable, writer-to-reader messaging at all Army locations. DMS-Army replaces the aging 1960s automatic digital network equipment with updated, cost-effective message management concepts. Additionally, DMS-Army provides e-mail message capabilities with guaranteed timely delivery, accountability, and authentication of the message sender and receiver.

The use of National Security Agency-certified applications and public key cryptography will provide the DMS-Army with multiple levels of messaging security assurance. The Tactical Message System is the deployable component of the DMS-Army Program and will implement mobile, end-to-end tactical messaging for the warfighter, from the battlefield to the sustaining base.

Within PEO, STAMIS, the Tactical Management Information Systems (TACMIS) Office provides system acquisition support. Additionally, the TACMIS Office provides consolidated acquisition and support service contracts, systems fielding support, and management of specified information system projects. These projects include a battlefield-critical communications interface system, installation support systems, and the Army's Civilian Personnel Office Automation Program.

Conclusion

PEO, STAMIS is achieving the Army Chief of Staff's vision by providing *deployable* information systems that support force projection and operational readiness and technologically *agile* programs (many of which are laptop-sized or smaller and accompany the warfighter in accomplishing his combat mission).

PEO, STAMIS programs are also *versatile* and allow the warfighter to operate in multiple environments. While our systems are not *lethal* per se, they contribute decisively to the fight by supporting information dominance. Further, our systems are *survivable* and support the warfighter with the capability to withstand the demands required for mobility on the battlefield. We are aggressively reducing the Army's CSS logistics footprint while ensuring all of our programs are fully *sustainable*.

PEO, STAMIS systems operate in both sustaining base and deployed operational environments and provide CSS management support by:

- Ensuring visibility of assets with enabling technologies and transportation management;
- Supporting interoperability and integration from combat support to combat environments;
- Providing warfighter reachback into CSS capabilities with flexible, open computing systems;
- Providing end-to-end information access and global messaging;
- Providing electronic data interchange to streamlined systems acquisition management;
- Supporting individual and collective solider instruction with multiple training technologies;
- Supporting solider accession through the use of recruiting information systems; and
- Leveraging business process improvements and reduction of total ownership costs.

The preceding article was provided through the combined effort of several key members of the PEO, STAMIS staff.

Greater Accuracy, Lethality, And Mobility ...

TRANSFORMING THE ARMY'S TACTICAL MISSILE PROGRAM

BG John W. Holly

Introduction

As we begin the 21st century, achieving "strategic dominance across the entire spectrum of operations" is the challenge for our Army. This vision involves making objective forces more lethal, heavy forces more strategically deployable, and reducing the logistical footprint of our forces. These challenges, however, present unique opportunities for tactical missile systems to contribute to reshaping our Army.

Approximately 18 months ago, the Program Executive Office (PEO), Tactical Missiles began developing a long-term tactical missile strategy that will define the role of tactical missile systems well into the 21st century. This long-term strategy meshes perfectly with the goal to achieve strategic dominance and was presented to the Chief of Staff of the Army (CSA). The result of this presentation was a task to develop a Missile Modernization Campaign Plan (MMCP) to synchronize approaches for transforming the Army's tactical missile programs with the necessary requirements and resources. The MMCP provides the roadmap to ensure that our strategy fully supports the CSA's vision.

Lethality

PEO, Tactical Missiles is working to improve the lethality of missiles that affect both the close and deep battles and allow the Army to continue to dominate the battlespace. Critical advancements are being made to our tactical missiles to increase lethality. This is achieved through upgrading the accuracy and improving the Javelin, Hydra-70, and Longbow warheads. In addition, the new Line-of-Sight Anti-Tank (LOSAT) system dramatically improves light-force lethality and survivability, directly affecting the close battle.

The Multiple Launch Rocket System (MLRS) guided rocket (GMLRS) with greatly improved accuracy and range will make fire support more effective and lethal. Unitary warhead rockets using the same guidance as the GMLRS will not only increase lethality but will also reduce collateral damage. Finally, the BAT preplanned product improvement (BAT P3I) will introduce a truly brilliant submunition, allowing the operational commander to attack critical deep targets with extreme precision.

Strategic Deployability

From a deployability perspective, the two most significant improvements in the tactical missile arena are the development of the LOSAT System and the High Mobility Artillery Rocket System (HIMARS). Mounted on wheeled chassis, both systems have transportability design constraints. LOSAT gives the Brigade Combat Team and current light divisions a deployable, lightweight anti-tank system capable of sling loading under the UH-60 helicopter. HIMARS can be airlifted by a C-130 into unimproved airstrips giving the Brigade Combat Team, or a larger force, the same rocket and deep attack missile systems capability found only in much heavier forces. Consequently, both of these systems epitomize the CSA's goal to provide a revolutionary and unmatched capability to dominate the direct and indirect fire battle.

Javelin missile fired from a pedestal mount on a HMMWV

Logistics Footprint

One of the many challenges facing the PEO is the logistics tail reduction for the objective force. Increased effectiveness, reduced size and weight, and a common caliber all contribute to significant reductions in the logistical footprint. For example, the stated accuracy of the GMLRS rocket and the new Common Ground and Air Missile will dramatically reduce the size of the logistics burden, contributing to making the "Brigade in 96 Hours" a reality.

Tactical Missile Programs

We are working on evolutionary and revolutionary technologies that will increase force versatility and deployability, increase system commonality, reduce our logistics footprint

LOSAT's overwhelming lethality

and replenishment demand, while continuing to dominate across the operations spectrum. The following paragraphs provide a brief review of some of the initiatives being pursued by PEO, Tactical Missiles.

Javelin

Javelin is expected to be the dominant anti-tank missile system in the Brigade Combat Team's infantry battalions and the Reconnaissance, Surveillance, and Target Acquisition Squadron. Javelin's anti-tank capability is enhanced by its residual capability against buildings and bunkers. Once the target is identified using the integrated day/night sight, the fire-and-forget seeker technology allows the gunner to lock on to the target, launch the missile, and immediately move to another launch point or take cover, providing increased survivability for the gunner in close combat. Recent exercises at the National Training Center have demonstrated that a light force equipped with Javelins can engage and win a battle against a superior armored force.

LOSAT

Unparalleled lethality for a ground-based system is the hallmark of the LOSAT missile. As the objective system for the brigade's anti-tank company, LOSAT provides overwhelming accuracy, lethality, and a rapid fire rate at ranges exceeding tank main gun range. The system is composed of a hypervelocity kinetic energy missile and a modified Improved Bradley Acquisition System mounted on an expanded-capacity High Mobility Multipurpose Wheeled Vehicle (HMMWV) chassis. As shown in an Advanced Concept Technology Demonstration (ACTD), LOSAT can be ready to provide a lethal overmatch capability at the brigade level. LOSAT was recently accelerated to support the Army transformation. It will move from an expanded ACTD into production followed by time-phased upgrades to provide a dominant anti-tank capability.

TOW Fire-And-Forget

The Tube-launched, Optically-tracked, Wire-guided (TOW) fire-and-forget missile is an interim capability that will increase the survivability of our light forces. It will provide the Improved Target Acquisition System-equipped light forces with a new fire-and-forget missile that dramatically improves survivability and lethality of forces that currently deploy with the TOW 2A/2B missile.

Longbow HELLFIRE

The Longbow HELLFIRE remains the mainstay air-launched missile. It is a fire-and-forget, adverse weather missile that uses radar-aided guidance. It is capable of multiple target engagements against both stationary and moving targets. The Longbow missile provides the AH-64D Longbow Apache attack helicopter with the capability to defeat a broad range of targets (including armor) while significantly improving aircraft survivability. Longbow will undergo improvements over time and remain the dominant air-launched missile well into the 21st century.

HELLFIRE II Missile

The HELLFIRE II is an air-to-ground point target, precision strike missile system designed to defeat individual hard-point targets using semiactive laser terminal guidance. A new version of HELLFIRE II with a blast fragmentation warhead is currently under development for the Navy.

Common Missile

The Army has an unparalleled opportunity to meet future battlefield needs at a dramatically reduced cost. Increasing lethality while reducing the logistical tail drives us to look at combining requirements into a single common missile for both ground and air platforms. Instead of developing unique missile systems to satisfy the requirements for each specific platform, we believe current technology can support development of a single missile system for use on a variety of platforms. Such an approach can reap

significant-benefits in operational flexibility for the warfighter through a common-caliber solution that profoundly reduces the logistics footprint for a deployed force. Examples of these benefits range from technical (a common launcher interface and significant commonality in fire-control algorithms) to operational flexibility (cross-leveling missiles between air and ground combat platforms) to logistical (reductions in aggregate missile totals required in theater). We are exploring this concept to compensate for reduced inventories of TOW and HELLFIRE missiles as their shelf life expires. However, more than just compensating for reduced inventories, a common missile will yield a 21st-century improved capability in range, lethality, and effectiveness over existing systems and be available for the mid- to far-term objective force.

MLRS

As we transform the force, a wheeled version of the combat-proven MLRS launcher will provide the Army with a C-130 transportable rocket and missile fire support capability. The HIMARS is mounted on a 5-ton, Family of Interim Armored Vehicles truck chassis. It can launch our entire inventory of rockets and missiles including all variants of the Army Tactical Missile System (ATACMS)-BAT deep-strike missiles. The XVIII Airborne Corps is currently evaluating a HIMARS platoon equipped with prototype launchers as part of an early user evaluation. The launchers could be ready to support the interim and objective force. The continued development and fielding of the new M270A1 MLRS launcher will form the basis for the HIMARS digitization effort to meet Army digitization objectives.

GMLRS

The GMLRS expands our MLRS rocket family with dramatic accuracy improvements in addition to a 30-percent range increase. This system clearly enhances deployability and reduces the logistics tail. Greater accuracy and effectiveness results in fewer rocket pods required in the area of operations. The GMLRS is now in engineering and manufacturing development with production currently set to begin in FY02.

Today's tactical missiles have provided our soldiers with the necessary edge in effectiveness, accuracy, and modern lethality to dominate the battlefield.

ATACMS-BAT

Besides the current availability of the ATACMS Block I and IA deep strike missiles, the BAT submunition recently began production and will be loaded into and delivered by the new ATACMS Block II missile. With the ATACMS/BAT Block II missile and HIMARS, the rapidly deployed brigade and other objective early entry forces now have the capability to engage moving armor targets deep in enemy territory. Deep strikes influence the close battle by shaping the close fight and improving the effectiveness and lethality of our lighter forces. Further, the new BAT P3I will be able to engage both moving and stationary critical high-value targets, improving lethality and flexibility of forces in the area of operations. The ATACMS unitary warhead missile will allow our forces to strike deep with minimum collateral damage against point targets.

Advanced Precision Kill Weapon System

The Advanced Precision Kill Weapon System is designed to provide Army aviation with a low-cost, highly accurate weapon for engagements against unarmored targets. The program couples the Army's 2.75-inch Hydra-70 rocket with a laser-guided seeker and guidance package. The result is a weapon with a high single-shot hit probability against point targets, exceeding the current Hydra-70 by up to two orders of magnitude.

Hydra-70

The Hydra-70 Rocket System Project is improving both unitary and cargo rounds. Enhancements have transformed the basic rocket into an effective combat weapon. Future plans include Global Positioning Systems/Inertial Navigation Systems guidance technologies and smart submunitions inserted into the M261 rockets, thus providing a low-cost fire-and-forget precision overmatch alternative.

Conclusion

Today's tactical missiles have provided our soldiers with the necessary edge in effectiveness, accuracy, and modern lethality to dominate the battlefield. The systems currently under development are lighter, more mobile, and improve the Army's strategic deployment capabilities. More important, these new missiles bring increased accuracy and lethality to retain the decisive edge for our Army, to transform the force, and to continue to dominate at any point along the spectrum of operations on the 21st century battlefield.

BG JOHN W. HOLLY is the PEO for Tactical Missiles, reporting directly to the Army Acquisition Executive. He manages six major project offices and oversees more than 30 product lines. He graduated from the U.S. Military Academy and earned a master's degree from the Georgia Institute of Technology. He is also a Licensed Professional Engineer in the Commonwealth of Virginia.

AIR AND MISSILE DEFENSE:

ENABLING STRATEGIC DOMINANCE

BG John M. Urias

Introduction

The Program Executive Office for Air and Missile Defense (PEO, AMD) develops, integrates, and fields AMD systems to defeat all current and future air and missile threats across the spectrum of operations. To achieve this objective, PEO, AMD is pursuing an acquisition strategy that will provide the warfighter with plug-and-fight capabilities that are readily tailorable to the specific mission at hand. We are pursuing this strategy to support our user's warfighting concept as outlined in the FY00 Air and Missile Defense Master Plan, which states that the plug-and-fight capability is fundamental to and inherent in all future AMD operations. This architecture allows the deployment of task-tailored AMD battle elements that provide lethal, versatile, survivable, and sustainable AMD protection while minimizing strategic transport requirements.

The plug-and-fight architecture integrates capabilities at the functional level into a family of components that effectively and efficiently provide needed force protection. Key features of this plug-and-fight architecture are shown in the accompanying table.

Responsiveness And Dominance

PEO, AMD is responsive, with 33 percent of our missile defense capability forward deployed today. These highly capable forward-deployed forces deter any pre-emptive strikes through the air, and our capability to project the remainder of our AMD forces from within CONUS quickly denies threat air and missile attack alternatives.

The Army Chief of Staff's vision of a more lightweight, leaner, and capable Army demands that we reduce the requirements imposed on strategic lift. During Operation Desert Storm, the Phased Array Tracking To Intercept Of Target (PATRIOT) proved that a credible AMD force could be projected, but exacted a heavy price in strategic lift requirements.

Future AMD systems, such as the Medium Extended Air Defense System (MEADS), are being designed to be significantly more transportable. For example, MEADS will reduce C-5 sortie requirements by 40 percent in comparison with requirements for equivalent firepower. Whereas PATRIOT requires C-5 sorties to deploy, MEADS will be fully capable of deployment by a C-130. However, PATRIOT will remain the backbone of AMD for another decade. To reduce demands on strategic lift requirements, PEO, AMD has commissioned the Theater High Altitude Area Defense (THAAD) Project Office to develop a common launcher in a cooperative effort involving THAAD, MEADS, and PATRIOT Advanced Capability-3 (PAC-3). This effort could reduce strategic lift requirements for a PATRIOT battery by one-third.

Plug-And-Fight Architecture

Agility and versatility are principles driving the need for a plug-and-fight architecture. Such an architecture enables tailoring of battle elements in accordance with Mission, Enemy, Terrain, Troops-Time Available (METT-T) by integrating the right mixture of sensing capability, command and control facilities, and firepower to defeat the full spectrum of potential enemy third-dimensional attack alternatives. Using self-generation and self-healing network techniques, the battle element will maintain continuous force protection across a wide range of dynamically changing operational conditions. When a capability is added to the battle element, the defense design is adjusted to exploit the more robust capabilities. When capabilities are lost because of movement, maintenance, or enemy action, the battle element automatically adjusts its defense design to ensure continued effective force protection. Thus, the correct AMD force is deployed and maintained throughout the full spectrum of operational activities being supported.

Because the plug-and-fight architecture is self-healing, it automatically compensates for changes in the defense design, assuring graceful degradation of the defense even when hostile actions force outages of individual systems. The greater agility and versatility inherent in the plug-and-fight architecture enables

Key Features Of Plug-And-Fight Architecture

- **Self-Generating and Self-Healing**
- **Agile and Versatile Tailorability**
- **Sustainable and Survivable**
- **Responsive Deployability**
- **Capable of Overmatching and Lethal Against All Threats**
- **Integrated at Component and Functional Levels**
- **Interoperable with Army and Joint Battlefield Systems**

individual components to move both for survivability and to maintain pace with the supported force without degrading the quality of the force protection that is continuously provided. Thus, the plug-and-fight architecture will inherently make AMD systems more survivable and the defenses they provide more enduring.

