Army Communicator

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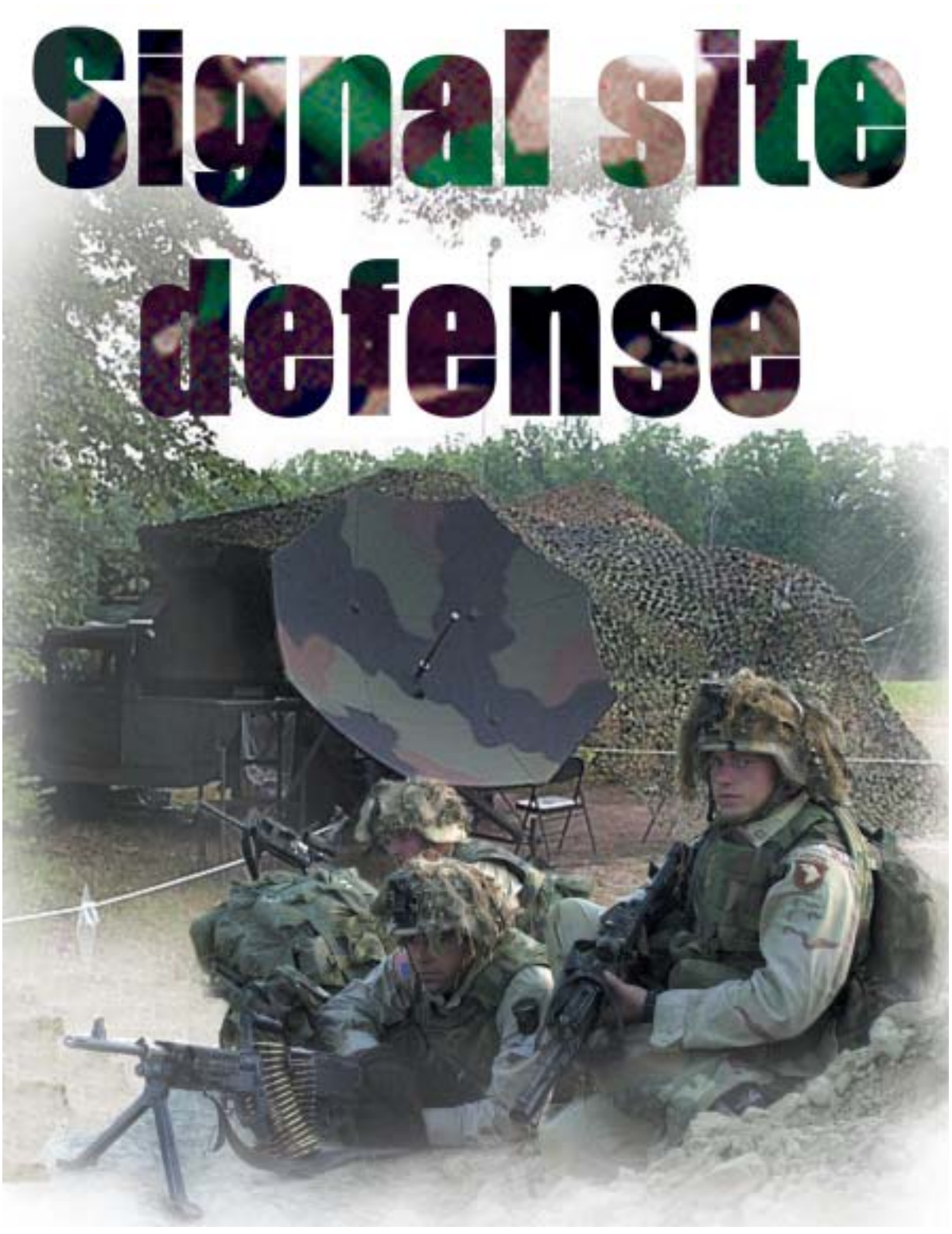
Headquarters,
Department of the Army

Voice of the Signal Regiment ❖ PB 11-02-4 Winter 2002 Vol. 27 No. 4



Chief of Signal's Comments

Progress toward Objective Force

I first want to say hello to every member of our Signal Regiment. I'm honored to serve you as the Regiment's 30th Chief of Signal and delighted to be at Fort Gordon, our Regimental home. I'm amazed at the progress the Army and especially the Signal Regiment have made on our road to the Objective Force.

We have plenty of things going on right now – all very important efforts for our future. Our materiel programs are adjusting fire to the concepts. We're shaping our doctrine as the Army shapes the Objective Force. Our training institutions are seeing transformation on the horizon. As a matter of fact, the Signal Regiment is on point for the Army in retooling Army training for the future. And we still have the best soldiers in the Army – Signal Regiment soldiers who are enabling the force and supporting warfighters everywhere in the world.

BG Janet E.A. Hicks
Chief of Signal

I feel comfortable with the state of our materiel programs. We recently adjusted a number of operational-requirements documents to align them with the Objective Force's warfighting requirements. Warfighter Information Network-Tactical, Joint Tactical Radio System and our many satellite and other programs are well positioned to support the unprecedented and daunting information requirements in the Objective Force. For the Objective Force we've designed a command, control, communications and computers network that will enable the Objective Force warrior to "see first, understand first, act first and finish decisively" – these systems are worthy of the soldiers who will depend on them. This is of singular importance to the Army as we move the Objective Force from concept to reality.

I'm very excited about the tremendous leap forward in training we've seen adopted in lifelong learning. (You'll be hearing much more about lifelong learning in many different venues over the coming months). Our Objective Force soldiers will be sent to the field more quickly, with shortened advanced individual training and with focused training that will meet the soldier's individual needs based on his or her next assignment. Some of our Regiment's soldiers are already in the field after receiving assignment-oriented training instead of the former military-occupation specialty course, and they're just about to come back through the schoolhouse to get their supplemental training. We're watching closely to make sure we do this right.

Looking farther down the road, we see a total retooling of training. Technology will enable our soldiers and leaders to receive critical required training at any time or place across the full spectrum of operations. Our personnel-management systems are accommodating some revolutionary ideas and are changing to allow much more precise management of the assignment process so every soldier can be a part of lifelong learning.

It's an exciting time to be a soldier, especially in the Signal Regiment! There are many challenges, sure. But with challenge comes opportunity for change, growth and improvement. These are the components that must be exploited. That is where each and every one of you will play a role. I look forward with great excitement to serving you as Chief of Signal. I salute all that you do for your Regiment, your Army and your nation. Thank you.

Looking farther down the road, we see a total retooling of training. Technology will enable our soldiers and leaders to receive critical required training at any time or place across the full spectrum of operations. Our personnel-management systems are accommodating some revolutionary ideas and are changing to allow much more precise management of the assignment process.

U.S. ARMY SIGNAL CENTER AND FORT GORDON

Army Communicator (ISSN 0362-5745) (USPS 305-470) is an authorized, official quarterly professional bulletin of the U.S. Army Signal Center, Fort Gordon, Ga. 30905-5301. Second-class official mail postage paid by Department of the Army (DOD 314) at Augusta, Ga. 30901 and additional mailing offices.

POSTMASTER: Send address changes to ***Army Communicator***, U.S. Army Signal Center, Fort Gordon, Ga. 30905-5301.

OFFICIAL DISTRIBUTION: ***Army Communicator*** is available to all Signal and Signal-related units, including staff agencies and service schools. Written requests for the magazine should be submitted to Editor, ***Army Communicator,*** U.S. Army Signal Center, Fort Gordon, Ga. 30905-5301.

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CORRESPONDENCE: Address all correspondence to ***Army Communicator,*** U.S. Army Signal Center and Fort Gordon, Signal Towers (Bldg. 29808A), Room 707, Fort Gordon, Ga. 30905-5301. Telephone DSN 780-7204 or commercial (706) 791-7204. Fax number (706) 791-3917.

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U.S. Government Printing Office: 1984-746-045/1429-S.

Worldwide web homepage address http://www.gordon.army.mil/AC/
E-mail ACeditor@gordon.army.mil

PB 11-02-4
Winter 2002
Vol. 27 No. 4

ARMY COMMUNICATOR

Voice of the Signal Regiment

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No site, no Signal

Lessons-learned on Signal site defense

by Virgil Huston Jr.

Observation Post 2. It was almost 1 a.m., and it was my turn for guard duty at our sector's perimeter observation post. The site occupied a small hill surrounded by open ground and two areas of trees in small ravines that came within a few meters of the perimeter. Observation Post 2 was between the two treelines and the farthest-out defensive position on the perimeter.

The site itself consisted of the company command section, mobile-subscriber-equipment node center, system control, remote-access unit, small extension node, communications-electronics maintenance, mess section, supply section and motor pool. Along with our dispersed Signal nodes, we were supporting a separate mechanized infantry brigade in a field-training exercise.

The first thing I did as I took over the observation post was a radio check. The battery was dead. I told the soldier I had just relieved to get a battery in the radio and bring it back before he went to bed. I settled down for my shift, waited for the radio and started scanning the sector with and without night-vision goggles. (Night-vision goggles are incredibly valuable, but when the moon is out, I find that scanning without them occasionally helps keep my surroundings in perspective.)

About 10 minutes later, I noticed two dim lights through the treeline to my right. Due to their position, they had to be on the other side of the ravine, although I had no idea how far away they might actually be. There was open ground and a dirt track over there.

The radio still wasn't back and I wanted to report my sighting. I also was hesitant to leave my post. After all, the lights were probably nothing, and there was another fire point with a view of the area where I thought the lights were. The mysterious lights moved a couple of times and stayed on for at least five minutes.

I couldn't just sit there, however, and finally left to find the radio. What I found was the soldier already in bed and the radio still without a new battery. I wasn't impressed (to say the least), told my boss what I'd seen, asked him to call the node center to report it and again asked for someone to find a battery for the radio and bring it to me. I returned to my post, concerned that the position had been unmonitored while I was gone.

By now 15-20 minutes had elapsed since I first saw the lights. They were gone when I returned to the observation post. I settled in again, expecting someone to investigate the lights, and was extra-vigilant in scanning the sector. I still didn't have a radio.

Suddenly, the night lit up with small-arms fire out of the treeline to my immediate left, not more than about 30 meters from my position. As I was sighting in on the muzzle flashes, the nuclear-biological-chemical attack alarm went off. By the time I had my mask on, I'd been killed without getting a shot off.

The opposing-forces squad had waited at my position until the NBC all-clear signal sounded, then came in with grenades and small arms to destroy the site. The OPFOR was counting on the all-clear signal to cause everyone to think the attack was over. They were correct. There was incredible confusion when they attacked again.

The OPFOR leader later told me that while they'd waited, they'd parked where I'd seen the lights (they were the vehicle's blackout lights) and walked completely around the site to position themselves in the left treeline rather than come the short way across my sector. They also had another squad that attacked from the other side of the perimeter, creating even more confusion for us. It also turned out that the fire point with the view of the other side of that right-hand treeline had actually seen the OPFOR park, dismount and move out. They radioed the node center and reported it, but nothing had been done. My boss had called the node center multiple times but received no answer.

Knowing I wasn't the only one who tried to sound the alarm might have made me feel better after frantically trying to report potential enemy activity and having no one pay attention, but I take field exercises seriously. We did wonderfully with our Signal mission during this exercise. We didn't do so well with our site defense. It doesn't matter how well your Signal mission is going if your site is wiped out – no site, no Signal. All of it was preventable.

What went wrong

The bottom line with this failure to properly defend the site was simply that site defense wasn't a priority; the defense, such as it was, was inadequate due to lack of training on the part of noncommissioned officers and officers responsible for site operations.

Site defense was very much an afterthought. It was an exercise, after all, and the consequences for failure to defend the site were essentially nonexistent. Signal wasn't shut down when the site was wiped out. The leaders knew this and perhaps allowed themselves to pay lip service to defense while concentrating on the "important" mission tasks.

However, this kind of thinking is fatal. In the real deal, a destroyed site can perform no mission, Signal or otherwise. Field exercises should be played as if the situation was real,

and the proper consequences should be in place.

It was also evident there were training deficiencies in how to actually set up and maintain a defensive perimeter.

Training exercises are supposed to identify weaknesses so they may be corrected – they're not designed to place blame and punish people. There are some important lessons to be learned from this exercise:

- Make Signal site defense a priority; and
- Develop and implement a site-defense plan.

Signal site defense as a priority

There were two main rationalizations I heard for lack of attention to site defense. A common misconception was that, in a real war, the site would have had infantry or military police to handle defense. This is simply not the case. Signal doctrine has dictated for years that Signal units must defend themselves. Even when Signal units are co-located with infantry or military police, Signaleers usually must defend a designated sector.

As Field Manual 11-43, ***The Signal Leader's Guide***, says, "Signal sites must be able to defend against sabotage, ground forces and airborne / air-assault forces with little or no outside help. They must also be prepared to survive enemy air, artillery and NBC attack."

The second problem was lack of personnel to adequately meet site-defense requirements while accomplishing the other duties required of the site's various sections. The ideal site-defense plan includes manning fighting positions, listening posts, dismount point, a roving-guard force and external patrols. Our node center was isolated and had no nearby units to provide mutual support. We had to do it all with around 65 soldiers.

Every situation is different. "Current threat status / situation is an important factor when planning and committing assets and personnel to defend a site," FM 11-43 states. In this scenario, guerrilla / small-unit attacks, including use of NBC agents, were to be expected.