Improved Sustainability

AMD systems in development are being designed with the goal of significantly improved sustainability. For example, MEADS will use prognostics to replace parts about to fail during periods of reduced operational tempo so they won't fail during high-intensity operations. PEO, AMD is also investigating greater commonality across systems in an effort to reduce costs and improve sustainability within the family of AMD systems. An example is the common launcher approach currently underway within PEO, AMD. The common launcher approach will provide standardized electronics for a family of heavy-, medium-, and light-launcher platforms. Initially, the electronics package will support launch of THAAD and PAC–3 interceptors. However, the modular open architecture of the common electronics will enable other interceptor types to be added by inserting a card rather than designing a completely new electronics package.

Because electronics have traditionally been the cost driver, the common launcher will provide for built-in interoperability and sustainability across AMD forces while substantially lowering the cost of developing and procuring AMD systems. The intent is to include the common launcher in the PAC-3 production run as soon as feasible. Because the PAC-3 interceptor is also designated as the initial MEADS missile, fielding common launchers in half of the modernized PAC-3 fleet will provide for a "feed-forward" capability in the transition from a PAC-3 dominant AMD force to a MEADS-dominant force. All THAAD launchers will be fielded using the heavy variant of the common launcher.

Integration Across Systems And Services

The plug-and-fight architecture is changing the paradigm for developing AMD capability. The traditional "stovepipe" development within system-specific requirements has traditionally treated interoperability as an "add-on" to system design capabilities, using a "bottoms-up" approach to determine the synergism between interoperable systems and the conditions under which the synergism could be exploited on the battlefield. The new paradigm approaches integration across components and interoperability across systems and Services as a top-down process. This process intentionally exploits synergism to provide maximum combat capability while minimizing the specific requirements on individual components and systems. PEO, AMD is considering some fundamental changes to the organizational structure and acquisition approach, shifting from a "systems-centric" approach to a "functional-based" approach.

Joint Initiatives

Even as the Army modernizes its AMD force, the joint development community is also becoming increasingly aware of the need to leverage capabilities across Service systems. This leveraging effort will optimize warfighting capabilities while minimizing cost, risk, and complexity in designing, developing, and fielding individual systems. While PEO, AMD is investigating development and fielding of a family of components in a plug-and-fight architecture, the joint development community is migrating to a "family-of-systems" concept that enables the functional capabilities of individual Service-fielded systems to be integrated across all Services.

Recognizing that future warfare will be joint, the Army is participating with the Ballistic Missile Defense Organization and the Joint Theater Air and Missile Defense Organization to modify legacy systems and develop new AMD systems that operate within the family-of-systems concept. Joint initiatives for improved interoperability and integration across Service systems are two-pronged, focusing on both improvements to legacy capabilities and pursuit of "leap-ahead" technologies.

Improvements to legacy capabilities are focused on better situational awareness and information exchanges to enable greater exploitation across systems. PEO, AMD has already demonstrated plug-and-fight through the Joint Tactical Ground Station (JTAGS), which provides space-based missile warning and cueing data to centralized and distributed U.S. forces throughout the battlefield. In the future, JTAGS will transition to a common, tri-Service multimission mobile processor that can be plugged in to provide support to 16 different strategic and tactical missile warning and defense missions.

Seamless Capability

Within 10 years, new capabilities will emerge in both legacy and planned systems exploiting leap-ahead technologies and will be merged with legacy systems to provide a seamless capability to the warfighter. Leap-ahead technologies include a joint composite tracking network that will fuse multiple sensor measurements into composite tracks that are more stable, accurate, and enduring. Composite tracks will enable greater exploitation and use of functional capabilities across systems, such as "engaging on remote" by a PAC-3 interceptor of a target being tracked by a Navy AEGIS combat system. The Single Integrated Air Picture will fuse track reports and sensor measurement data into a holistic air situational data set that is consistent across every node and echelon of the joint AMD architecture.

Conclusion

Capabilities beyond 10 years not currently planned or budgeted are also being investigated, such as use of directed energy to provide an "umbrella of protection" to shield our maneuvering forces from rocket, artillery, and mortar fires.

Our aggressive approach to accomplishing our current mission will result in improved efficiencies and improved warfighter capabilities today while preparing for significant improvements and greater efficiencies in the future. Army AMD is achieving the Army Chief of Staff's vision of lighter, leaner, and more capable forces today!

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STRICOM . . .

POISED TO SUPPORT THE ARMY'S TRANSFORMATION

BG(P) William L. Bond

"War is a matter of heart and will first; weaponry and technology second. Thus, while strategists must understand the role that technology plays in changing how land combat will be conducted in the 21st Century, so too must they acknowledge the ways in which the nature of warfare remains constant."

—COL James A. Dubik and GEN Gordon R. Sullivan
"Land Warfare in the 21st Century"
***Military Review*, September 1993**

Introduction

One constant principle of warfare is that the *best-trained* armies win wars and successfully accomplish their missions. Our Army must be mentally and physically agile to meet the wide spectrum of conflict that lies ahead—from large-scale war to urban conflict. It has been said that we could have beaten the Iraqis using their own poor equipment solely because of the quality of our soldiers' training.

As we transform our Army to meet the many challenges and diverse missions in the new millennium, we must maintain the best-trained, most capable strategic fighting force in the world. This is the challenge that Chief of Staff of the Army (CSA) GEN Eric K. Shinseki has presented to us. He has challenged us to think BIG as we transform our current Army.

Responding To The CSA's Challenge

How do we respond to the CSA's challenge? Commanders and staff officers must look internally, externally, horizontally, and vertically across all organizations to see how best we can become a part of the transformation process and the objective force. The common denominator for all Army organizations is TRAINING. Training is the key component to maintaining readiness of the initial Brigade Combat Teams (BCTs) while they are undergoing the transformation process and, thereafter, as they prepare for future missions and renewed conflicts.

The U.S. Army Simulation, Training and Instrumentation Command (STRICOM) in Orlando, FL, is in a unique position as the training technology modeling and simulation (M&S) materiel developer for the Army. The role of our command is to enable the "second training revolution." We provide tools that allow commanders to fully exploit new weapon systems, doctrine, and organization by maximizing their unit's ability to train, rehearse, and plan for combat. We are committed to working in collaboration with the rest of the Army on initiatives to more closely align the M&S domain with the warfighter.

STRICOM not only facilitates the development of the materiel training requirements with HQDA, the Army Training and Doctrine Command (TRADOC), the program executive offices, and the users, we synchronize and integrate the requirements across the Army. STRICOM accomplishes this by working closely with TRADOC leaders at the National Simulation Center and the Army Training Support Center. Together, we strive to synchronize and align the M&S requirements with the common training infrastructure architecture, develop and field a truly low-overhead driver to stimulate our Army staff's training events, and enable solutions for embedded training within the tactical platforms and systems. We are a full-system materiel developer from inception of the requirement to retirement of the training tool or system ("cradle-to-grave").

To ensure that our products and services are both responsive and relevant to the warfighter's needs, we have created a management infrastructure. This infrastructure includes a Senior Leader Advisory Board composed of retired general officers ("graybeards"), a two-star Board of Directors, a Senior Army Leadership and Congressional Education Program, and a team of field service representatives to provide liaison to the warfighter. Through the proactive use of these command assets, we can achieve a nearly 360-degree review of our programs and initiatives to ensure alignment with the newly stated Army objectives and vision.

Identifying Key Enabling Technologies

For the Army to realize the full potential of the objective force, we must leverage ongoing and future technologies. The objective BCT will require new and innovative solutions to the many technological challenges that it will face. STRICOM is actively working to develop, integrate, and field innovative solutions to these challenges.

STRICOM is providing a system-of-systems approach to training as opposed to the current single-system approach. No longer can training devices and simulations be an afterthought in the weapon systems acquisition process. They must be fully integrated into the development process from the beginning and be in step with the system developer. Training devices and simulations must also be operationally linked through digitization, as they are in the 4th Infantry Division currently being fielded at Fort Hood, TX.

We must develop new systems and integrate legacy systems into a *common synthetic environment* to achieve full interoperability across all Services and with all potential foreign allies. In this environment, dismounted and mounted systems will be linked across all three M&S domains: live, constructive, and virtual. Additional key technologies necessary for achieving the objective BCTs are rapid terrain generation, course of action analysis (COAA), mission planning and rehearsal, and after-action reviews (AARs).

Rapid terrain generation allows us to simulate/stimulate (sim/stim) the warfighter's training and operational environments. To achieve this capability, we must import timely imagery products from strategic national assets. We can then create the terrain representations necessary to allow the warfighter, on a moment's notice, to conduct COAA and perform mission planning and rehearsal while en route to the area of operations.

The warfighter must be capable of conducting operational AARs on his go-to-war system. For example, after conducting a successful combat operation, the future Army leader needs the ability to

conduct an immediate AAR while sitting on the objective, before transitioning his unit to follow-on operations. This is critical in order for the leader to learn from the unit's collective experiences and to continue to adapt and hone his warfighting skills against a dynamic and asymmetric threat. As noted by GEN John N. Abrams, TRADOC Commanding General, this capability cannot be overemphasized as a key component of adaptive leadership skills. Further, this capability requires that the tactical system have the ability to implement "simulation-like" features (such as stop, start, rewind, and playback of the unit's combat data).

STRICOM is posturing now to provide the objective BCTs the ability to train *anyone, anytime, anyplace* in a fully immersive environment combining all three M&S domains seamlessly. The warfighter will have the capability of donning a headset to train in a simulated environment that will exercise all his senses and emotions. He will feel as though he is in a real-life situation. Additionally, the warfighter will have the option of linking with other members of his unit, the Army, or coalition teams, training individually or collectively across the Internet.

Teaming With Industry

The entertainment industry is light-years ahead of the Army in developing the key technologies that enable a fully immersive environment. Consequently, the Army has formed a partnership with academia and the entertainment and Defense industries through the newly established Institute for Creative Technology (ICT), a university-affiliated research center located at the University of Southern California. The Assistant Secretary of the Army for Acquisition, Logistics and Technology has selected STRICOM as the Army's executive manager for the ICT. Through this partnership with academia, Walt Disney Imagineering, Dreamworks, Sony, and other premiers within the entertainment industry, STRICOM and the Army are seeking ways to leverage technologies and techniques to make the training experience more realistic and compelling for the warfighter.

One example of how these technologies could enhance future warfighter training is development of virtual observers/controllers to provide on-the-spot corrections from within the tactical weapon system or command and control hardware. Another example is development of a team of graybeards who will use telepresence to inject themselves into the training scenario to provide observations and insights from a distant, networked leader-development facility.

Other potential benefits of these technologies include the ability to do the following:

- Adapt commercial "militarized" computer games to enhance or sustain individual training,
- Augment traditional digital training support packages with multimedia solutions to quickly immerse the warfighter into the unfolding training scenario, and
- Use the feature of character to enhance our virtual or constructive simulations to allow the opposing force to take on the character of the enemy in asymmetric warfare situations.

Supporting Initial BCTs

While working to obtain these key enabling technologies for the objective force, STRICOM is simultaneously supporting the formation and fielding of the initial BCTs. We have adopted a two-axis approach to support this effort.

On one axis, STRICOM is in direct support of the Army Materiel Command's Brigade Materiel Plan Overarching Integrated Process Team (IPT) initiatives. STRICOM is working closely with the U.S. Army Tank-automotive and Armaments Command's (TACOM's) IPT to execute the CSA's vision, to define the requirements for the new combat platform, and to ensure we leverage digitization and field a system to the initial BCTs with embedded training tools and devices.

STRICOM is also assisting TACOM with the platform performance demonstrations at Fort Knox, KY; the ongoing source-selection activities; and the development, submission, and review of potential technology insertion candidates. Reducing the logistical footprint of the BCTs is the predominate focus of the technology insertion candidates. From the training perspective, this is best achieved through the use of embedded training systems across all simulation domains, including the live-training instrumentation and products from the One Tactical Engagement Simulation Systems Program.

The second axis is focused in support of the TRADOC initiatives to define the initial brigade. A TRADOC IPT has divided its axis into three areas consisting of ranges; training aids, devices, simulators, and simulations; and sim/stim aligned with the three M&S domains. Because the Office of the Project Manager for Warfighters' Simulation is a STRICOM subordinate element, STRICOM is the leader of the Sim/Stim IPT.

STRICOM has submitted a proposal to design the future Military Operations on Urbanized Terrain range at Fort Lewis, WA. The goal is to link all three M&S domains into one facility. Although this effort may appear to be far reaching to some, a similar scenario is currently in use in today's theme parks. While awaiting the delivery of the future combat platforms, the range will permit the warfighter to train on the future platforms using M&S systems.

M&S Transformation Strategy

STRICOM's M&S transformation strategy must be overlayed and integrated with the Army's objective force strategy to ensure we meet the timelines outlined by the CSA and capitalize on programs already in place.

Conclusion

The CSA's challenge to maintain a well-trained, strategically responsive force during the transformation of the Army is not an easy task and can only be accomplished through a coordinated, well-formulated training strategy. TRADOC, with its vast experience and leadership, has taken on this mission. It understands that we must capitalize on situational awareness by leveraging digitization to significantly enhance the survivability and increase the lethality of the warfighter.

To train effectively and capitalize on the synergistic effect, we must have a system-of-systems approach linking the live, virtual, and constructive domains. For new brigades to reach their full potential, we must pursue key enabling technologies that will permit the warfighter to train in a fully immersive and joint interoperable environment—just as he would fight! STRICOM is responding to the CSA's challenge on point for the Army in modeling and simulaton.

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WARRIOR SYSTEMS TO MEET THE ARMY CHIEF OF STAFF'S VISION

COL Bruce D. Jette

"Our non-negotiable contract with the American people is to be a warfighting Army—persuasive in peace, invincible in war. Therefore, my overarching goal must be to provide the leadership—grounded in a vision of the future—to keep the Army the preeminent land warfighting force in the world."

— GEN Eric K. Shinseki,
Chief of Staff of the Army (CSA),
June 23, 1999

Introduction

In his initial statement of intent for his tenure as CSA, GEN Shinseki made clear his desire to ensure that the Army remains the world's most potent land force. To achieve this, " ... the force must be versatile, agile, lethal and survivable ... [able] to get there quickly and operate jointly." (*Soldiers* magazine, August 1999, Page 2) Accomplishing this in an austere funding environment with an extensive number of deployments demands a well-tailored and economically achievable plan for modernization. Essentially, light forces must be made more lethal and survivable while heavy forces must become more versatile and agile.

Central to all these issues is the soldier. No weapon threatens an enemy unless placed in the hands of a well-trained and ready soldier. Rifles and tanks do not arm themselves or deploy to fight. Soldiers do. Soldiers are the "weapon systems" and such assets as rifles and tanks provide them the combat overmatch to convince an adversary to capitulate or lose all. Therefore, to accomplish Shinseki's goals, the soldier must remain the focus around which the Army's fighting force is structured. Light forces must have more staying power, lethality, and survivability. Heavy forces must be lightened to increase agility and versatility without reducing the strength they bring to the battle. But our proven doctrine of organizing light and heavy forces to meet the specific needs of the operational or tactical situation dictates that these forces be modernized in concert, not as separate entities.

The Project Manager (PM), Soldier System is contributing to the fulfillment of this vision in a practical way by equipping the soldier systematically rather than as a collection of individual items. Metrics are being established to track success in enhancing both individual and collective capabilities of soldiers who are deployed with both light and heavy forces. Weight carried, power consumed, and situational awareness provide measurable parameters to support all soldier system objectives of lethality, survivability, mobility, command and control, and sustainability. The difference between their impact on light and heavy forces is simply an issue of emphasis.

Outfitting The Soldier

This effort literally begins at the skin of the soldier and extends to a vehicle or equipment interface. PM, Soldier System is responsible for everything soldiers wear and much of what they carry. As such, PM, Soldier System must ensure that soldiers are outfitted with clothing and personal equipment to survive in all operational environments, including hot, cold, wet, and dry climates; and in areas subjected to all types of ballistics and nuclear, biological, and chemical weapons. This process begins with undergarments and socks now made of highly sophisticated materials to provide lightweight protection from abrasion, cold, and moisture. Outfitting continues with uniforms that camouflage and protect; then to body armor and helmets; and to load-bearing equipment, canteens, and specialty items such as grappling hooks. While this seems like a rather mundane area of work, these items have been the primary source of increased weight for soldiers during the last 40 years, impacting survivability and mobility. During this same 40 years, chemical protection has gone from something needed under unusual circumstances to something required as part of the ensemble. True ballistic-protection body armor is only now being fielded. Advancements in lightweight materials to stop bullets and shrapnel demand further application to bulletproof helmets and more extensive coverage areas. But these advancements must be measured in terms of their total effectiveness in lethality protection, and their impact on survivability and on soldier mobility.

Communication Enhancements

Command and control must also be enhanced for the individual and the small tactical unit. Lightweight computers, sensors, and communication devices not only enhance the individual's effectiveness but also let the commander bind these more effective soldiers together synergistically. Light-force soldiers having no radio communications have traditionally communicated primarily through personal contact, hand and arm signals, and shouting. The addition of individual digital communications allows more secure, rapid, and accurate communications under all combat conditions. Coupled with the sensors and processors

attached to the soldier, this communication equipment provides individual soldiers and commanders greater situational awareness, which the commander can tailor to minimize distraction while maximizing effectiveness. The same electronics could provide the heavy-force soldier with more seamless connectivity to vehicle systems. Combat Vehicle Crewman (CVC) helmets may be replaced with ballistically protective modular helmets identical to those of the dismounted soldier. Integrated communications will, one day, allow wireless connectivity to the vehicle data bus, and the heads-up display will provide direct connectivity to sensors and eliminate the need to peer into fixed sights.

Land Warrior

The Land Warrior is the first warrior system that focuses on the individual as a weapon platform and is the primary asset to enhance soldier effectiveness on the battlefield. By focusing on the infantryman, Land Warrior presents the most difficult challenges to overcome in developing a warrior system. Every possible environment must be considered, including the harsh impact of airborne operations. Deep submersion required for special operations must be included. Isolation of units calls for highly efficient systems to minimize the forward logistics footprint. In addition, the large number of soldiers to be outfitted demands an extremely economical approach to the solution.

The current developmental system, version 0.5, has already reversed the growth in soldier load and increased ballistic and chemical protection while facilitating the efficient completion of 60 percent of individual and 90 percent of collective small-unit tasks. The Joint Contingency Force-Advanced Warfighting Experiment System, Version 0.6, will demonstrate the durability of the system and enable its refinement prior to the fielding of version 1.0.

To reduce the logistical footprint in theater, battery use and power management will be implemented through computer electronics and a central power bus, all seamlessly integrated into the soldier's fighting gear. In this way, unused sensors and electronics, now always on, can be shut down when not in use with little or no distraction to the soldier. Once implemented, the same bus system will provide for easy recharging of batteries when in a vehicle, connectivity to vehicle data busses, and ultimately to improvements in managing new power sources. Most important, it will allow reduction in some of the supplemental individual equipment components that have been the source of weight increases over the last 40 years.

Land Warrior advances the CSA's vision by making the light force more lethal, more survivable, and more sustainable in its initial configuration. More important, it positions the Army for even greater advances. Land Warrior makes the soldier the center of the weapon system. It integrates a well-trained and ready soldier, outfitted with systematically integrated clothing and equipment, with appropriate electronics to enhance connectivity to situational awareness. The electronic suite provides the first personal connection among a soldier's senses (both visual and auditory), sensors (such as on weapon systems), and situational awareness systems (such as the Tactical Internet). Redundant systems can be eliminated over time depending on these inherent soldier capabilities. For example, PM, Soldier System and PM, Javelin are working to integrate the computer, guidance, and visual functions of the Command Launch Unit (CLU) for the Javelin missile into Land Warrior, providing not just a logistic and economic savings but a significant weight savings. Clearly, each contributes to the CSA's vision, and this is only one of the initial integration efforts.

By keeping the basic concepts of warrior systems in mind as the Land Warrior is developed, the system becomes usable by all soldiers. Instead of connecting a spare battery to an M-4 modular weapon, the future Mounted Warrior will connect to a vehicle, the future Air Warrior to a helicopter, the future Medic Warrior to diagnostic equipment, and the future Logistics Warrior to barcode and microwave tag readers. Standardization of connections and software are all that is necessary to leverage this single development for all warriors.

Perhaps the greatest flexibility comes from considering the soldier as the basic weapon system and supplementing the soldier with equipment to form a specific warrior system. Future vehicles could be constructed with far less internal volume if each soldier came with heads-up displays to connect to a sensor data bus much as CVC helmets provide connection to intercoms. PEO, Ground Combat and Support Systems is working on a related program of common vehicle crew stations. The future Mounted Warrior will provide the common connection to those stations with little additional investment. There would be less logistical burden because of the reduction of vehicle components. All of this facilitates the CSA's vision of a lighter, more deployable heavy force.

Conclusion

PM, Soldier System focuses on fielding a systematically integrated ensemble of individual equipment providing a measurable improvement in lethality, survivability, situational awareness, and sustainability. Because the focus, to this point, has been on the Land Warrior, the first leap forward in capability will be for the dismounted infantryman. The reduced weight, logistical requirement, and improved interconnectivity will provide the enhanced versatility, agility, lethality, and survivability central to GEN Shinseki's vision.

Future efforts to leverage what is developed first for the infantry to the needs of the heavy forces will provide for a much lighter and more potent force. While both can evolve through component integration such as the Javelin CLU discussed earlier in this article, the greatest benefit can be gained by development of all systems with the soldier at the center. This will require *"leadership—grounded in a vision of the future—to keep the Army the preeminent land warfighting force in the world."*

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MANPRINT IMPLICATIONS OF COTS/NDI FOR THE BRIGADE FORCE INITIATIVE

MAJ Richard S. Barbera, Hugh Denny, and Nick Hubbell

Introduction

On Oct. 12, 1999, Army Chief of Staff GEN Eric K. Shinseki presented his vision of the Army of the 21st century to members of the Association of the United States Army. His vision, now known as the Brigade Force Initiative (BFI), is to convert the Army to a lighter, all-wheeled, common chassis force as quickly as possible.

BFI units are characterized as full-spectrum-capable forces. They are more lethal, survivable, and deployable, with a reduced logistics footprint. Shinseki stated that an interim force of two brigades located at Fort Lewis, WA, would make full use of existing systems to get the program moving quickly.

BFI changes the way soldiers train and fight as well as the number and types of systems they operate and maintain. The success of the BFI will depend on the most innovative and comprehensive application of manpower and personnel integration (MANPRINT) to date.

Unlike the traditional Army acquisition process, which can take years, commercial off-the-shelf (COTS) systems and nondevelopmental items (NDIs) will be used to initially equip BFI units. Part 2 of the *Federal Acquisition Regulation*, "Definitions of Words and Terms," defines commercial item and NDI as follows:

Commercial Item. *Any item, other than real property, that is of a type customarily used for nongovernmental purposes and that has been sold, leased, or licensed to the general public, or has been offered for sale, lease, or license to the general public.*

NDI. *Any previously developed item of supply used exclusively for governmental purposes by a Federal agency, a State or local government, or a foreign government with which the United States has a mutual defense cooperation agreement.*

A COTS-/NDI-based approach results in significant time savings in the research, development, and acquisition process. The engineering and manufacturing development phase is replaced with a brief candidate evaluation and down-selection process. In the case of NDI, previously developed U.S. or foreign defense military Service items are primary candidates. This article discusses MANPRINT implications of a COTS/NDI strategy and how that strategy supports the BFI.

Why Is MANPRINT Important?

MANPRINT originated as an Army initiative under GEN Maxwell Thurman when he was the Army Deputy Chief of Staff for Personnel (DCSPER). The initiative was later adopted by DOD and known as Human Systems Integration (HSI). Today, MANPRINT is a comprehensive management and technical effort to ensure total system effectiveness by integrating work from seven domains. The figure on Page 48 provides details on each of the domains.

The success of the Brigade Force Initiative will depend on the most innovative and comprehensive application of manpower and personnel integration to date.

MANPRINT DOMAINS

U.S. Total Army Personnel Command

Manpower. The number of human resources, both men and women, military and civilian, required and available to operate and maintain Army systems.

Personnel. The aptitudes, experiences, and other human characteristics necessary to achieve optimal system performance.

Training. The requisite knowledge, skills, and abilities needed by the available personnel to operate and maintain systems under operational conditions.

ARL-HRED

Human Engineering. The comprehensive integration of human characteristics into system definition, design, development, and evaluation to optimize the performance of human-machine combinations.

Army Safety Center

System Safety. The inherent ability of the system to be used, operated, and maintained without accidental injury to personnel.

U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM)

Health Hazards. The inherent conditions in the operation or use of a system (e.g., shock, recoil, vibration, toxic fumes, radiation, noise) that can cause death, injury, illness, disability, or reduce job performance.

ARL, Survivability and Lethality Analysis Directorate (ARL-SLAD)

Soldier Survivability. The characteristic of a system that can reduce fratricide and detectability of the soldier, prevent attack if detected, prevent damage if attacked, minimize medical injury if wounded, and reduce physical and mental fatigue.

The agency responsible for the Army's implementation of MANPRINT is the Personnel Technologies Directorate in the Office of the DCSPER. The Army Research Laboratory, Human Research and Engineering Directorate (ARL-HRED) assists the DCSPER with implementing MANPRINT into ongoing development programs and is responsible for long-term soldier research. ARL-HRED is uniquely suited to the MANPRINT task, with its field elements collocated at each of the key Army Materiel Command and Training and Doctrine Command facilities. Agencies responsible for each of the domains are shown in the accompanying figure.

By emphasizing the soldier's requirements in the acquisition process, MANPRINT influences design and fielding of weapon systems to improve battlefield effectiveness while reducing life-cycle costs. DoD Regulation 5000.2, *Mandatory Procedures for MDAPs [Major Defense Acquisition Programs] and MAIS [Major Automated Information System] Acquisition Programs*, paragraph 4.3.8 requires that a comprehensive management and technical strategy for HSI be initiated early in the acquisition process. Early involvement of MANPRINT (pre-Milestone 0) in system development produces significant cost savings through the elimination of expensive redesigns or workarounds late in the acquisition cycle. Given the need for a quick vehicle selection in the BFI, MANPRINT participation is essential early in the selection process to identify the "pluses and minuses" of a particular soldier-system design.

MANPRINT Support To An NDI Acquisition

The value of an NDI-MANPRINT collaboration was realized in the Forward Area Air Defense (FAAD) Line-of-Sight Rear competition. To meet time and cost challenges, the FAAD was compartmentalized and a set of NDI-based Requests For Proposals (RFPs) was released. The MANPRINT community played a significant role (25 percent of the overall selection criteria) in the selection process by providing evaluation criteria and evaluators for the competition.

The Boeing Corp. won this competition with its Avenger. Their design won with the top soldier-system performance, minimal safety and health concerns, and lower training costs. After selection, Boeing used the government's diagnostics test and study data from the competition to guide engineering design changes to the soldier-system interface (e.g., standardizing the crew compartment and remote control unit displays) to improve the overall performance of the Avenger design.

Implementing MANPRINT

Paragraph 3.3.2.1 of DoD Regulation 5000.2 requires a market survey to determine the availability of COTS/NDI prior to the commencement of, and during, the development effort. Army Regulation (AR) 602-2, *MANPRINT in the Systems Acquisition Process*, implements this DOD regulation. Under the requirements of paragraph 2.3 of AR 602-2, the program manager (PM) is directed to execute the MANPRINT Program for all systems that include NDI acquisitions and separately managed modification efforts. The PM is also directed to include MANPRINT as a separate major area in the source-selection process. PMs are required to ensure that members of the various MANPRINT domains participate in Source Selection Evaluation Boards (SSEBs).

Implementing MANPRINT into the BFI presents a unique challenge because NDI and COTS system designs are relatively mature. Nevertheless, MANPRINT plays a key role in assisting decisionmakers regarding the viability of a given solution. Many important issues directly impact system operational effectiveness. These issues include manpower required to support the new force compared to existing brigades; soldier aptitudes and skill levels; characteristics of user personnel; whether crew station designs accommodate the 5th through 95th percentile soldier; and the critical tasks and changes to tactics, techniques, and procedures (TTPs) required to ensure maintainability and survivability on the battlefield. Therefore, the support of MANPRINT to the BFI consists of the following:

- Developing MANPRINT questionnaires for industry to use in the market survey,
- Participating in development of requirements documents,
- Participating in the development of RFPs,
- Identifying the key measures of effectiveness (MOEs),
- Participating in the SSEB and assessing which systems offer the possibility of achieving the MOEs,
- Collecting data from comparable systems,
- Modeling likely mission scenarios in a system-of-systems model and developing data collection plans for verifying the model assumptions,
- Augmenting data voids with laboratory studies where research is required and conducting hands-on evaluations with real soldiers with systems under consideration,
- Recommending human engineering metrics for evaluating soldier-system performance along the seven domains of MANPRINT,
- Developing an overall recommendation of the best candidate,
- Identifying critical issues that could prevent the effective functioning of the brigade, and
- Summarizing findings in a human factors engineering assessment and a MANPRINT assessment.

Presently, a team of MANPRINT personnel is involved in supporting ongoing BFI activities with the Maneuver Mounted Battlespace Battle Lab and the Armor School at Fort Knox, KY. The MANPRINT team, which is led by ARL-HRED, is composed of personnel from ARL-HRED, CHPPM, and ARL-SLAD. ARL-HRED plans to furnish MANPRINT personnel for BFI at Fort Lewis, WA.

Conclusion

Through application of MANPRINT into the BFI, the return on investment can be substantially improved. COTS and NDI offer a tremendous opportunity to provide a near-term, cost-effective materiel solution with current, proven technology. Identification of soldier-system interface issues also provides the means to either incorporate system design changes or, in cases where a redesign is not feasible, changes in TTPs. Considering the urgency of the BFI, MANPRINT will facilitate the selection process, highlight possible strengths or weaknesses with a particular soldier-system design, and identify the required workarounds to ensure optimal combat effectiveness.

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An Army National Guard Perspective . . .

TRANSFORMING THE FORCE WITH INNOVATIVE INSTRUCTIONAL TECHNOLOGIES AND METHODOLOGIES

Maureen T. Lischke

"The magnificence of our moments as an Army will continue to be delivered by our people. They are the engine behind our capabilities. ... We will continue to attract, train, motivate, and retain the most competent and dedicated people in the Nation. ...

We will provide to the Nation an array of deployable, agile, versatile, lethal, survivable, and sustainable formations, which are affordable and capable of reversing the conditions of human suffering rapidly and resolving conflicts decisively.

Our commitment to meeting these challenges compels comprehensive transformation of The Army. To this end, we will begin immediately to transition the entire Army into a force that is strategically responsive and dominant at every point on the spectrum of operations. We will jumpstart the process by investing in today's off-the-shelf technology to stimulate the development of doctrine, organizational design, and leader training even as we begin the search for new technologies for the objective force."