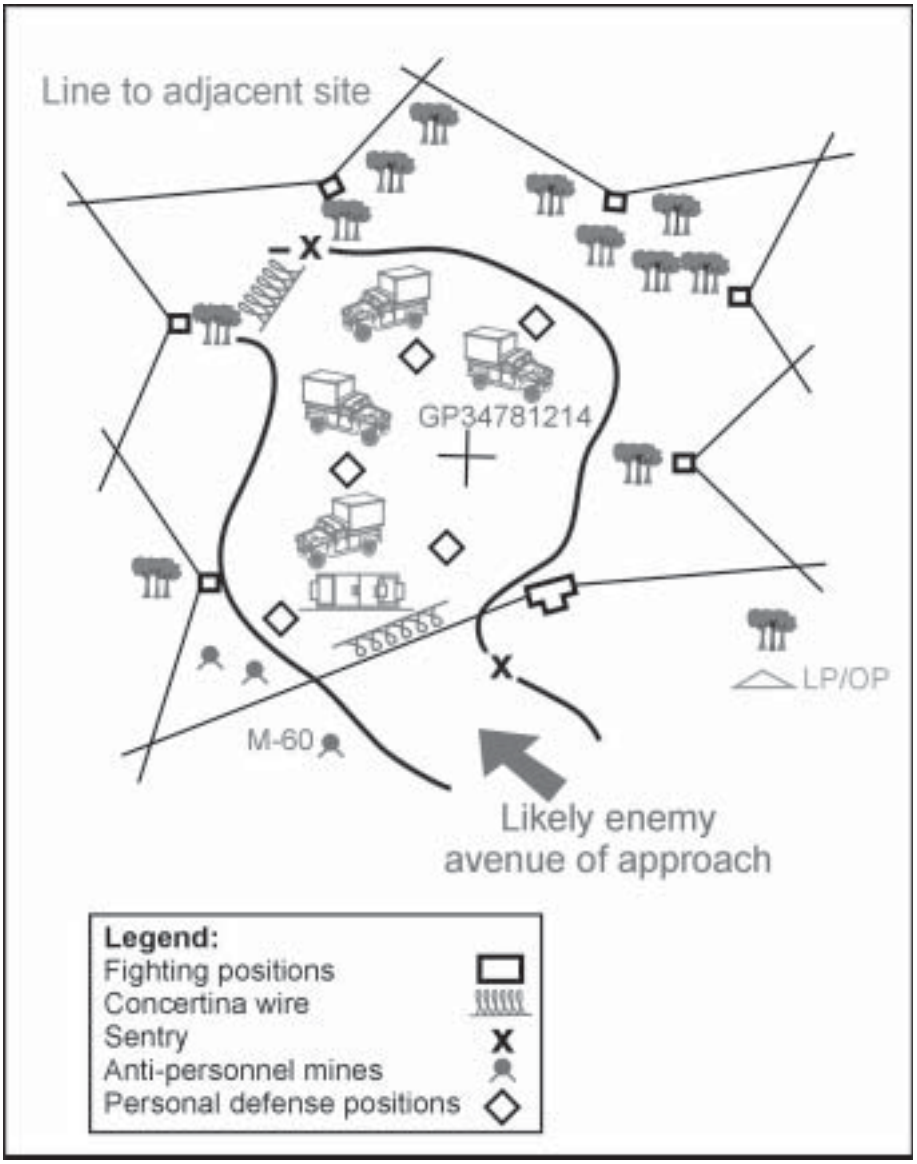

Figure 1. Signal site-defense plan from Field Manual 11-43, *The Signal Leader's Guide*.

Site-defense plan

A site reconnaissance was done before we occupied the position, but there's no evidence that hasty defensive positions were identified and a security plan developed. The site-defense plan, which had evolved over time, was haphazard and considered a nuisance by those with Signal mission requirements on their minds. It was three days before an initial site-wide plan was implemented.

As we first occupied the site, no one appeared to be in charge of defense, and no hasty defensive positions were occupied to provide security while everyone was setting up. Individual fighting positions weren't identified and assigned, and no defensive plan was worked up that I was aware of. A couple of sections, mine included, set up sector defenses, but these weren't coordinated with any site-wide plan and only covered a small part of the perimeter. For the first two days, the only site defenses in evidence were these individual efforts.

While initiating and establishing Signal and other missions went very well, the observer / controllers made note of the lack of proper site

defenses and other problems with site setup, such as vehicles parked too close together and too close to tents and working areas. On the exercise's third day, a full site-defense plan had been developed and was implemented. It included a dismount point, control of entry and exit from the site, a quick-reaction force and 24-hour manning of perimeter fire points / observation posts. It didn't include such things as aiming stakes and interlocking fields of fire; preplotted map coordinates for calling in fire support; simulated obstacles, mines and trip wires; identification and preparation of personal fighting positions for soldiers not on the fire points; communications checks; training of soldiers; and other requirements of site-defense doctrine.

The NCO put in charge of site defense did an exemplary job with minimal support. For him, it was a 24-hour job combined with his normal duties. When he had to sleep, no one was in charge. The soldiers who pulled guard duty did their jobs well, within the limitations of the situation in which they were placed. The node center was not manned 24 hours a day or, if it was, the soldiers manning it weren't answering the radio.

Lack of personnel was a major problem. Some soldiers had guard duty three and more times a day. This eventually wore down those continuously pulling guard while doing their normal jobs day to day. Not all soldiers participated in site-defense duties.

Recommendations for Signal leaders and soldiers

I must point out that this exercise was very successful from an overall mission perspective, and the unit should be justly proud of its accomplishments. Everyone worked hard in difficult conditions and pulled together as a well-honed team. If there had been a viable site-defense plan from the start, this part of the mission would also have been accomplished without a hitch. All it will take to do it right next time is command emphasis and a little training of soldiers and leaders on execution.

Following are suggestions for improvement from this specific experience. Most of the suggestions are documented in FM 11-43, a must-read hip-pocket publication every Signal soldier should have.

Site defense. Consider site defense an essential part of accomplishing the Signal mission. No site, no Signal – it's that simple. Leaders must ensure that defense is a top priority.

Site reconnaissance. During this operation, the officer or NCO designated as responsible for site defense should identify hasty defensive positions and develop a plan to be implemented immediately upon arrival. Individuals should be designated to man positions as the site is set up. Positioning vehicles, antennas and work / sleeping areas must be done with defense in mind and with all available mission, enemy, terrain, troops and time knowledge. And while it's always a trade-off between area to defend / control and vulnerability to indirect fire, I prefer to see antennas not positioned right next to their radio shelters and the maximum possible distance kept between work areas. Having everything positioned on the top of the hill around the antennas makes for a very good target.

Site setup. Developing and implementing the permanent site-defense plan should be an integral part of the set-up procedure. Yes, it takes personnel to man positions and at least one dedicated NCO or officer to lay out fields of fire; set aiming stakes; place anti-personnel mines, obstacles and trip wires; map and call for fire coordinates; and prepare for ongoing operation of the defense plan. Also, personal fighting positions must be identified and assigned. These positions must fit into the overall situation framework (such as expected enemy avenue of approach or placement of permanently manned fighting positions).

Ongoing operations. This covers a lot of ground and involves implementing the plan and ensuring that site-defense tasks are carried out when the site is operational – including teardown in preparation for a jump, if applicable. Key considerations include ensuring continual communications is maintained between the command post and the observation / listening posts, dismount points, fighting positions and casualty-evacuation points. Personnel shortages must be addressed by developing a sleep plan that provides relief for those most affected by pulling multiple duties. Require everyone on the site to take their turn on guard duty, including officers.

Command of the defense plan must not be left in the hands of one NCO or officer. No one can be expected to work 24 hours a day every day – and defense is something that must be done continuously. Perhaps most important, make sure every soldier is trained on his or her site-defense tasks; practice procedures to follow when something out of the ordinary occurs in the soldier's area of responsibility. Especially train soldiers on patrolling and rules of engagement.

Don't ever forget that if your Signal site is wiped out, you can't accomplish your Signal mission. No one ever said adding defense to an already full mission plate is easy. It is, however, essential, especially in this age of guerrilla warfare.

Mr. Huston serves in a Signal battalion in the Army National Guard. He has worked in the Signal Leadership Department and Directorate of Training and Doctrine at the Signal Center, Fort Gordon, Ga. He earned the Superior Civilian Service Medal for directing the Training and Doctrine Command's training-base expansion during Operation Desert Shield/Desert Storm.

Acronym QuickScan

FM – field manual
NBC – nuclear-biological-chemical
NCO – noncommissioned officer
OPFOR – opposing force

Also see CPT Scott Gress's article "Site security and defense for Signal units" in Army Communicator's Spring 1998 edition

Training update

Training updates from the Directorate of Training, 15th Signal Brigade and Leader College of Information Technology, Fort Gordon, Ga.

OFFICER EDUCATION SYSTEM ENTERS THE "TRANSFORMATION ZONE"

by LTC Robbie Mosley

Over the past several years, the Army has made significant changes to reflect today's operating environment. The buzzword for these changes is ***transformation***, which is touching every facet of the Army.

One of the main objectives of this transition is movement toward a much lighter, strategically responsive, rapidly deployable force that will leverage information technology to increase our lethality in the battlespace. Today's operating environment will demand that these lighter, deployable units be able to fight in non-linear, small and independent formations – a drastic change from Cold War and Operations Desert Shield / Desert Storm success stories.

As we push toward the Objective Force (which is all about change), new unit formations and structures – such as the initial / interim brigade combat team – have been developed to fight in the new strategic paradigm called the Contemporary Operating Environment, which will employ an array of new technologies. The time has now come to focus on the heart and soul of any fighting force: its people.

To support the OF with trained leaders, Training and Doctrine Command is sponsoring a transformation project known as the Officer Education System initiatives. The project's initial concept started more than two years ago; the project is about to enter the implementation stage. This article's purpose is to explain core features of these initiatives and address specific concerns regarding training our company-grade officers under OES.

What are the OES initiatives?

TRADOC published the Army Training and Leader Development Panel-Officer Report May 25, 2001, which validated the need for transforming training and education across the Army – whether institutional, unit (operational) or self-development. The OES initiatives focus on all three pillars with a simple mission: develop training-and-education requirements over a 20-year military career for commissioned officers (Figure 2).

The OES initiatives were given six guiding principles and eight future focus points. The guiding principles are:

- Right education, right officer, right place and time;

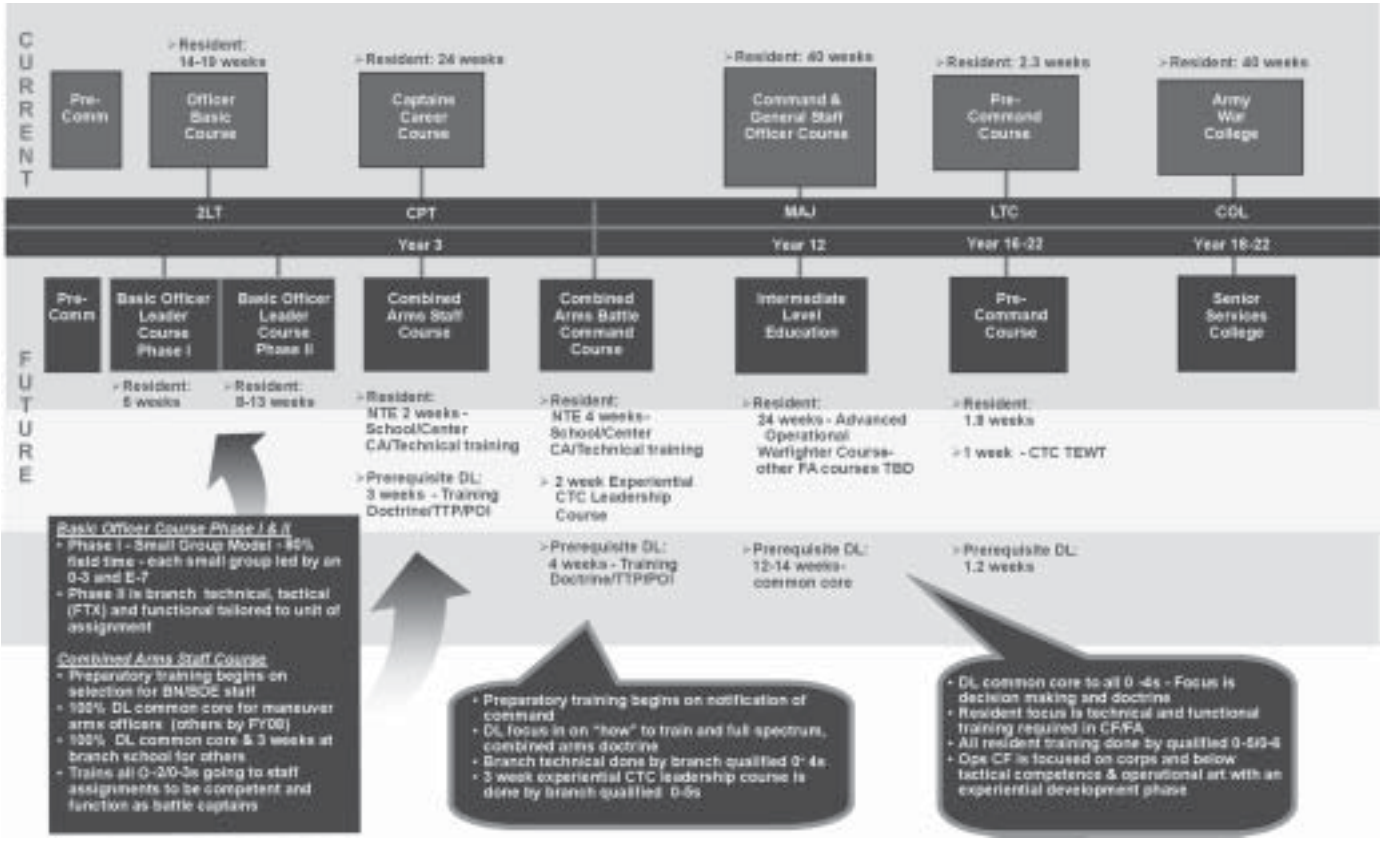

Figure 2. Overview of the Officer Education System.