—GEN Erik K. Shinseki
Army Chief of Staff
Excerpts from *The Army Vision: Soldiers On Point for the Nation ... Persuasive in Peace, Invincible in War*

Introduction

The Army National Guard is committed to the Army vision for a unified, strategically responsive force. Toward that end, the Army National Guard is committed to achieving its primary missions of military readiness and rapid response to federal and state needs by leveraging the best instructional methodologies, information systems, and communication technologies to deliver education, training, and performance-enhancing tools. The Army National Guard must have the capability to train forces rapidly in support of forward-deployed troops, domestic stability, and emergency response and homeland defense missions. By supporting the Army National Guard and other military partners, the Distributive Training Technology Project (DTTP) is providing the infrastructure to conduct training for diverse mission requirements under some challenging training conditions.

DTTP is a comprehensive, enterprise-wide solution for providing training in a distributed learning environment. This involves embracing evolving technologies as we move from instructor-centric teaching techniques to the student-centric learning environment that supports OSD's Office of the Director for Readiness and Training vision of "anytime, anywhere" training.

Given the research indicating that a technology-enhanced, student-centric environment is more effective, our limited training time dictates leveraging every possible resource to maximize that efficiency. The project was established by Congress in 1995 and was assigned to the National Guard Bureau (NGB) to implement. The DTTP is designed to support military readiness; improve command, control, communications, and computers; and provide opportunities for enhanced connectivity to nonmilitary users throughout the country through a plan for sharing the use of the distributive training technology (DTT) infrastructure.

DTTP Structure

The DTTP encompasses a network of classrooms, courseware repositories, business operations, and management tools. DTTP is already implemented throughout the United States, its three territories, and the District of Columbia. The backbone of DTTP is an asynchronous transfer mode (ATM) network, GuardNet XXI, connecting all partner classrooms and training facilities.

As of Dec. 1, 1999, 126 classrooms were established. Under current plans, approximately 339 DTTP classrooms will be established by 2003. DTTP classrooms are configured in four variations: small trainer classrooms, medium trainer classrooms, multimedia classrooms, and dual multimedia classrooms. Classroom capabilities range from simple audio conferencing to two-way video, two-way audio conferencing; and from single stand-alone computer-based training to interactive Web-based training. Virtual simulation capabilities are just around the corner with the development of the Virtual Emergency Response Training Simulator under the auspices of the Office of Consequence Management Program Integration Office. DTTP classrooms will be interoperable with The Army Distance Learning Program classrooms as well, thus leveraging off-the-shelf technology to support the training and education of both Active and Reserve components. The combined effort should result in more than 700 classrooms.

Courseware

Routing courseware to students in the classrooms and to desktop computers is accomplished through the Integrated Information System (IIS). The IIS provides a user interface to all network content and services, maintains a concise courseware repository listing, tracks all DTT services, maintains user account registry, and integrates the scheduling of all local and network resources.

In addition to disseminating content in myriad formats, the IIS incorporates a multifaceted application-level network management tool to remotely administer all aspects of the delivery and management of services provided over the net-

work. Each classroom and network-based multimedia domain has an inter-relationship with each other to transfer essential information needed to make the entire system operational. In addition, each classroom has a national scheduling capability.

The network backbone, GuardNet XXI, has 7 primary hubs located across the 48 contiguous states and a network operations center located in Arlington, VA. In addition, there are 47 subordinate nodes completing the connection to all states, territories, and the District of Columbia. Each node has two state-of-the-art ATM switches. In each case, the Defense Information Systems Agency controls one of the switches. The system was designed to be cost-efficient, reliable, expandable, and able to simultaneously support voice, video, and data transmission. The system was also designed to support the large bandwidth requirements associated with advanced simulation and modeling technology. In addition to supporting DTTP, GuardNet XXI is also being used to support a number of Army National Guard enterprise management programs, including the Reserve Component Automation System (RCAS).

The majority of military courseware is provided by the U.S. Army Training and Doctrine Command, with the Army National Guard's Professional Education Center and the Army Reserve Readiness and Training Center creating additional courseware unique to Reserve components. Nonmilitary courseware is being acquired and made available on a fee-for-use basis to limit capital investment in products with short life cycles while ensuring that current versions are available on all software products.

NGB Partnering

Increasingly, other components of the military are turning to distributed learning solutions to meet training requirements. The NGB is partnering with the following DOD organizations and others to leverage resources and capabilities:

- The NGB is working with the Central Technical Support Facility at Fort Hood, TX, to distribute digital training to Digital Divisions 2 through N, with the 10th Mountain Division as the first Digital Division to be trained outside Fort Hood.
- A Memorandum Of Understanding (MOU) has been signed with the U.S. Joint Forces Command to conduct joint training exercises in a distributed mode using DTT sites and GuardNet XXI.
- The U.S. Marine Corps/U.S. Marine Corps Reserve has signed an MOU with NGB to use distributive training to conduct military occupation specialty training.
- The Naval Air Warfare Center-Training Systems Division (NAWC-TSD) has signed a Memorandum Of Agreement with NGB to establish a Joint Advanced Distributed Learning Co-Laboratory at NAWC-TSD in Orlando, FL, and distribute training content through a link with GuardNet XXI.
- The NGB is actively working with the Field Artillery School at Fort Sill, OK, to develop and distribute field artillery training content in support of the Multiple Launch Rocket System.

Additionally, non-DOD agencies have been proactive in pursuing alternative training strategies to meet their own training requirements. The U.S. Patent and Trademark Office, for example, has signed an MOU with NGB to pave the way for training hundreds of patent examiners across the country. In addition, Big Brothers/Big Sisters of America has signed an MOU with the NGB to help meet its national staff training needs in a more cost-effective way.

Remaining Challenges

Challenges facing the National Guard in the 1990s made a distributed training solution a very desirable option. As the Army National Guard supports the transformation of the Army, hurdles remain. First, training requirements dramatically increase as a result of changes in roles and missions. Second, there are limited seats available in existing military classrooms for "in-residence" training. Third, trends suggest that budgets for training might not increase to meet additional training requirements. Finally, competing demands for time from Army National Guard personnel (already full-time professionals outside the Guard) place a severe limitation on when and for how long National Guard personnel could attend training without jeopardizing their civilian careers. This last factor alone continues to be one of the greatest challenges to retaining trained personnel in the National Guard.

The DTTP Manager is collecting and analyzing data on the success of DTTP and distance-learning solutions. The data so far look very promising. For example, in Iowa, the use of distance-learning technologies has directly led to a reduction in travel time and expenses:

- The resident component of the Armor Captains Course was reduced from 20 to 2 weeks. Associated travel costs—103.8 travel hours and 5,154 travel miles—were saved by attending readiness briefings via video teleconferencing.
- Distributed simulation of battalion and brigade exercises reduced training costs from $142,000 to $18,000 in 1997.
- A total of 58 ordnance officers trained at Camp Dodge, IA, when no seats were available in the resident classrooms at the U.S. Army Ordnance School.
- Participating in a multistate effort to train aviation-maintenance personnel on new aircraft, the National Guard was able to achieve a cost avoidance of $10,000 per soldier.

Conclusion

Comprised primarily of commercial off-the-shelf products, the DTTP endeavors to maximize the effectiveness of new technologies in support of innovative leader and soldier training. In an era of increasingly advanced technology, decreasing training budgets, and increasing training requirements, the Army National Guard must leverage every available asset that will allow us to " ... continue to attract, train, motivate, and retain the most competent and dedicated people in the Nation ... by investing in today's off-the-shelf technology to stimulate the development of doctrine, organizational design, and leader training even as we begin the search for new technologies for the objective force."

MAUREEN T. LISCHKE is the National Guard Bureau Chief Information Officer and the Program Executive Officer for DTTP and RCAS. She attended graduate school at the University of Georgia where she majored in computer sciences. She attended undergraduate school at the University of Delaware.

1999 FORSCOM CONTINGENCY CONTRACTING WORKSHOP

LTC Kenny Kendrick,
LTC Patrick O'Farrell,
and MAJ Mel Metts

Introduction

The 1999 U.S. Army Forces Command (FORSCOM) Contingency Contracting Workshop was held late last year at Fort Hood, TX. This annual event was hosted by III Corps and the Fort Hood Contracting Command. More than 70 officers, noncommissioned officers (NCOs), and emergency-essential civilians attended the 3-day conference. Attendees representing a broad range of contracting experience joined FORSCOM and III Corps participants. These attendees included personnel from the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology; U.S. Army Forces Central Command-Kuwait; U.S. Army Contracting Command Europe; XVIII Airborne Corps; 7th Transportation Group; joint Service counterparts; and I Corps representatives. The conference objectives were to provide an overview of various contracting organizations and personnel, review current changes in contracting doctrine and battlefield support, and discuss after action reports and lessons learned from FY99 missions.

Keynote Speaker

Keynote speaker, III Corps Commander LTG Leon J. LaPorte, discussed his experiences in contingency contracting support and his perception of contracting in the 21st century as a part of Force XXI and the Army After Next. He stated that contracting support is integral to obtaining support across the entire Army spectrum. He also noted that contingency contracting specifically provides the commander with a flexible and responsive means to support deployed forces and their mission.

While serving as 1st Cavalry Division Chief of Staff during Desert Storm, LaPorte recognized that contracting officers provide critical assistance in developing infrastructure, especially in austere environments. LaPorte learned from his wartime experience that, "When you go to war, ensure your contingency contracting officer is part of your mission decision-making process and remains in your back pocket." To bridge the gap before arrival of scheduled resources and combat service and support units, the Army is turning more frequently to contracting support to provide required goods and services.

At the conclusion of his remarks, LaPorte fielded questions from conference attendees. Areas that drew interest from conferees included current operational tempo (OPTEMPO), an additional skill identifier (ASI) for NCOs, and branch qualifying coded positions for majors within the Acquisition Corps.

FORSCOM Perspective

Toni Gaines, the Principal Assistant Responsible for Contracting (PARC), provided FORSCOM's perspective on contingency contracting and presented an overview of FORSCOM's mission. She also gave an update of the status on the new Standard Procurement System (SPS) for contracting, expounded on the Automated Individual Development Plan, and spoke about contingency contracting OPTEMPO. LTC Ken Cobb, the PARC Staff Officer in charge of FORSCOM contingency contracting, noted that contingency contracting OPTEMPO continues to be high. In fact, he said contingency contracting officers (CCOs) are continually deployed anywhere troops are deployed. In many cases, contingency personnel finish one deployment and immediately deploy again. Relief, however, is on the horizon with the advent of the new ASI G1 for NCOs.

III Corps Acquisition Section

In FY99, the III Corps CCO Division executed several deployments to Bosnia, Macedonia, Haiti, and Kuwait, with rotations to the National Training Center and the Joint Readiness Training Center. The CCO Division also participated in mission readiness exercises. Similar missions are scheduled for FY00, along with a drive to fill vacant contracting NCO positions within the Fort Hood Command.

The CCO Division is actively recruiting NCOs in Career Management Field 92 who possess the ASI in hopes of filling the division's robust Table of Organization and Equipment.

Other Briefings

COL Scott Risser from the Office of the Deputy Assistant Secretary of the Army for Procurement discussed the newly released Field Manual (FM) 100-10-2, *Contracting Support on the Battlefield*. This FM is DOD's first Service doctrine on contingency contracting. It addresses the logistics of contracting on the battlefield and is intended for the noncontracting reader responsible for, or involved with, planning and obtaining supplies or services through contracting support. Risser stressed that FM 100-10-2 provides a solid foundation for commanders and their staffs throughout the total Army on how to use contingency contractors as force multipliers.

Joint Service counterparts from the U.S. Air Force and Navy provided their perspectives on contracting organizations and missions and identified several major contingencies where each are involved. The Air Force in particular has a robust deployable force and currently has more than 170 CCOs and NCOs deployed in support of operations in Southwest Asia, Bosnia, and Kosovo. Current initiatives by the Army's Service counterparts include revising CCO warranting authority; increasing the purchase card limit to $200,000; emphasizing, financing, and dispersing agents on advance deployment teams; and researching the use of hand-held tools to automate contracting actions while away from the office.

MAJ Jay Norris from the U.S. Total Army Personnel Command's (PERSCOM's) Acquisition Management Branch stressed the importance of gaining experience in all contracting areas, especially in contingency contracting. Serving in a designated contingency contracting position is becoming a requirement and enhances the contracting officer's promotion opportunities. Norris also stated that promotion rates and command opportunities have increased slightly over the past several years. He emphasized that the most important factor for any officer is "manner of performance." Increased responsibility in duty descriptions and clearly written communications are also extremely important within the officer's efficiency reports. During the conference, officers were given the opportunity to review and update their officer record brief and discuss any outstanding issues.

Other issues addressed during the conference included use of IMPAC credit cards on deployments, filling contracting NCO positions within FORSCOM, scheduling PERSCOM training for officers prior to arrival at their unit, and implementing the SPS in a stand-alone role on a contingency basis. How FORSCOM was seamlessly integrating the civilian workforce for contingency missions was of particular interest to the emergency-essential civilians.

Conclusion

The 1999 FORSCOM Contingency Contracting Workshop was termed "highly valuable" by the participants, who were particularly encouraged by LTG LaPorte's strong support for contingency contracting as a force multiplier. The 2000 workshop, tentatively scheduled to be held at Fort Bragg, NC, will be used to evaluate progress in dealing with issues discussed at the 1999 workshop.

LTC KENNY KENDRICK, Commander, Contracting Command assigned to III Corps at Fort Hood, TX, is a graduate of the State University of New York at New Paltz and holds an M.P.A. from Jacksonville University and an M.A. in business from Webster University. He is also a graduate of the Army Command and General Staff College.

LTC PATRICK O'FARRELL, Chief, Contingency Contracting Division assigned to 13th Corps Support Command, Fort Hood, TX, is a graduate of the U.S. Military Academy and has an M.B.A. from the University of Missouri at Kansas City. He is also a graduate of the Armed Forces Staff College.

MAJ MEL METTS, Contingency Contracting Officer assigned to 13th Corps Support Command, Fort Hood, TX, is a graduate of South Carolina State University and also holds a master's degree in procurement and acquisition management from the Florida Institute of Technology. He is also a graduate of the Combined Arms Services Staff School.

FY98 Achievements Cited . . .

SECRETARY OF THE ARMY AWARDS PRESENTED FOR CONTRACTING EXCELLENCE

Sandra R. Marks

"This is a great day." With those words, Dr. Kenneth J. Oscar, Deputy Assistant Secretary of the Army for Procurement, welcomed the assembly of award winners, their sponsors, and distinguished guests to the Secretary of the Army Awards for Excellence in Contracting ceremony held Dec. 1, 1999, at Fort Myer in Arlington, VA. Units, teams, and individuals were honored for outstanding contracting accomplishments during FY98.

In his opening remarks, Oscar praised all those who have given outstanding support to our soldiers through their expertise and skills in contracting and business. Their efforts, Oscar said, have helped our customer—the soldiers—fight our country's wars and come back alive. He commended contracting officials for their creativity through difficult times of downsizing and reduced funding. Their creativity, Oscar added, spurred many new initiatives.

LTG Paul J. Kern, Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology, and Paul J. Hoeper, Assistant Secretary of the Army for Acquisition, Logistics and Technology, also recognized the key contributions that contracting personnel have made to the Army. Kern recalled how he has benefited from the professionalism, integrity, and hard work of contract professionals across the Army, both military and civilian, in almost every position he has held. He specifically praised the efforts of contracting officers who not only apply their federal acquisition regulations training but often use their on-the-spot ingenuity to create a good deal for the government and for their organization. Contracting officers, he added, not only help provide our soldiers the goods and services they need, but also help teach the rest of the world about competing, making a profit, and returning a fair equity for the goods and services we get.

Hoeper called contracting personnel an outstanding group of people who often operate under some significant constraints. Contract flexibility and proper use and understanding of the contracting process can often be key to solving problems, he added. Hoeper ultimately wants the Army to be perceived as a profitable place to do business, where flexibility can broaden the possibility of value creation.

Preceding the awards ceremony, Oscar presided over a Principal Assistant Responsible for Contracting (PARC) Workshop, which provided senior members of the contracting community an opportunity to hear updates on contingency contracting and acquisition reform training. Other workshop highlights included presentations by Mark Lumer, PARC, U.S. Army Space and Missile Defense Command (SMDC); and Ed Elgart, PARC, U.S. Army Communications-Electronics Command, who respectively chair the Program Effectiveness Committee and the Professional Development Committee. In addition, the Army Policy Member of the Defense Acquisition Regulation Council Greg Doyle gave a presentation on potential key contracting and acquisition policy changes. (For additional information on the PARC Conference, see the related article on Page 66.)

Deputy Assistant Secretary of the Army for Procurement Dr. Kenneth J. Oscar addressed attendees at the Secretary of the Army Awards for Excellence in Contracting ceremony.

Background

The Secretary of the Army Awards for Excellence in Contracting Program was established in 1997 to recognize outstanding contracting accomplishments. Units, teams, and individuals may be nominated for consideration. A list of the FY98 award recipients and their achievements follow.

Editor's Note: Award recipients listed in this article may no longer be serving at the organizations indicated.

Unit/Team Awards

Unit/Team Award For Installation-Level Contracting Center

The U.S. Army Forces Command (FORSCOM) PARC Staff was recognized for self-directed professionalism, acquisition expertise, and innovative synergy. Team members are Judy S. Armstrong, Judith W. Blake, Patricia A. Boterweg, Sandra G. Bruner, Gail L. Burrell, MAJ Scott A. Campbell, Susan M. Clark, LTC John L. Clemons, Toni M. Gaines, Brenda A. Good Miller, Julie G. Grace, COL Charles J. Guta, Irene E. Hamm, Steven A. Hunnicutt, Carol E.

Lowman, Rebecca M. McCarthy, Roy T. Marr, Gwendolyn S. Miles, Mary A. Morris, Alan Schantz, Joan G. Sylvester, Beverly Y. Thomas, W. Clyde Thomas, and Nancy L. Ware.

Unit/Team Award For Installation-Level Contracting Satellite

Fort Drum New York's Directorate of Contracting, FORSCOM was commended for its outstanding customer support, efficiency, resource management, and innovation. Team members are Norma J. Brennan, Sherry A. Breton, Sandra A. Brown, Melody Ciulo, P. Stephen Clendenen, Kathleen M. Countryman, Richard E. Edgar, Judith A. Felder, Bruce R. Ferguson, Cynthia L. Gillette, Paula M. Greene, Kelly A. Gotzmann, Kathy L. Hair, Kelly J. Haukaas, CPT Mark A. Hicks, John E. Honey, Barbara A. Hunt, Brenda L. Hunter, Solomon R. Jantzi, Christine L. Jeffries, Ronald C. Johnson, Monica D. Junod, James M. Lawlor, Martha L. Locy, Louise A. McBride, Debra A. McGuire, Roberta S. Meyers, Regina K. Miller, CPT David J. Pinter, Kelly R. Price, Gordon R. Reynolds, Carol A. Romeo, Annie L. Semo, John R. Stinson, Charles R. Taylor, Neil J. Walroth, and Karleen J. Witham.

Unit/Team Award For Systems Contracting

The Consolidated Theater Target Services (CTTS) Team, SMDC was recognized for exceptional performance of duties resulting in outstanding mission accomplishments through customer support, contracting cost efficiency, human resource management, and contracting innovation. Team members are Robbie Phifer, Willard Schick, Richard Sevigny, and Stephen Wynn.

Unit/Team Award For Specialized Contracting

The Systems Engineering and Technical Assistance Contract (SETAC) Team, SMDC was commended for its skills, dedication, and ingenuity, resulting in outstanding mission accomplishments through contracting innovation and efficiency, customer support, and human resource management. Team members are Kenneth Bragg, Mary Jones, Carol Meenen, Susan Rogers, and Lynne Washburn.

Outstanding Contracting Officers

Outstanding Contracting Officer (Civilian) At Installation-Level Center

Janie P. Wright, Contracting Officer, Army Atlanta Contracting Center, was recognized for exceptional customer focus, innovation, entrepreneurship, integrity, leadership, and dedication to professional self-development.

Outstanding Contracting Officer (Military) At Installation-Level Center

MAJ Gary Hickey, Directorate of Contracting, United States Army, South, was praised for superb leadership through problem analysis, new policy development, procedure streamlining, and customer and contractor training.

Outstanding Contracting Officer (Civilian) At Installation-Level Satellite

Deborah S. Craig, Contracting Officer, Directorate of Contracting, U.S. Army Training and Doctrine Command, Fort Rucker, AL, was commended for her exceptional and exemplary service, which helped accomplish numerous highly visible and installation-impacting projects.

Outstanding Contracting Officer (Military) At Installation-Level Satellite

MAJ Richard A. Catignani, Directorate of Contracting, Fort Campbell, KY, was recognized for his unequaled performance of duty and dedication to professional excellence, focusing on improving operations, support, and training.

Outstanding Contracting Officer (Civilian) In Systems Contracting

Diane L. Street, Contracting Officer, Army Materiel Command (AMC) Acquisition Center at the U.S. Army Soldier and Biological Chemical Command, distinguished herself by her outstanding contracting and management ability and her dedication and commitment to quality customer service.

Outstanding Contracting Officer (Civilian) In Specialized Contracting

Barbara McShea, Army Contracting Officer, Defense Supply Service-Washington (DSS-W), was cited for making maximum use of acquisition reform techniques for the benefit of customers.

Outstanding Contingency Contracting Officer (Military)

MAJ Daniel C. Rosso, U.S. Army Contracting Command Europe, was recognized for providing valuable contracting assistance and advice, and for maintaining accurate records of transactions that saved the government money. He was also cited for keeping his task force commander and chief of staff informed of all transactions.

Secretary Of The Army Professionalism In Contracting Award

Secretary Of The Army Professionalism In Contracting Award (Military)

MAJ Jon Campbell, Deputy for Contingency Contracting Operations and Policy, Office of the Assistant Chief of Staff for Acquisition Management, HQ, U.S. Army Pacific, was cited for demonstrating the highest level of contracting professionalism through his unselfish devotion to duty, outstanding guidance, training, and support to contingency contracting officers.

Secretary Of The Army Professionalism In Contracting Award (Civilian)

Sandra Crisp, AMC's Industrial Operations Command, was recognized for her leadership, technical skills, knowledge, and integrity, which have all contributed to her ability to excel in senior acquisition positions and improve the contracting profession.

Secretary Of The Army Professionalism In Contracting Award (Civilian)

Ronald E. Howell, Chief, Army Atlanta Contracting Center, FORSCOM, was praised for exhibiting outstanding individual professionalism in contracting, displaying exemplary leadership, innovation, and mission support. (Note: COL Charles J. Guta, FORSCOM, accepted the award in Howell's absence.)

Secretary Of The Army Award For Exceptional Support Of The Javits-Wagner-O'Day (JWOD) Act Program

The JWOD Program is one of the most important social programs that the Army uses to help blind and severely disabled people. This award recognizes commands, installations, or activities that successfully initiate significant additions of products or services to the Procurement List of the Committee for

Purchase from People Who Are Blind or Severely Handicapped.

The following organizations were recognized:

Defense Supply Service-Washington was commended for sponsoring a Pentagon exhibit of supplies and services provided by the National Industries for the Blind (NIB) and NISH and for serving as a test market for a wide variety of products manufactured by NIB/NISH.

U.S. Army Forces Command was commended for institutionalized support for community rehabilitation programs, many in locations that would not otherwise have federal service contracting opportunities.

Conclusion

At the conclusion of the ceremony, Dr. Oscar offered his vision of where the Army is headed in contracting. The goal, he said, is to take the Army's contracting experts and evolve them into contracting business experts, thus becoming business advisors to the Army community. The Army, he added, is asking its contracting experts to learn about business, finance, and industry, and seek out soldiers—the Army's customer. Oscar said that by being a business advisor to the command, Army contracting experts will substantially help in fulfilling the Army's mission.

SANDRA R. MARKS, an employee of Science Applications International Corp. (SAIC), provides contract support to the staff of Army AL&T magazine. She holds a B.S. in journalism from the University of Maryland, College Park, MD.

EXCELLENCE IN CONTRACTING AWARD RECIPIENTS

Editor's Note: Shown on the extreme left and extreme right of each photo below are Assistant Secretary of the Army for Acquisition, Logistics and Technology Paul J. Hoeper and Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology LTG Paul J. Kern. The photos show recipients of Secretary of the Army Awards for Excellence in Contracting and their sponsors.

UNIT/TEAM AWARDS

Recipient COL Charles J. Guta and Sponsor MG Robert Shadley. (Guta accepted the award on behalf of the FORSCOM PARC staff.)

Recipient Bruce R. Ferguson and Sponsor MG Robert Shadley. (Ferguson accepted the award on behalf of the Fort Drum Directorate of Contracting, FORSCOM.)

Recipients Robbie Phifer and Willard Schick and Sponsor Mark J. Lumer. (Phifer and Schick accepted the award on behalf of the CTTS Team.)

SETAC Team with sponsor Mark J. Lumer.

INDIVIDUAL AWARDS

Recipient Janie P. Wright and Sponsor MG Robert Shadley.

Recipient MAJ Gary Hickey and Sponsor Clea B. Efthimiadis.

INDIVIDUAL AWARDS (Continued)

Recipient Deborah S. Craig and Sponsor Wendell Noyes.

Recipient MAJ Richard A. Catignani and Sponsor MG Robert Shadley.

Recipient Diane L. Street and Sponsor Helen E. Morrison.

Recipient Barbara McShea and Sponsor COL Charles F. Vondra.

Recipient MAJ Daniel C. Rosso and Sponsor COL Donald R. Yates.

Recipient MAJ Jon Campbell and Sponsor Richard Young.

Recipient Sandra Crisp and Sponsor Brad Pierce.

JWOD AWARDS

Recipient Dennis R. Tozser and Sponsor COL Charles F. Vondra. (Tozser accepted the award on behalf of DSS-W.)

Recipient COL Charles J. Guta and Sponsor MG Robert Shadley. (Guta accepted the award on behalf of FORSCOM).

IMPROVING THE PAPERLESS ACQUISITION PROCESS

Richard J. McCunney

Introduction

Organizations have experimented with various initiatives to improve their paperless acquisition process. In some cases, the process amounts to little more than posting documents to the Web or attaching them to e-mail messages. While these approaches convert paper to digital data, they do little to improve the process of providing timely information to decisionmakers.

At the Communications-Electronics Command's (CECOM) Acquisition Center-Washington, the approach to paperless acquisition for the pre-award phase of best value procurements focuses on efficiently managing information rather than simply eradicating paper. In particular, two recently implemented Lotus Notes database programs securely transmit information between industry and government to improve the process and eliminate paper.

The first database program manages both the comment process during the draft solicitation stage and the question and answer (Q&A) process during the final Request For Proposal (RFP) stage. A paperless Q&A process could be achieved by simply providing industry an e-mail address to submit their comments or questions and a Web site to post the response. This approach, however, does nothing to track the disposition of the comment or the answer to the question.

Q&A Process

The CECOM Q&A Notes application provides a coherent, orderly structure to efficiently manage the draft comment and Q&A process. Industry users receive a Web address (**http://128.190.157.111**) where they can submit questions or comments about existing RFPs as well as view the government's response. This Web site provides a list of active solicitations to which comments or questions can be sent. After choosing the desired solicitation, the questioner selects the specific part of the solicitation for which a comment or question will be submitted. The questioner is provided a list of available solicitation sections from which to choose. The industry user then completes a form that includes the paragraph number of the relevant solicitation section, a brief subject, and the question. The Notes application automatically assigns the question to the party responsible for providing the answer. The application also notifies the sender via e-mail of the successful receipt of the question, as well as the name of the individual assigned to answer the question.

For a large acquisition where hundreds of questions or comments may be received, the initially assigned party can reassign the issue to another member of the team. Additionally, the Q&A manager of the project can reassign questions, as appropriate, to the proper party if the automatic assignment by the Notes application is incorrect. Once a comment or question is answered, the application routes it automatically to the team leader responsible for this RFP section, then to the contracting officer and legal counsel for review and approval. Once approved, the answer is posted to the same Web site for industry access.

At any point during the process, the Q&A manager or contracting officer can query the database on any matter, such as who has the action on the next comment or question. Team members responsible for answering the questions can sort them by subject or paragraph so that all questions on the same topic can be answered together. This procedure expedites the process and ensures consistency. Keyword searches can be performed in the database to locate any particular subject. Bottlenecks in the process can be identified quickly so that additional resources can be applied as necessary to keep project schedules on track. The resulting process eliminates paper as it reduces and efficiently manages the time required to handle industry input about the solicitation.

Additional Application

The second Lotus Notes program, the Source Selection Evaluation Board (SSEB) application, manages the items for negotiation (IFN) process with offerors who submit responses to the RFP. Evaluators use this application to document matters requiring negotiation with offerors who are identified during the process.

Because both the RFP and the offerors' proposals are available electronically through the Interagency Interactive Business Opportunities Web page (**http://abop.monmouth.army.mil**) developed by CECOM, the evaluator simply copies and pastes the appropriate RFP and proposal sections into the IFN form. As the IFNs are completed, the Notes SSEB application automatically routes them through the appropriate team leader, the SSEB chairperson, the contracting officer, and legal counsel for review, approval, and transmission to the offeror.

All offerors are provided with a secure Internet account to access their IFNs through a Web browser. When the offeror submits an answer to the IFN, the SSEB chairperson and IFN author are notified of the receipt of the response for review and disposition. Once again, the status of all IFNs is available in real time to the SSEB chairperson and contracting officer to monitor the progress and status of the evaluation. The database of IFNs can be sorted to provide essential information in a timely fashion to effectively manage the evaluation process.

Another Notes SSEB module provides the evaluators with a tool to facilitate a collaborative best-value evaluation of the proposals. All evaluators assessing the proposal are provided with a form to record their evaluation, along with the appropriate justification. When all evaluators have completed their individual assessments in an evaluation area, the application enables the team to develop a consensus evaluation and scoring of this proposal element. The SSEB chairperson can monitor the progress of the evaluation in real time to assess individual and team progress in meeting established target milestones, as well as review the quality and consistency of the evaluation.

Conclusion

In addition to eliminating paper in the acquisition process, CECOM Acquisition Center-Washington has found these Lotus Notes applications have reduced acquisition cycle time by providing managers with continuous, real-time insight into the evaluation process. The ability to meaningfully organize the data assists the review and decisionmaking process and improves the evaluation's quality and consistency.

RICHARD J. MCCUNNEY is an Electronics Engineer with the U.S. Army CECOM Acquisition Center-Washington, Alexandria, VA. He holds a B.S. in engineering from Villanova University and an M.S. in engineering from Penn State University. In addition, he has completed the Program Management Course at the Defense Systems Management College and is Level III certified in computer-communications and program management.

IMPORTANT NOTICE

If you are an individual who receives *Army AL&T* magazine and you change your mailing address, do not contact the Army *AL&T* Editorial Office! **We cannot make address changes regarding distribution of the magazine**. Please note the following procedures if you need to change your mailing address:

- Civilian members of the Army Acquisition Workforce must submit address changes to their Civilian Personnel Advisory Center (CPAC).