• Bonding, cohesion and trust in cohorts;

• Combined arms and joint operations;

• Sequential and progressive training;

• Common standards, assessment, feedback and accreditation criterion; and

• Lifelong learning opportunities.

The future focus (long-term benefits) points are:

• Strengthen the warrior ethos and warfighting focus;

• Increase and enhance combined arms / joint training and education;

• Increase performance-oriented training and education;

• Embed digital command-and-control training;

• Develop and implement shared training events with noncommissioned and warrant officers;

• Increase emphasis on developing battalion and brigade commanders;

• Improve faculty selection and assignment strategy to ensure the Army's best qualified, most experienced instructors teach the least experienced students; and

• Integrate distance learning; focus on self-direction and self-development.

The endstate is an officer capable of adaptively thinking, leading and winning in combat across the full spectrum of Army operations. We'll review the educational concept in more depth.

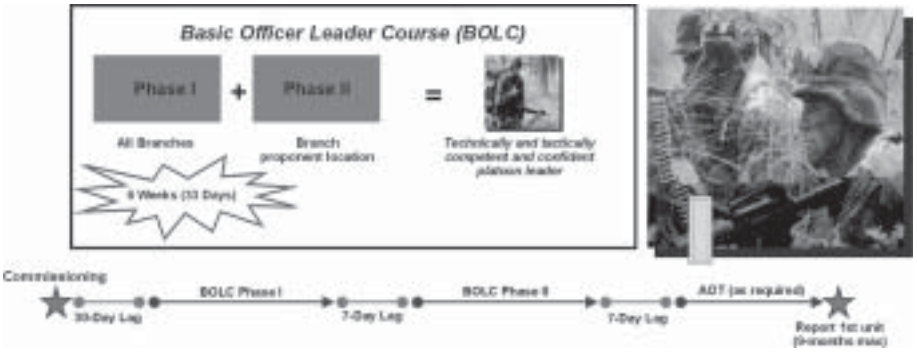

Figure 3. Two-phase BOLC timeline.

Lieutenants (initial-entry training)

Officer basic courses will become two-phase training courses: Basic Officer Leadership Course Phase I and BOLC Phase II. BOLC Phase I will focus on training TRADOC's mandatory common-core subjects, instilling the warrior ethos, reinforcing physical readiness over fitness and developing field-craft skills. Phase I will also cover the importance of the officer / NCO relationship, and it's the first stage of

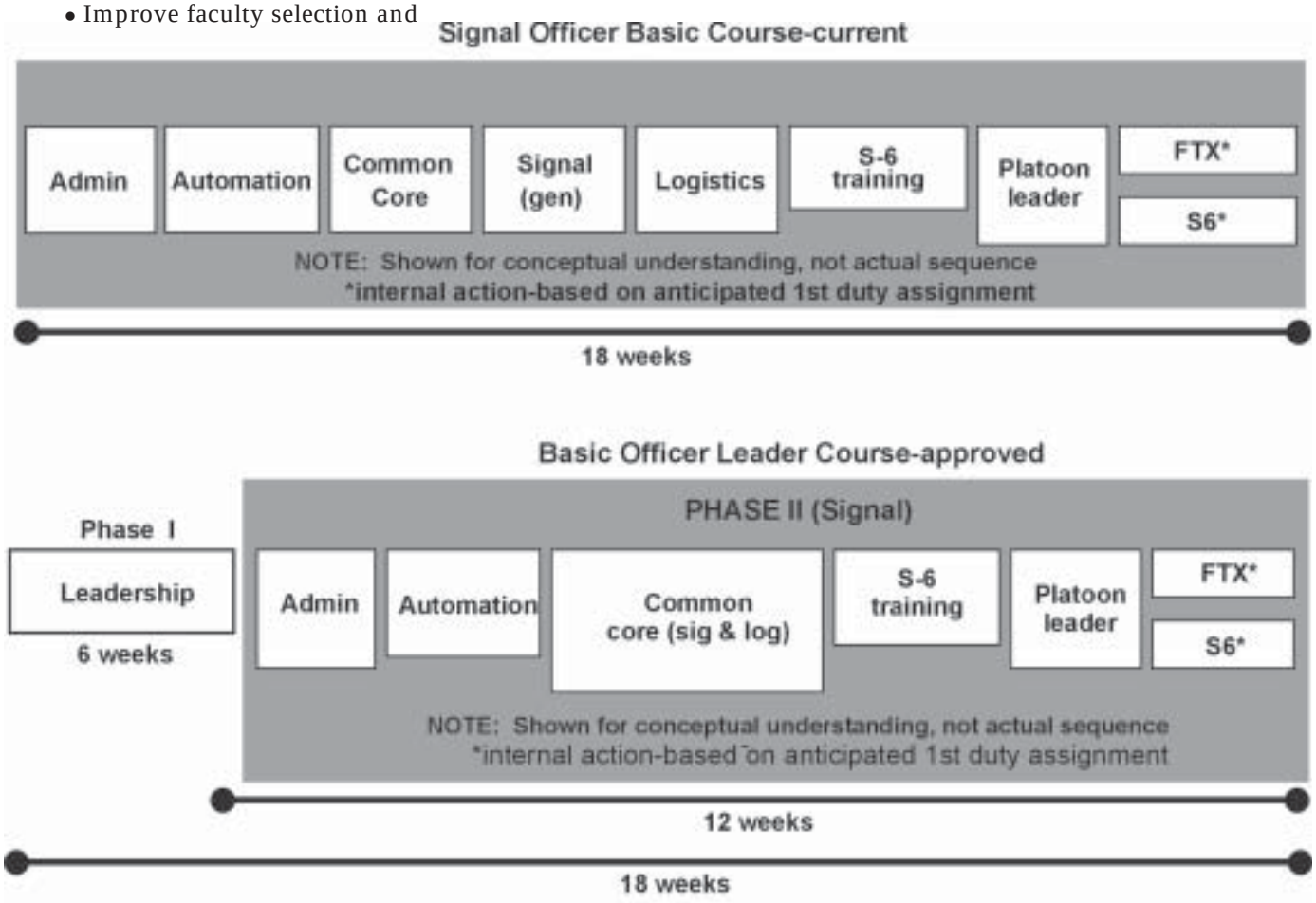

Figure 4. Comparison of current SOBC and approved BOLC.