- Active duty military personnel must submit address changes to their Military Personnel Office (MILPO).

- Army Reserve personnel must submit address changes to the U.S. Army Reserve Personnel Command (ARPERSCOM) in St. Louis, MO.

- National Guard personnel must submit address changes to the Army National Guard Acquisition Career Management Branch at **perkindc@ngb-arng.ngb.army.mil** or call DSN 327-7481 or (703) 607-7481.

Your attention to these procedures will ensure timely mailing of your magazine.

FROM THE DIRECTOR ACQUISITION CAREER MANAGEMENT OFFICE

The acquisition career development community faces great challenges as a result of Army Chief of Staff GEN Eric K. Shinseki's new vision to transform the force, recent workforce reductions, and aging workforce issues. Grooming innovative leaders who have the multifunctional experience to step in and make a difference is now more critical than ever. With the dawning of the new millennium and the Army Acquisition Corps's (AAC's) second decade, we have established a number of initiatives that will make life considerably better for Army Acquisition Workforce (AAW) members in the 21st century.

At the fourth annual Army Acquisition Career Management Workshop in New Orleans, LA, in January, we introduced many ideas to support the changes required to transform the AAW. One idea is our initiative to establish a framework of career managers providing "one-stop" service to our members. Even certification requests will now go through career managers who will forward the requests to certification officials and, later, enter them into the Acquisition Career Record Brief (ACRB) database. We are trying to get the Acquisition Career Management Office (ACMO) and the Acquisition Career Management Advocates (ACMAs) back into the business of policy and programs and out of the "face" business. I encourage everyone to watch for the article on the annual workshop in the next issue of *Army AL&T*.

Winners of the annual ACMA and Acquisition Workforce Support Specialist (AWSS) of the Year awards were also announced at the workshop in New Orleans. Congratulations to Toni Gaines, ACMA of the Year, and Polly Merlo, AWSS of the Year. Gaines is employed at the U.S. Army Forces Command in the Southern Region and Merlo serves as an AWSS in the National Capital Region. Our ACMAs and AWSSs are dedicated to the AAC's vision of one integrated corps of leaders, and they are helping us make the vision a reality.

I also extend congratulations to the Materiel Acquisition Management Course graduates and the Command and General Staff College selectees.

FY99 Colonel Promotion Board results are announced in this issue on Pages 62-63. It's a great article outlining the emerging trends under our new officer evaluation reporting system. Unfortunately, the FY99 colonel promotion rate for AAC members was less than the Army average promotion rate and somewhat disappointing in comparison with last year's results. However, our current projections indicate that FY00 will show a marked increase in the promotion rate to colonel for AAC members.

I want to add that we are working with Deputy Chief of Staff for Personnel LTG David H. Ohle and his staff to ensure a smooth transition to the Officer Personnel Management System for the 21st Century (OPMS XXI). We hope to increase the AAC promotion requirements for this year's boards in anticipation of the smaller year groups that follow. By promoting more now and less during smaller year groups, we can provide a more equitable promotion opportunity while bringing our officer inventory in compliance with OPMS XXI inventory goals.

Workforce members often ask the ACMO staff who they should call for assistance with their Individual Development Plans or ACRBs. Under our new regional framework, career managers are available to provide you "help-desk" support. Civilian AAC and Competitive Development Group members should contact their Functional Acquisition Specialist (FAS) at the U.S. Total Army Personnel Command's Acquisition Management Branch (AMB). Military personnel should contact their assignment officer in AMB. All other workforce members should contact their AWSS. A contact list with all AWSSs and FASs is on the AAC home page at **http://dacm.sarda.army.mil.** The current schedule of the AAW 2000 briefings is also on that home page. Be sure to check for details about the next briefing in your area.

Finally, as you probably noticed in the announcement on the inside front cover of this magazine, Keith Charles, Deputy Director for Acquisition Career Management (DDACM), has assumed new duties in the Office of the Secretary of Defense. As such, I will serve as the Acting DDACM until a permanent DDACM is selected. On behalf of the Army Acquisition Workforce, I want to thank Keith for his outstanding achievements as the DDACM and wish him well in his new assignment. He will certainly be missed. I also want to ensure members of the Acquisition Workforce that I fully intend to continue the great work that Keith began during his tenure.

COL Roger Carter
Director
Acquisition Career Management Office

21 Graduate From MAM Course

Twenty-one students graduated in November 1999 from the Materiel Acquisition Management (MAM) Course, Class 00-001, at the U.S. Army Logistics Management College, Fort Lee, VA. The graduates included three allied officers from Turkey. The Distinguished Graduate Award was presented to MAJ James Raftery, assigned to the Army Research Laboratory's Sensors and Electron Devices Directorate, Adelphi, MD.

The 7-week MAM course provides a broad knowledge of the materiel acquisition process. Areas of coverage include acquisition concepts and policies; research, development, test, and evaluation; financial and cost management; integrated logistics support; force modernization; production management; and contract management. Emphasis is on developing midlevel managers to participate in the management of the acquisition process.

Research and development, testing, contracting, requirements generation, logistics, and production management are examples of the materiel acquisition work assignments offered to these graduates.

AAW 2000 Briefings Begin

Keith Charles, Deputy Director for Acquisition Career Management, kicked off this year's Army Acquisition Workforce (AAW) 2000 briefings in February 2000 in the National Capital Region.

All briefings are followed by a visit from the Mobile Acquisition Career Management Office, a team of experts from the Acquisition Career Management Office. The team provides assistance to AAW members and helps with updating Acquisition Civilian Record Briefs and Individual Development Plans.

The remaining schedule is as follows:

Atlanta, GA	TBD
Orlando, FL	TBD
Aberdeen Proving Ground, MD	March 21-24
Hawaii	April 3-4
Korea	April 6-7
Fort Bragg, NC	April 25-26
Huntsville, AL	May 9-12
Fort Worth/Fort Hood, TX	May 22-25
Warren, MI	May 31-June 1
Europe (Germany, England)	June 10-17
Fort Monmouth, NJ	June 26-27
Picatinny Arsenal, NJ	June 28-29
Fort Monroe/Fort Lee/Fort Eustis, VA	July 11-12
Omaha, NE	July 26-27
Fort Huachuca, AZ	Aug. 15-18
Fort Dietrick, MD	Sept. 6-7
Yuma, AZ	Oct. 11-12
San Antonio, TX	Oct. 23-24
Rock Island, IL	Nov. 13-14

PERSCOM Notes . . .

ACQUISITION CANDIDATE ACCESSION BOARD RESULTS

The annual U.S. Total Army Personnel Command (PERSCOM) Acquisition Candidate Accession Board (PACAB) was held Nov. 15-19, 1999, to review applications of officers for accession into the Army Acquisition Corps (AAC). The board reviewed the records of 70 officers from year group (YG) 93 and 61 officers from other year groups. The PACAB selected 95 officers for accession into the AAC.

The Director of PERSCOM's Officer Personnel Management Directorate approved PACAB's selections, and the officers were accessed into the AAC from the YGs indicated. Congratulations to the following officers:

RANK	NAME	BASIC BRANCH	YEAR GROUP
CPT	ALLISON RANDY SCOTT	MI	1993
CPT	ANSLEY STEVEN ROY JR	AV	1993
CPT	BARRETT CLARK CHRISTIAN	AR	1993
CPT	BEARD KIRBY DWAYNE	FA	1993
CPT	BECKEY MARK ANDREW	AV	1993
CPT	BECKMANN MATTHEW CLEMENS	MI	1990
CPT	BESAW CRAIG STEPHEN	AV	1993
CPT	BLANEY JEFFREY DEREK	SC	1993
CPT	BURRIS JOSHUA RICHARD	QM	1993
CPT	CARRERA DANIEL SERVANDO	MI	1993
CPT	CASH JONATHAN GERALD	SF	1991
CPT	CAULEY TIMOTHY MARK	FA	1990
CPT	CHAMBERS DAVID PHILLIP	QM	1991
CPT	CHARLES MELODY JANE	FI	1993
CPT	CLANTON ANDREW BULLINGTON	MI	1990
CPT	CLINE TODD CARL	QM	1993
CPT	COLON JOSE ENRIQUE	SC	1990
CPT	CONROY MICHAEL PATRICK	TC	1993
CPT	COSLIN DAVID LEE	AR	1993
CPT	COTTOARROYO LUIS	QM	1993
CPT	CUMMINGS KENNETH FRAZIER	TC	1993
CPT	DEAN GLENN ALLEN III	AR	1993
CPT	DELLERT GREGG MICHAEL	AV	1993
CPT	DEMARTINO CHARLES RUSSELL	AV	1993
CPT	DOOLEY MATTHEW RUSSELL	FA	1993
CPT	EDWARDS JOSEPH ALLEN II	AV	1993
CPT	FARMER TYRONE WHITNEY	EN	1994
CPT	FERREIRA JAY MICHAEL	OD	1991
CPT	FINCH KEVIN JAMES	OD	1992
CPT	FLAIL KEITH ALLEN	AV	1989
MAJ	FLANDERS THOMAS PATRICK	OD	1988
CPT	GAMEL DANNELL TODD	OD	1993
CPT	GARD DUKE BRYAN	AV	1990
CPT	GENTRY TODD MICHAEL	TC	1993
CPT	GUFFY KENT GREGORY	AD	1993
CPT	HALL LAMONT JOHN	MI	1993
CPT	HANG YEE CHANG	AR	1991
CPT	HANSON MICHAEL GERALD	QM	1993
MAJ	HEILIG DONALD M JR	FA	1987
CPT	HELM ERIC GORDON	AV	1990
CPT	HENDERSON ROGER GARRETT	AV	1993
CPT	HIGHT WILLIAM BRYAN	FA	1991
CPT	HITT JOSEPH KARL	EN	1989
CPT	HOFFMAN DEAN MECK IV	SF	1992
MAJ	HOMSY SAMUEL CHARLES	EN	1987
CPT	HURST DONALD WRAY III	MI	1992
CPT	JENKINS SHAWN TERRELL	IN	1993
MAJ	JOHNSON LEWIS ALLEN JR	FA	1988
CPT	KELLEY THOMAS CLIFFORD III	AV	1991
CPT	KERISH JOHN FRANCIS	IN	1990
CPT	KERLEY NELSON GLENN JR	EN	1992
CPT	KILLEN BRADLEY JAMES	AV	1993
CPT	KIMBALL CHARLES FOSTER	CM	1992
CPT	KISSELL GEORGE CHARLES	MP	1991
CPT	LANGE JASON ANDREW	AV	1993
CPT	LAURILA JOHN JAMES	MI	1993
CPT	LEE CEDRIC DEON	OD	1990

CPT	LEE JONG HYUK	AV	1991
CPT	LOCKARD WILLIAM MACLEAN	FA	1990
CPT	LOFTON MICHAEL STEPHEN	IN	1989
CPT	LUCAS SHAWN PATRICK	FA	1993
CPT	LUCIUS TOMMIE JOE	QM	1993
CPT	MACGREGOR LEE JAE	MI	1992
CPT	MALONEY PATRICK WILLIAM	FA	1990
MAJ	MANAUIS ROY CARMELO L	IN	1987
CPT	MCGEE RANDY EUGENE	AG	1992
CPT	MCGHEE ALONZO BERNARD	MI	1991
CPT	MENDOZA WENDELL LACUATA	QM	1993
CPT	MERCADO LUCIANO	EN	1991
MAJ	MISKOVIC MARK ANDREW	AV	1988
CPT	MOBLEY KEVIN DUANE	AV	1991
CPT	MURRAY RANDY	AV	1990
CPT	NASH KEVIN MICHAEL	AR	1991
CPT	NERDIG DANIEL ADAM	OD	1993
CPT	NEWSON MARCELLUS JEROME	AD	1993
CPT	NOBLE RICHARD JAY	AV	1993
CPT	OGBURN JOHN DAVID	TC	1992
CPT	PANOZZO PAUL RICHARD	QM	1993
CPT	PRICE PAUL EDWARD	OD	1993
CPT	ROYSE LYNDA RENEE	EN	1993
CPT	SANDERS SHELLEY ELENA	FI	1994
CPT	SCHWEITZER STEVEN JOHN	AV	1990
CPT	SHARP PAULA DARLENE	MI	1993
CPT	SHAW TREVOR WARREN	IN	1988
CPT	SHELTON ROBERT WAYNE	OD	1991
CPT	SHEPARD JASON KINCAID	AD	1993
MAJ	SOLOMON NORMAN EUGENE	FA	1987
CPT	SPARROW WILLIAM EDWARD ARTH	TC	1992
CPT	TAYLOR KEITH LLOYD	FA	1994
CPT	THOMPSON-BLACKWELL ROSALYN	QM	1993
CPT	TOGISALA LLOYD LEE	SC	1993
CPT	VANNOY JOHN MARSHALL	AV	1991
CPT	WALLACE EUGENE FITZGERALD	IN	1993
CPT	WASHINGTON CRYSTAL MICHELLE	AG	1993
CPT	WILSON TERRY MAC JR	IN	1990

FY99 Colonel Promotion Board Results

The release of any promotion list is always followed by an exhaustive data analysis to "map" the characteristics of the considered and selected populations. This article summarizes the initial analysis of the Army Acquisition Corps (AAC) population for the FY99 Colonel Promotion Board.

Overall Acquisition Corps Results

Board members reviewed the files of 58 AAC officers in the primary zone. From this population, 23 were selected by the board. The resulting selection rate of 39.6 percent is below the Army Competitive Category figure of 49.6 percent. Additionally, one officer was selected above the zone to give the AAC a total of 24 selections and a Defense Officer Personnel Management selection rate of 41.3 percent.

Who Was Promoted?

Of the 23 officers selected in the primary zone, all were either current or previous centrally selected product managers (PMs) or acquisition commanders. At the time the board convened, two officers were serving as PMs and one selectee was serving as a contracting commander. Only 6 of the 23 selectees had not been previously selected for Senior Service College (SSC) resident or corresponding studies prior to the FY99 Colonel Promotion Board. The six not selected for SSC prior to the board convening were selected on the FY00 SSC list.

Trends

Officers who complete a successful PM or command tour (receiving top-block Officer Evaluation Reports (OERs) under the old OER system with supporting narrative write-up from the senior rater and at least one above-center-of-mass rating under the new DA Form 67-9) are competitive for continued service as colonels.

Who Was Not Promoted?

Of the 35 officers in the primary zone not selected for promotion to colonel, only 11 were either current or former PMs or acquisition commanders. The majority of those officers not selected for promotion to colonel had not served as an O-5 level PM or acquisition commander.

Trends

Clearly, success as a lieutenant-colonel-level PM and/or commander is key to competing for promotion to colonel. Late selection for PM/command (especially when the board sees no "command" reports) can result in nonselection. In the past, these officers have sometimes been selected "above-the-zone" by subsequent boards. This year, one officer was selected in this category by the board, resulting in a 2.5 percent selection rate, slightly higher than the Army Competitive Category figure of 2 percent.

General Observations

The file quality of officers selected for promotion continues to be strong. The competition remains tough with insufficient requirements to promote all successful PMs and commanders. Early selection for lieutenant colonel PM or command improves one's chances for promotion to colonel. Strong narrative comments from senior raters appeared to benefit promotion candidates and make them more competitive than those without such comments.

Summary

The practices that have held true for previous boards are still valid. It is imperative for officers in all consideration zones to take time to personally "scrub" their Officer Record Brief to ensure accurate information is conveyed to the board members. Do not forget about the photo. Photos

more than 2 years old should be replaced. Check your awards, branch, and U.S. insignia, etc. Attention to detail makes a difference.