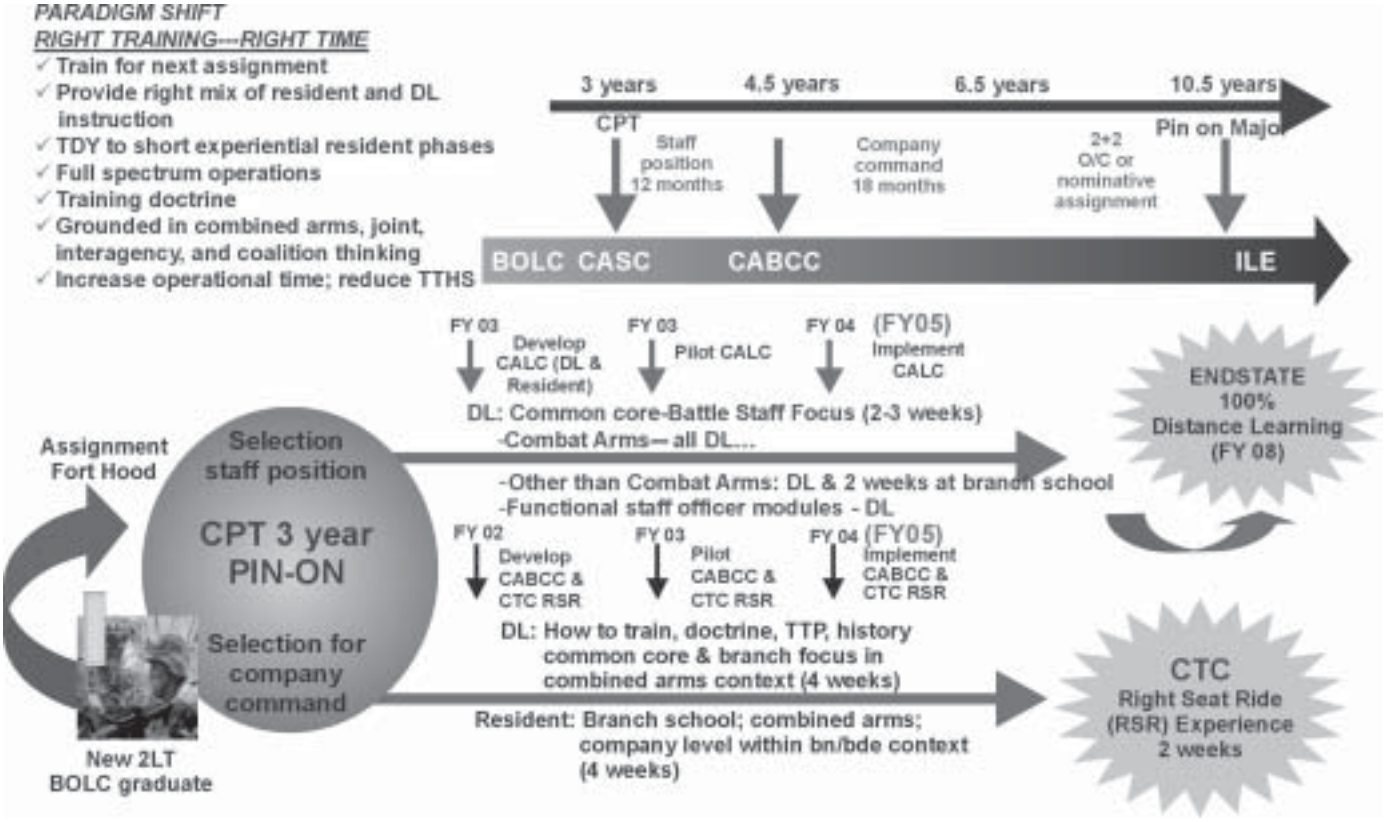

Figure 5. Transformed captains OES, which aims for just-in-time training and more local-commander influence.

developing competent and confident small-unit leaders. In a nutshell – besides two training locations (Fort Gordon, Ga., and possibly Fort Benning, Ga.) – the primary change in OBC is the heightened focus on leadership skills.

BOLC Phase II will provide officers with technical skills based on their assigned branch. Also, an initial common-training experience before they receive their specific branch training will enhance the overall bonding and trust among all officers.

Figure 3 shows the general timeline from precommissioning to arrival at first unit of assignment. All lieutenants (competitive category, Active Component and Reserve Component) must graduate from both phases.

We project implementation of this initiative for Fiscal Year 2004. Four pilot courses have been conducted at Fort Benning for Phase I; however, the actual location for Phase I is still to be determined. BOLC's length is currently scheduled for six weeks.

The Signal Center conducted a pilot course for Signal BOLC Phase II for 12 weeks from March to June. The current OBC and the BOLC concept are compared in Figure 4. Reducing course length from 18 weeks to 12 weeks was largely accomplished by relocating most of the common-core training from Fort Gordon to Fort Benning; reducing administrative hours; streamlining specific blocks of Signal branch-specific training; and eliminating integrated-systems control from the course. Thus, the overall reduction is more than 200 hours, representing the six weeks' decrease.

The current track training in the Signal OBC is assignment-oriented and prepares the lieutenant for his / her initial assignment. With full-scale implementation of BOLC, track training will most likely be suspended, and ***all*** students will participate in the field-training exercise. Lieutenants with assignments that require knowledge of S-6 skills will remain on temporary duty to attend the 4C-F40 Signal Staff Officer (S-6) Course. Students going to an assignment where ISYSCON skills are needed can attend a stand-alone ISYSCON course (offered by General Dynamics).

With the OES initiatives, the Signal Regiment continues to develop a curriculum for preparing second lieutenants for their initial assignment. Figure 4 was just the starting point.

Captains' training

Because of the three-year period to pin on captain's bars, added to the ATLDP report's results and critical shortages in the operational force, ***relevant*** and progressive training for our company-grade officers becomes a must-win for the Army. Figure 5 provides the general construct for institutional training for captains. The planned implementation dates are early FY05, with pilot courses in FY04.

According to a concepts paper from the captains' OES transformation team dated June 12, the methodology and goal for mission accomplishment is that captain's OES "… is to initially develop a model which links training to officer assignments with a warfighting focus. This model must account for the ongoing Army transformation, current and evolving technology and emerging OF requirements. The ultimate goal for captains'

OES is to produce a corps of leaders who are technically and tactically competent: officers who are knowledgeable of how the Army operates; who demonstrate confidence, integrity, critical judgment and responsibility; who can operate in a rapidly changing environment of complexity and ambiguity; who can build effective teams amid continuous organizational and technological change; and finally, who can adapt and solve problems creatively.

"The new captains' OES will allow for just-in-time training aimed at reducing the time apart from troops for junior officers while providing them with exposure to requisite skills they need at a time when it most benefits them. The new OES will also greatly increase local-commander influence in regard to junior-officer professional development. Commanders will be able to slate officers for upcoming assignments well in advance and ensure they're trained locally and at the individual schools and centers when it behooves the unit.

"Captains' OES also will include an interaction with an observer / controller, and the captains will observe the performance of the rotational unit at one of the combat training centers. The intent of this exposure is that the captain will have the opportunity to view a company similar to the one they're scheduled to command. The CTC experience will serve as the capstone training opportunity for the captain before he / she assumes company command."

The amount of time officers will spend at resident courses will be cut in half. That instruction now will be conducted via advanced distance learning and locally by the chain of command. The inclusion of local leadership is a significant change from the previous instruction model that depended solely upon resident-course training. Distance learning also puts responsibility for course completion on the individual officer. Each officer will manage his or her own discretionary time to better himself or herself professionally and to ensure he / she is qualified to serve in his / her next duty assignment as either a staff member or as a commander. Individuals slated for command also will participate in a CTC training experience associated with the type of unit they'll command.

Other officer training

The Combined Arms Staff Course (Figure 6) consists of five weeks (three weeks' ADL and two weeks' resident instruction). All officers, regardless of branch, must complete the CASC common-core module consisting of two weeks' ADL. The third week of ADL and the resident instruction is tailored to the officer's next assignment.

Officers selected to fill a primary

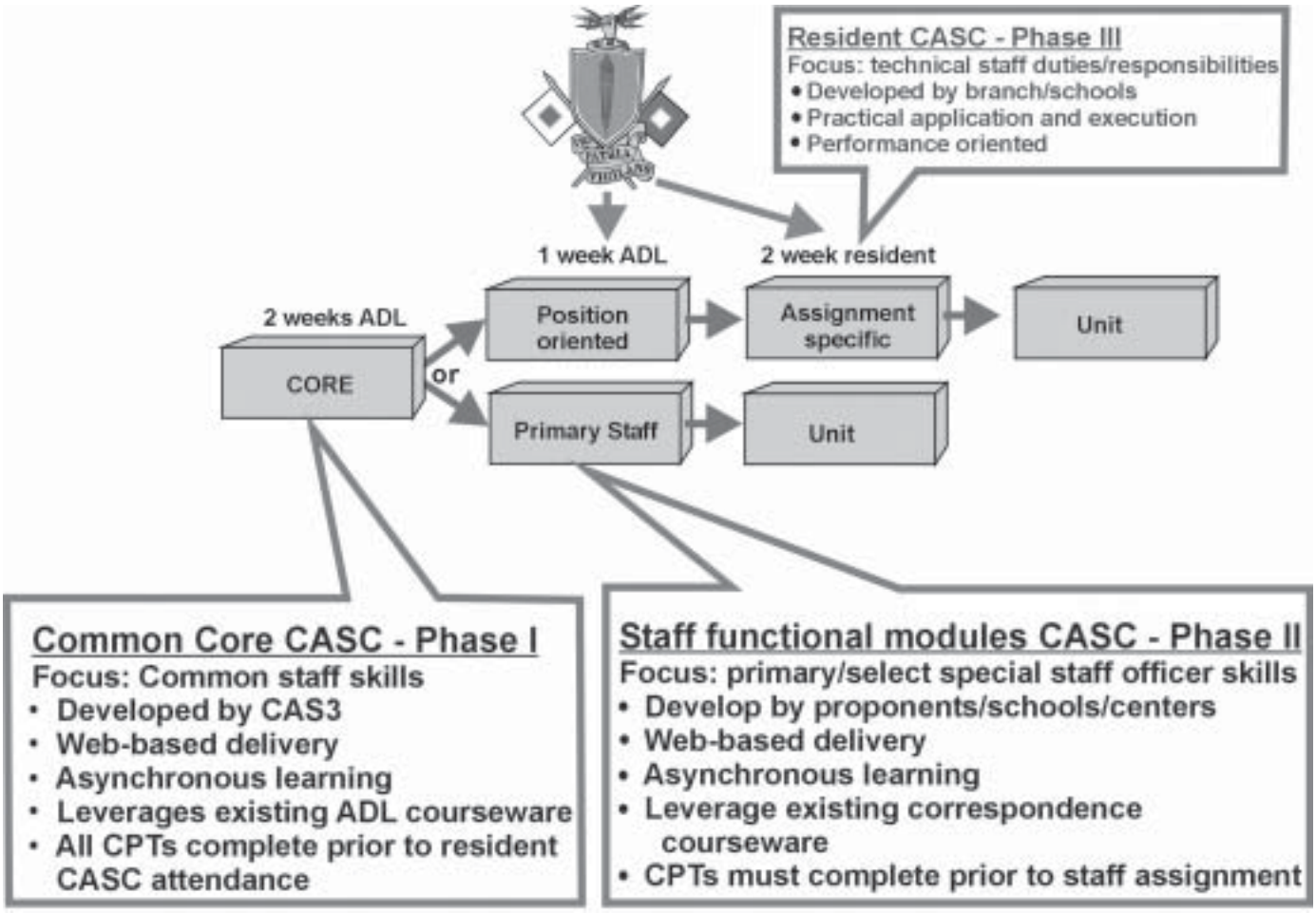

Figure 6. Overview of CASC modules, which consist of three weeks' ADL and two weeks' resident instruction.

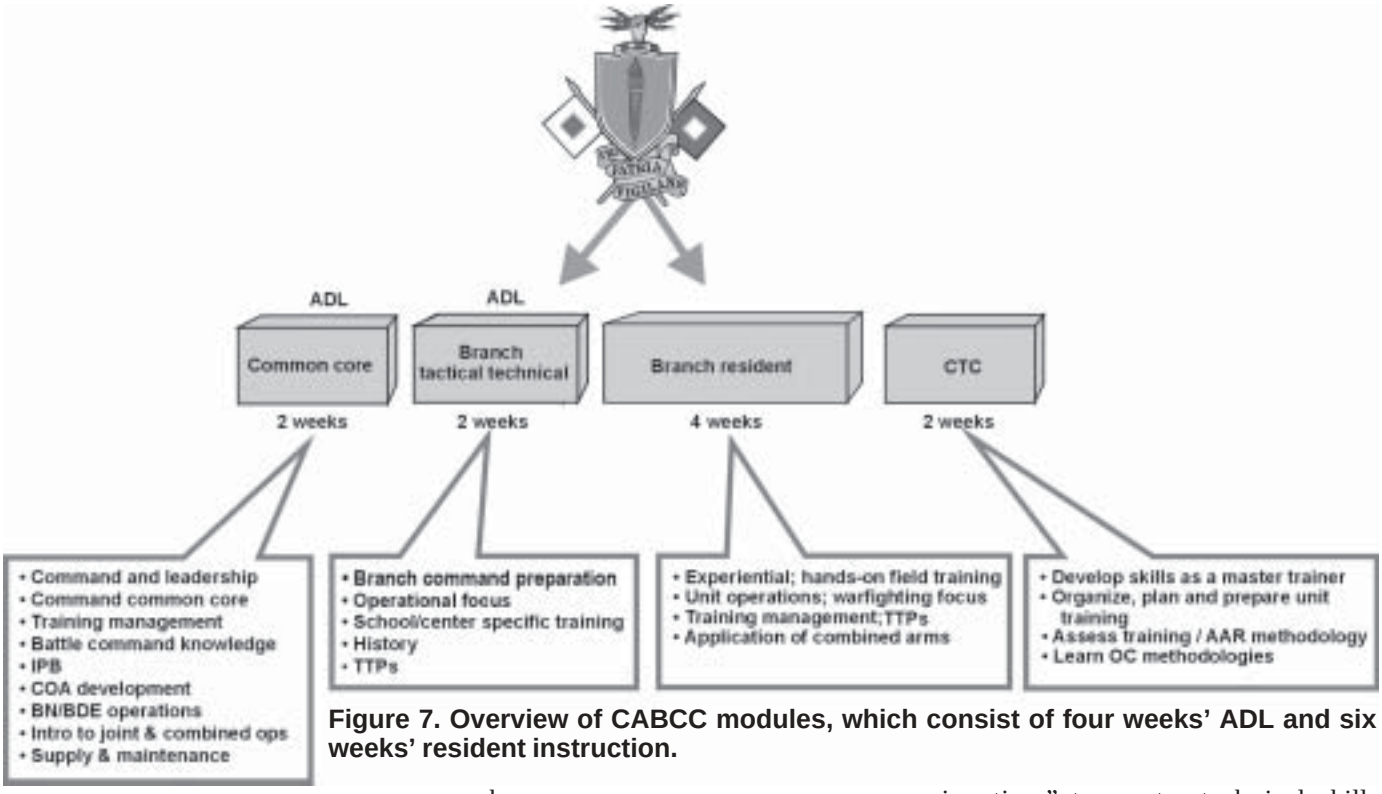

Figure 7. Overview of CABCC modules, which consist of four weeks' ADL and six weeks' resident instruction.