Finally, as a captain or major, seek career-broadening experiences to become competitive for early selection as a lieutenant colonel PM or commander. With limited positions in program executive offices, PERSCOM will need to rotate captains and majors approximately every 24 months to ensure a sufficient pool of experienced branch-qualified officers for future PM positions.

FY99 AAC Colonel Selectees

The following is a list of acquisition officers selected for colonel by the FY99 Colonel Promotion Board:

Brown, Mary Kathleen
Cole, Thomas Michael
Cripps, David Bruce
Dellarocco, Genaro James
Haynes, Jacob Norton
Holmes, Sharon Lee
Johnson, Michael Ellery
Johnson, Theodore Elliot
Johnson, William Reed Jr.
Jones, Mark William
Jorgenson, Charles Harold
Justice, Nickolas Grey
Kotchman, Donald Paul
Lake, William George Jr.
Leach, Kim Charles
Maxwell, Jody Allen
Miller, Gregory Scott
Ogg, Robert David Jr.
Parker, Christopher John
Perry, Steven Richard
Petty, Frank Siggard
Reyenga, Robert Lee
Sans, Luis Diego
Weger, James Edward

FY99 Acquisition Corps Resident Command And Staff College Officer Selection Results

The FY99 Command and Staff College (CSC) Selection Board results for Academic Year (AY) 00/01 were released Dec. 16, 1999. Seventy-three Army Acquisition Corps (AAC) officers were selected for resident attendance, and 41 AAC officers were revalidated. Statistical information for each year group is shown in the table on Page 64.

FY99 board results are unique because of the transition from a four-look to a two-look selection process. The board selected the number of officers from year groups (YGs) 86 through 88 to close them out at their 50-percent selection rate. These year groups will not be considered again for resident CSC attendance. Under the two-look system, 20 percent of YG89 was selected. The other 30 percent (by the FY100 board) will be selected along with 20 percent of YG90.

Allocation of seats for AY 00/01 has not been finalized, but the U.S. Total Army Personnel Command's Acquisition Management Branch anticipates approximately 60 seats against the total population of 114 selectees. At the time this article was written, slating decisions were expected to be finalized around the middle of February 2000.

Congratulations to the following officers selected to attend CSC:

ALEXANDER SCOTT EDWARD
AMBROSE MATTHEW HENRY
ANDERSON THOMAS JOSEPH
ARMSTRONG SCOTT C
BACKMAN ROBERT EDWARD
BALLEW MARK EDWARD
BANDY LEIGH MICHAEL
BARRACLOUGH BRETT A
BATCHELDER DEAN RAY
BLANCHETTE ROBERT D
BLANCO JAMES ALLEN
BORUFF WILLIAM MAX
BRIGHAM DAVID RALPH
BRUNSON KERRY PATRICK
BURDEN PATRICK WESLEY
CAPOBIANCO JOSEPH ANTHONY
CARD DENNIS ALAN
CARRICK KENNETH GEORGE
CLARK WILLIAM JOHN
COLE WILLIAM EDWARD
COMPTON RAYMOND KENT
CREECH GREGORY STUART
CRUMLEY DENNIS VINCENT
CULLEN JEFFREY LEONARD
DANIELS DEBRA DEENA
DIMARCO ANDREW JOHN
DODGE RONALD CLEVELAND JR
DONOVAN SHARLENE JOY
EPPS WAYNE EVERETTE
FIELD WILLIAM EDGAR
FLETCHER ROBERT ERIC
FLINT JEFFREY LEWIS
FLOERSHEIM ROBERT B
FORTUNATO EDWARD MICHAEL
FROM JEFFREY DWAYNE
FRULLA KURT ANTHONY
GARLAND WILLIAM ANTHONY
GORDON VELMA WARD
GREIN ALFRED JOSEPH
GRINSELL CHRISTIAN B
GRUBBS ALBERT LEE
HAGER JEFFREY EUGENE
HAIDER RUTH ANN
HANNAH ROBERT JOHN
HARPER ROBERT DALE
HARPER VICTOR RAINIER
HARRIS BENJAMIN MATTHEW
HAYTHORN MARK EDWARD
HILL RONALD EDWARD
HIRSCHMAN KEITH ALAN
HITZ STEPHEN ERNEST
HOUSEWRIGHT RICHARD W
HUBNER MICHAEL WINFRIED
JACKSON TONIE DAVIS
JOHNSTON ROBERT JON
JONES WALTER
JOST WADE RANDALL
KEMMERER DAVID ALAN
LAMB TODD FRANKLIN
LEAPHART JOHN RUSSELL
LIPPERT THOMAS EDWARD
MACDONALD ANDREW JAY
MANZO JENNIFER JENSEN
MARION ROBERT LEE
MARTINO CHARLES DAVID
MATTHEWS JOHN CONNOR
MCMANUS GILBERT SHAWN

MENTZER RODNEY ALLEN
METTS MEL MARK
MINUS JOSEPH SHEPPARD
MITCHELL JAMES CALVIN
MOFFATT JAMES ANTHONY
MOHONEY ERIC VERN
MYERS YEWSTON NATHANIEL III
NELSON SCOTT
NEWELL MICHAEL WILLIAM
OLSEN ROBERT FRANS
OREGAN JOHN MICHAEL
OYLER DOUGLAS LAYNE
PAYNE THOMAS LANCASTER
RAMSAY THOMAS ALAN
RANKIN JAMES ANDREW
RAUER SCOTT JOSEPH
RICHARDS CLYDE EZEKIEL JR
RICKEY JON KEITH
RIGGINS DAVID WILBURN
ROBERTSON KENNETH LEE
ROGERS STUART KAVAN
SCHAFER JOSEPH HUGHES
SCHNAIDT MATTHEW C
SCHUETZ DOUGLAS ANTHONY
SHANKLIN JOHN ELLIE J
SMITH JAMES HENRY
SOUDER JEFFREY KENT
STODDARD KEVIN PATRICK
SWANSON EDWARD JOHN
THEALL DEBORA LYNN
THEODOSS MICHAEL DAVID
UTROSKA WILLIAM THOMAS
VANNOLEJASZ SANDRA LEE
WALLACE GORDON TIMOTHY
WASHINGTON GAIL LYNN
WEGLER MICHAEL KARL
WELLBORN ROBERT MARSHALL
WELLS CHARLES ANDREW
WILLHELM STEPHEN TAYLOR
WILLIAMS JULIAN ROOSEVELT J
WILLIAMS RODNEY VAN
WILSON VERONICA ANN
WITHERS JOHN RAY
WOMACK JOHN SHANNON
WRIGHT GARY
WYGAL WILLIAM RUSSELL
ZRIMM MICHAEL PAUL

AAC CSC STATISTICS					
YEAR GROUP	POPULATION	TOTAL TO SELECT	PREVIOUS SELECTS	FY99 SELECTS	TOTAL SELECTS
86	102	51	40	11	51
87	119	60	50	10	60
88	106	53	28	25	53
89*	137	69	3	27	30
TOTALS	464	233	121	73	194

*Includes three YG90 officers selected below the zone to major

FAS Support Regions

Functional Acquisition Specialists (FASs)—the Civilian Career Managers at the U.S. Total Army Personnel Command—are now aligned by region rather than by functional area. As such, Army Acquisition Corps (AAC) civilians and Competitive Development Group members should contact their appropriate regional FAS in one of the following five regions: National Capital Region (NCR), Southern Region, Western Region, Northeast Region, and Central Region. The current FASs are listed below by region. A contact list is also on the AAC home page at **http://dacm.sarda.army.mil**.

For further information regarding FASs and the specific regions they support, please contact Gail DiNicolantonio at (703) 325-3222, DSN 221-3222, or e-mail **dinicolg@hoffman.army.mil**.

NCR

Leon McCray: (703) 325-4267, DSN 221-4267, e-mail **mccrayl@hoffman.army.mil**.
Chandra Evans-Mitchell: (703) 325-9690, DSN 221-9690, e-mail **evansc@hoffman.army.mil**.

SOUTHERN AND WESTERN REGIONS

Ken Winters: (703) 325-3215, DSN 221-3215, e-mail **wintersk@hoffman.army.mil**.
LaVerne Kidd: (703) 325-3190, DSN 221-3190, e-mail **kiddl@hoffman.army.mil**.

NORTHEAST AND CENTRAL REGIONS

Bruce Dahm: (703) 325-6137, DSN 221-6137, e-mail **dahmb@hoffman.army.mil**.
Gail DiNicolantonio: (703) 325-3222, DSN 221-3222, e-mail **dinicolg@hoffman.army.mil**.

From The Acquisition Reform Office . . .

Enterprise Change Management

The Army and DOD are in the midst of the revolution in business affairs. DOD has committed to breakthroughs in acquisition management with revolutionary enterprise performance results. On April 1, 1998, Secretary of Defense William S. Cohen submitted to Congress an implementation plan to streamline the acquisition organizations, workforce, and infrastructure. The Enterprise Change Management Plan was implemented during the last 2 years to gain rapid improvements toward specific goals and objectives. Enterprise "outcome-driven performance scorecards" were developed and used to measure progress against established outcome-driven performance baselines. Senior executives reporting to the Under Secretary of Defense for Acquisition, Technology and Logistics were the acceleration leaders for specific initiatives, and they are now accountable for their performance as measured by the scorecards. The following paragraph describes some recent initiatives resulting from the scorecards.

The Fiscal Year 1999 Procurement Statistical Reports and Summary of Procurement Actions have been published, and the Acquisition Reform (AR) Office is collecting data to prepare annual progress reports. Metric charts are being developed and posted to the World Wide Web at **http://acqnet.sarda.army.mil/acqref/armetrc.htm.** Many of these current measures are output-related and provide status information about an initiative in terms of completing work by a specified timeframe or within certain parameters. While output measures are appropriate for assessing performance, they are more useful for decisionmaking because they show the results related to an initiative in terms of its effectiveness, efficiency, or impact. In the next issue of *Army AL&T* magazine, the AR Office will provide information on the outcome-driven performance improvement results of the Enterprise Change Management initiatives. We will specifically report on how DOD and the Army are doing in achieving each of the goals.

Commercial Business Environment: Accelerating Change Through Enterprise Teaming

Dr. Jacques S. Gansler, Under Secretary of Defense for Acquisition, Technology and Logistics, signed the Section 912(c) report *Commercial Business Environment: Accelerating Change through Enterprise Teaming* on Nov. 23, 1999. He also signed a memo directing the Deputy Under Secretary of Defense for Acquisition Reform to take immediate action on the report's following key recommendations:

- Establish a Change Management Center (CMC) to accelerate acquisition and logistics reform initiatives, while providing a resource for change management across DOD;
- Explore using the CMC to help the Defense Acquisition University adopt key attributes of the corporate university approach to provide education and training for the acquisition, technology, and logistics workforce; and
- Pursue and incorporate, where possible, cross-functional teaming to accelerate organizational goals and manage change across the Defense business enterprise.

The report provides a vision for adopting fundamental commercial best practices within the DOD business enterprise. These practices involve cross-functional teaming across the enterprise. They also involve managing change while creating and maintaining a learning organization that seeks out and adopts best practices to improve individual and organizational performance. The report describes the application of these practices to "Team Acquisition," a cross-functional approach to the end-to-end management of acquisition that embraces best practices, empowers all enterprise players, and achieves optimal solutions in support of warfighters.

The report details a business model and provides an implementation plan for accelerating and managing change that DOD can use to transition to a Team Acquisition-type organization. The model uses rapid improvement teams (RITs) to inculcate teaming across the enterprise to achieve organizational goals (see related article on RITs in this column). This change model could be used to accelerate the revolution in business affairs and implement the recommendations found in other Section 912(c) studies.

Rapid Improvement Team Process

The Rapid Improvement Team (RIT) process evolved from the Section 912(c) Commercial Business Environment Study Group, which was chartered to identify training on commercial business practices for the DOD Acquisition Workforce.

The report called for DOD to improve individual and organizational performance across the enterprise through the use of RITs to create a learning organization and thereby achieve acquisition and logistics reform integration and acceleration. The RIT is a cross-functional team composed of senior representatives from the Office of the Secretary of Defense, the military departments, and other Defense agencies. The RIT process is a commercial learning process, industry's version of continuous learning, and an application of the corporate change for DOD. Unlike the integrated product team that can have a longer range focus (9 months or more), the multi-Service/Defense-agency RIT process provides results more rapidly. The initial design phase can be completed within days, and the final product (written plan, performance scorecard, etc.) completed within a 90-day turnaround.

The RIT process focuses on the process of change and is a collaborative effort of all stakeholders, who rigorously define problems or barriers and determine a plan or model

to overcome the barriers. Professional facilitators provide course direction, drawing upon their commercial-based experience. Interviews are conducted with all stakeholders prior to convening the RIT to ensure all concerns are brought out. Some of the RITs that have been conducted recently are Knowledge Management, Performance-Based Services Acquisition, Acquisition of Commercial Items, Reduction in Total Ownership Costs, and Defense Logistics Agency/Allied Signal Strategic Alliance and Source Inspection.

Army PARC Conference

A streamlined Army Principal Assistant Responsible for Contracting (PARC) Conference was held Dec. 1, 1999, at Fort Meyer in Arlington, VA. Dr. Kenneth J. Oscar, Deputy Assistant Secretary of the Army for Procurement and recent recipient of the Presidential Rank Award, hosted the 4-hour miniconference. The theme was "Professional Development of Contracting Personnel" (CP-14 career field).

Mark Lumer, Army Space and Missile Defense Command and Chairman of the Program Effectiveness Committee (PEC), presented the PEC annual report and discussed the status of the CP-14 Strategic Plan. The PEC objective is to resolve the outstanding issue of supervisory developmental assignments and coordinate the Strategic Plan with the PARCs.

Ed Elgart, Communications-Electronics Command, outlined the objectives of the Professional Development Committee, which he chairs. In addition, COL Lee McMillen updated the PARCs on performance-based service contracting initiatives, and Greg Doyle provided a Defense Acquisition Regulation Council update. McMillen and Doyle work in the Office of the Deputy Assistant Secretary of the Army for Procurement.

Advanced Acquisition Reform Training III

"Incentivizing Contractors" is the theme of Advanced Acquisition Reform Training III (AART III), a series of training sessions designed to strengthen and fine-tune key contracting skills of acquisition professionals. In keeping with the Army's commitment to ongoing training and development of the Acquisition Workforce, more than 800 participants are expected to attend AART III at more than 20 locations this fiscal year.

The AART III sessions concentrate on areas where additional training and emphasis will generate the most significant "payback" to DOD. This includes a more efficient acquisition process, contractors incentivized to provide high-quality goods and services to the government, a better educated and "business-smart" workforce, and increased customer satisfaction. In addition to "Incentivizing Contractor Performance," core topics for this year are Negotiation Skillshop and Outcome-Based Source Selection. A full slate of electives will also be offered to fill out the 3- or 4-day workshop tailored to organizational needs.

GAO Study Of IPT Best Practices

The Government Accounting Office (GAO) recently began a study of the best practices for employing multidisciplinary teams to manage product development programs. The objective is to improve teaming performance in managing DOD's weapon system programs. The study team will develop a model of teaming best practices and compare the model to current DOD practices. Some of the issues to be addressed are: What should be the DOD unit of analysis?; What are the most appropriate integrated process team levels?; and What is the best mix of program offices, teams, and persons on the teams?

The study report, expected at the end of 2000, will provide recommendations for achieving better DOD teaming results. Your comments or suggestions are solicited for input to the GAO study. If you are using teaming successfully or in innovative ways, please tell us your story.

The point of contact for Army input is Melissa Pittard in the Acquisition Reform Office, (703) 681-9141, Fax (703) 681-7583, e-mail **melissa.pittard@saalt.army.mil.**

For additional information on acquisition reform articles, contact Monti Jaggers in the Acquisition Reform Office at (703) 681-7571, DSN 761-7571, e-mail ***monteze.jaggers@saalt.army.mil***.

NEWS BRIEFS

Natick Researchers Hope To Cut Costs Of Flame-Resistant Uniforms

Researchers at the U.S. Army Soldier and Biological Chemical Command's (SBCCOM's) U.S. Army Soldier Systems Center, Natick, MA, are striving to develop affordable, flame-resistant uniforms for the Nation's military personnel.

Flame and incendiary weapons have been used in combat for centuries and are still used in conflicts today. Protection from these weapons, their secondary hazards, and accidental fires that occur on the battlefield is highly desired by today's military personnel.

Currently, Army tanker personnel and aviators from all Services are authorized to wear flame-resistant clothing made from Nomex fiber. This fiber, which chars rather than melts, provides durable flame protection throughout the life of a garment. Tanker personnel wear solid green or tan clothing depending on where they are deployed. For U.S. Army aviators, a special dyeing and printing technique was developed to provide a woodland camouflage version of the clothing.

While this flame-resistant clothing receives high user ratings, it is expensive. In general, infantry personnel currently use a nylon and cotton blend battle dress uniform (BDU).

(Continued on Page 67)

Natick, however, is actively addressing cost-based user needs and has established a Flame and Thermal Team to conduct research and development. Objectives of the team are to establish flame and thermal performance requirements for military clothing, demonstrate a flammability test methodology that simulates military flame and thermal hazards, and develop flame-protective clothing that is 30 to 50 percent less expensive than existing Nomex-based clothing.

The military uses a state-of-the-art instrumented manikin and an environmentally controlled chamber to test and evaluate developmental flame-protective clothing. The manikin is equipped with 122 sensors capable of predicting percentages of second- and third-degree body burns. This testing method is rapidly being accepted as a standard to evaluate industrial and fire-service protective clothing.

The flame-protective performance of existing military clothing was recently determined by conducting hundreds of burn tests on tanker and aviator clothing. Testing began with summer-weight uniforms (tanker coverall or aircrew BDU with T-shirt and briefs) and continued by adding clothing layers up to winter weight (long underwear, coverall, insulated overall, and jacket). All clothing, with the exception of the cotton T-shirt and briefs, was made from Nomex. The pass or fail criteria for the test, which is no more than a 20-percent body burn, are based on military requirements. Each piece of clothing provided excellent flame protection and, as expected, the protection time increased with each additional layer of clothing. The summer-weight clothing provided 3 seconds of protection, whereas the multiple-layered winter ensembles provided 10 seconds of protection.

Throughout the next few months, the detailed results of these burn tests, recommendations for performance requirements, and the flammability testing protocol will be presented to military users for review.

The team plans to reach its final solution for developing less expensive flame-protective uniforms by 2001.

For more information about SBCCOM or the Soldier Systems Center, please visit the Web site at **http://www.sbccom.army.mil**.

New Vest Keeps Soldiers Afloat

Soldiers operating over river crossings used to face the danger of drowning if they slipped off the bridge they were building. To deal with this problem, the U.S. Army Soldier and Biological Chemical Command's (SBCCOM's) U.S. Army Soldier Systems Center, Natick, MA, has fielded a new flotation vest that saves lives.

The Army's Project Manager for Enhanced Soldier Systems' (PM, ESS) Soldier Enhancement Program (SEP) is designed to find commercial off-the-shelf items to fit the needs of soldiers in the field without having to go through a formal research and development phase. The goal is to save time and money while rapidly fielding necessary items to the soldier.

The SEP was used to purchase a number of commercially available flotation vests. Each one was tested in Natick's hydroenvironmental simulator, which evaluates the effects of water immersion on humans and manikins by replicating calm and rough waters.

"The chief design feature was the vest's buoyancy and that the collar did not interfere with the PASGT [Personnel Armor System for Ground Troops] helmet, thus allowing an unconscious soldier to keep his face out of the water," said Kathleen Swift, Project Engineer, PM, ESS Team.

Test subjects wore the vest over the maximum allowable amount of gear and body protection. If the subjects sank, the vest was eliminated from the list of possibilities. If the vest demonstrated proper buoyancy and automatically rotated the subjects to keep their face out of the water, then that vest made it to the next round of the selection process.

The flotation vests were then sent to the field for real-world testing by soldiers as they performed their routine duties in and around water. At the end of the test maneuvers, the soldiers were asked to rate each of the vests for comfort, ease of mobility, compatibility with equipment and clothing, and how well they performed in water.

The vest that unanimously topped the list was manufactured by Stearns Manufacturing Co. Inc. and costs $34.98. The only change made to the Stearns vest was having the fabric made to the Army's standard woodland camouflage pattern.

For more information about SBCCOM or the Soldier Systems Center, see the Web site at **http://www.sbccom.army.mil**.

CORRECTION

On Page 53 of the January-February 2000 issue of *Army RD&A* magazine, the third sentence in the second paragraph of the article titled "Acquisition Branch Qualification" incorrectly stated that critical acquisition positions (CAPs) are equivalent to battalion executive officer and S3 positions and will enhance an officer's file for selection boards. *The sentence should have stated that for military personnel, Acquisition Branch Qualification positions are considered equivalent to battalion executive officer and S3 positions, and assignment to an ABQ position will enhance an officer's file for selection boards.* The fourth sentence in the same paragraph also incorrectly stated that for civilians, performance in CAPs will illustrate their key leadership and functional competencies, providing a more recognizable picture to selection boards and officials. *This sentence should also have referenced ABQ positions, not CAPs.*

Built to Last: Successful Habits of Visionary Companies

By James C. Collins and Jerry I. Porras
HarperCollins Publishers Inc., NY, 1994

Reviewed by CPT John H. Grimes, a Year Group 91 Procurement Officer with the Army Tank-automotive and Armaments Command, Rock Island, IL.

Built to Last: Successful Habits of Visionary Companies could be to the first decade of the 21st century what Tom Peters' *In Pursuit of Excellence* was to the last decade of the 20th century—required reading for business managers "in the know." It is a research text that broke new ground with old ideas when the two Stanford University professors published their 6-year study. The research focuses on unearthing fundamental principles that have endured time, and the overarching theme of the book is "preserve the core and stimulate progress."

The widely read book researches 18 pairs of sturdy companies. By sturdy, I mean that each company's success has spanned several eras and many chief executive officers (CEOs)— the average founding date of all the companies was in the 1890s. In the study, 18 "visionary companies" are compared and contrasted with 18 "comparison companies," yielding a mountain of data that are well presented in tabular form in the appendices. The visionary companies read like a who's who of the American blue-chippers. The authors seem to ask the right "how" questions and provide truly impressive discussions of just how the visionary companies have outpaced their contemporaries through the years.

The opening chapter outlines the methods of the study. Good logic is presented, nonetheless a sufficient amount of subjectivity entered this "social science" from the initial assumptions and methods chosen. Interesting though, is the introduction of the 12 myths that this study debunked.

The myths range from "the only constant is change" to "you can't have your cake and eat it too." The next eight chapters do a fair job derailing (oftentimes paradoxically) each myth. Sure, a few new buzzwords and managerial gimmicks like "BHAG" (Big Hairy Audacious Goals) and "Tyranny of the OR" (a narrowing mindset) are introduced along the way, but overall the book does a good job of avoiding the fashionable jargon found in so many contemporary business books. Each chapter concludes with a message for CEOs, managers, and entrepreneurs. Well written and chock-full of endearing vignettes, each chapter could stand alone as its own miniature research report.

Perhaps what I appreciated the most was the focus on success stories and what separated those companies from the pack. The blue-chippers themselves were the professor, the reader, and the student. Pitting one successful company versus another in similar industries and delineating the core principles and ideologies of each makes for very interesting reading.

The weakest part of the book for this reviewer was Chapter 7, which was dedicated to espousing Darwin's Theory of Evolution as applied to visionary companies. The chapter misinterprets change and attributes environmental adaptation to luck and chance; thereby downgrading the value of planned flexibility, intelligence, and choice in progression. The simplified and antiquated evolutionist world view clearly detracts from an otherwise insightful work.

Collins and Porras conclude in Chapter 10 with more stories and, in odd fashion, introduce some new thoughts about vision. The paperback edition has a bonus eleventh chapter that covers a practical lesson on the concept of vision. The core theme of their research is further tapped in this extra chapter, but lessons garnered from outside the original research are strangely incorporated (e.g., Nike stories are used).

Overall, the book is inspiring reading. The recurring theme of preserve the core and stimulate progress, and how it emphasizes the importance of core values, is both stimulating and reassuring. Plenty of methods are presented, but in the end, readers are left to choose the method necessary to preserve core values and stimulate progress within their business, whether covered in the book or not.

Although *Built to Last* is a quick read that is still *en vogue* among the management community, it is one that I don't recommend. Most of the "findings" in *Built to Last* are time-tested and proven, but the report lacks any new conclusions. If you can stomach being a bit out of the loop, then the acquisition professional would be better served to reread Field Manual 22-100, *Military Leadership*, and become reunited with the Army's own core values that have sustained us for nearly 225 years.

Earned Value Project Management

By Quentin W. Fleming and Joel M. Koppelman
Project Management Institute, 1996

Reviewed by LTC Kenneth H. Rose (USA, Ret.), Tidewater-Richmond Area Manager for WPI in Hampton, VA, and a former member of the Army Acquisition Corps.

Two things are important about earned value management: it is a simple, powerful technique for measuring project performance and projecting final results, and it is required. Authors Quentin W. Fleming and Joel M. Koppelman address both aspects in *Earned Value Project Management* published by the Project Management Institute.

In the views of the authors, earned value management often remains an untapped resource because its current implementation in government contracts is too complicated and rigid for universal use. And, while it is required in major system acquisitions, it is most often ignored in small projects where it might do great good. The authors' intent in this book is to simplify application processes and make earned value management accessible to the masses.

Thankfully, this book is not yet another listing of almost-identical formulas and acronyms to be memorized by obedient readers. Instead, Fleming and Koppelman go for understanding, disclosing concepts and goals, then allow the formulas to arise in clarity, almost on their own.

The authors make a strong case for the need for earned value management by describing a current evaluation device, the spend plan. A typical spend plan compares budget to actual expenditures, but does not offer a clue about the actual work that was accomplished compared to what should have been accomplished. That is the essence of earned value management: a three-way comparison of work to be done expressed in terms of its expected cost, actual work completed expressed in terms of its expected cost, and actual work completed expressed in terms of its actual cost. These three data elements allow a project manager to determine variances in both schedule and cost and to make reasonable estimates of each at completion.

Fleming and Koppelman begin by distilling 10 basic benefits of the DOD Cost/Schedule Control Systems Criteria. They then use these as a foundation for developing a simplified form of earned value management that may be integrated with other traditional tools.

A work breakdown structure is essential for defining tasks and managing scope. This leads naturally to planning and scheduling, also essential to effective application of the technique. A third step, estimating and allocating resources, allows completion of detailed "cost accounts," which are the distinguishing mark of an earned value management system. This information forms the foundation of the project baseline against which all future performance will be measured.

Quantifying subsequent work in baseline dollars and then calculating the cost of that work allows a project manager to gauge progress against planned schedule and planned cost. This information is far more meaningful and valuable than that in a typical spend plan. But the authors caution that a good baseline coupled with performance data are not sufficient for success. Management must use this information and act to control the final results. The authors describe a few measurement indices for doing just that.

The book closes with five simple criteria for applying earned value management in just about any project environment. *Earned Value Project Management* does not, by the authors' own declaration, offer anything really new. Rather, it examines an existing technique and transforms it into something more user friendly—something more useful to those who need it.

This book is available from the Project Management Institute at ***www.pmibookstore.org***.

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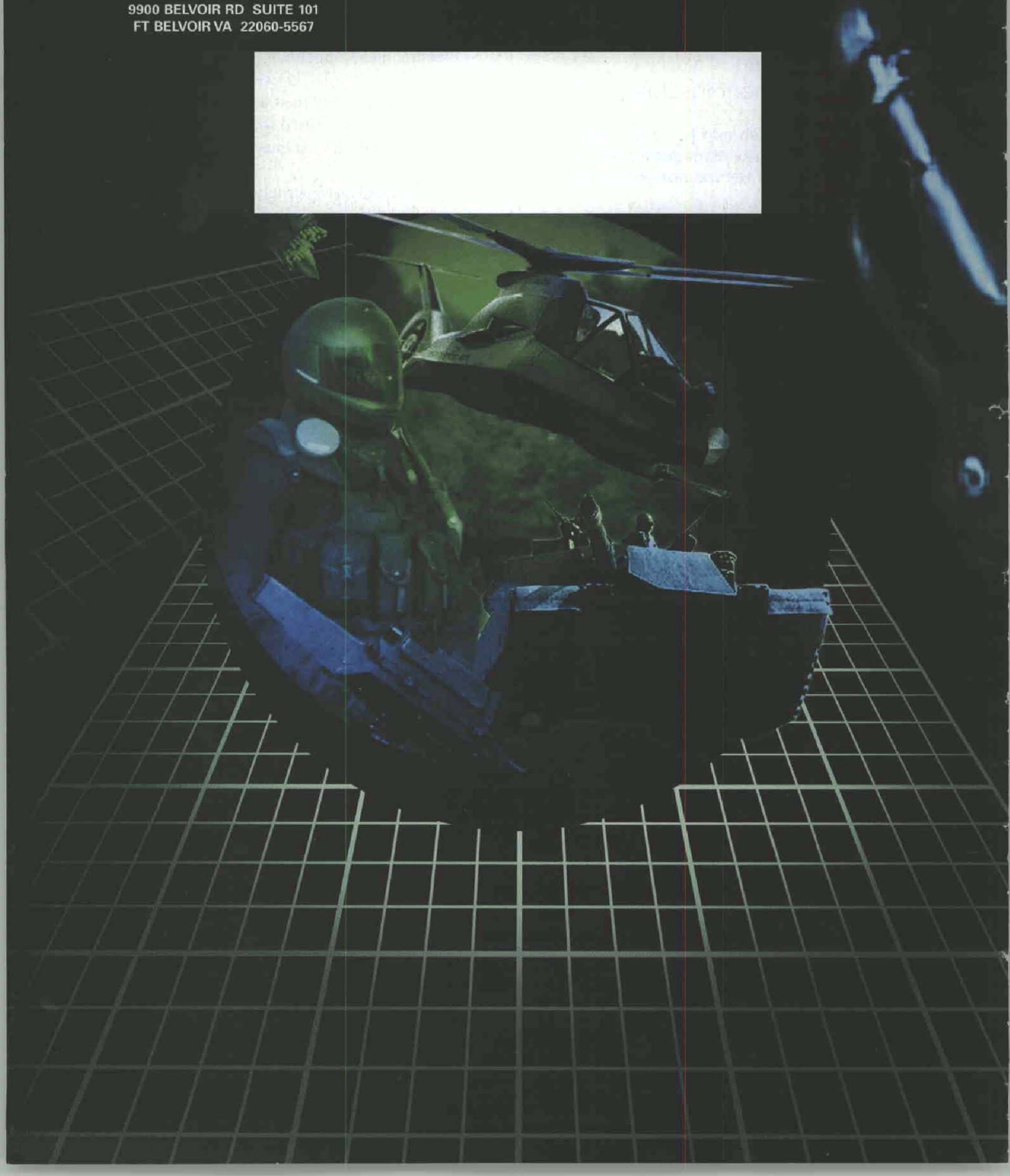
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