or special staff position will complete an additional staff functional module consisting of one week's ADL. Officers selected for primary staff positions (S-1, S-2, assistant S-3 / S-3 Air, S-4, S-5, battalion maintenance officer) will, after finishing CASC's common core, complete a third week of ADL before assuming the staff position.

Officers being assigned to a special staff position will also attend a two-week phase of resident training before assuming the staff position. Officers being assigned to a special staff position (for example, fire-support officer, assistant brigade engineer or petroleum officer will – once CASC's common-core ADL module is finished – complete a third week of ADL tailored to that staff position followed by two weeks' resident technical training at their respective branch school / center.

The Combined Arms Battle Command Course (Figure 7) consists of 10 weeks' training (four weeks of ADL and six weeks of resident instruction). Officers selected for company command must compete CABCC before assuming command. Each phase of CABCC must be completed sequentially prior to starting the next training phase.

CABCC consists of four weeks' ADL instruction with two distinct focuses. The first two weeks of ADL – referred to as CABCC common core – will be developed by the Combined Arms Center at Fort Leavenworth, Kan., according to TRADOC's guidance and will contain all non-branch specific topics. The second two weeks of ADL – referred to as the Pre-Resident Company Commander's Course – will be developed by individual branch schools / centers focused on specific branch skills and knowledge.

After completing all ADL, officers will attend resident training – referred to as the Company Commander's Course – which is focused on company command. Upon completion of the Company Commander's Course, all officers will complete a Train-the-Trainer Course consisting of two weeks' resident training at one of the CTCs.

The Regiment's challenge

The Signal Center supports the overall concept of transforming OES. However, we have concerns about standardizing resident training for all branches – especially for captains.

The Signal officer requires "training time" to master technical skills associated with the complex IT systems in today's operating environment. With the required integration of emerging digital systems (for example, Army Battle-Command System) and the increased demand for timely information, we can't totally support shortening resident training for captains. While the Signal Center will leverage distance learning, the Signal officer must exhibit mastery of his or her craft during resident training. Also, the Signal officer must possess the technical skills and employment knowledge of fielded and future IT systems for planning and implementing a robust and reliable communications network. Signal officers are expected to perform and ensure the right information reaches the warfighter without fail.

While we understand the need for shorter training time, the Signal Regiment must be able to develop a training construct for our complex and unique requirements. Without this option, captains' resident training in the Signal Regiment may not be complete. Simply put, the Signal officer requires more training time for integrating diverse IT systems that support all combat arms, combat support and combat-service support missions.

We feel more time can be added while adhering to the concept and construct of TRADOC's OES.

LTC Mosley commands the Signal Center's officer-training battalion (442d Signal Battalion). Previous assignments include Signal staff officer on the Army staff (Pentagon); Signal staff officer in the office of the assistant secretary of defense for command, control, communications and intelligence (Pentagon); S-3, 44th Signal Battalion, 7th Signal Brigade, Mannheim, Germany; branch chief, Current Operations Branch, 5th Signal Command, Heidelberg, Germany; and assistant S-3/company commander, 440th Signal Battalion, 22d Signal Brigade, Darmstadt, Germany. Mosley holds a bachelor's degree in mathematics from Appalachian State University and a master's degree in information-systems management from Bowie State University.

ACRONYM QUICKSCAN

ADL – advanced distance learning
AOT – assignment-oriented training
ATLDP – Army Training and Leader Development Panel
BOLC – Basic Officer Leader Course
CABCC – Combined Arms Battle Command Course
CASC – Combined Arms Staff Course
CTC – combat training center
FY – fiscal year
ISYSCON – integrated-systems control
IT – information technology
NCO – noncommissioned officer
OBC – officer basic course
OES – Officer Education System
OF – Objective Force
TRADOC – Training and Doctrine Command

Signals

Enlisted news ... officer news ... warrant-officer news — from the enlisted and officer divisions at Office Chief of Signal, Fort Gordon, Ga.

Officer Notes

SIGNAL CENTER NAMED PILOT SITE FOR NEW INTERMEDIATE-LEVEL EDUCATION COURSE

The Signal Center has been selected as one of two pilot sites for the Command and General Staff Officer Course's common-core extended-campus program. Fort Lee, Va., is the other pilot site.

ILE replaces Command and Staff College in the Army's Officer Education System. CGSOC's common core is one phase of the Army's ILE for officers; all majors will be required to complete the common core to achieve Military Education Level 4. Under Officer Personnel Management System III, ILE will consist of the CGSOC common core plus branch or functional-area qualification training. Officers in the operations career field will attend the Advanced Operations Warfighting Course, while FA officers will attend their respective FA-qualification courses as part of ILE.

Selection as an extended-campus site is a significant accomplishment for the Signal Center. If the extended-campus concept proves successful, selected FA 24 and FA 53 officers would be able to attend both phases of ILE at one location and in one permanent-change-of-station move.

The Signal Center is also working to link a graduate-degree program to ILE. Through a combination of graduate credit for military courses and resident graduate courses already offered at Fort Gordon, Ga., FA 24 and FA 53 officers may someday be able to attend ILE and concurrently earn a master's degree – all in the span of one PCS move to Fort Gordon.

The Regimental POC for ILE is MAJ Al Makowsky, senior career-program manager, Office Chief of Signal, alan.makowsky@us.army.mil.

Warrant-Officer Notes

ARMY TRAINING LEADER DEVELOPMENT PROGRAM PHASE III (WARRANT OFFICER)

The Army Training Leader Development Program Phase III (warrant officers) panel completed its study April 2. The final report, dated July 18, consists of 63 recommendations broken down into four major categories: Army culture, training and education, manning and professional development. The panel consisted of senior warrant officers, officers and noncommissioned officers from around the world. The study's results clearly highlighted the problems and challenges facing the warrant-officer corps as the Army transitions to the Objective Force.

Warrant officers are, and continue to be, the Army's technical experts as the Army transitions to the OF. This – coupled with the OF's projected reliance on modern systems and technology – will likely bring an expanded role for warrant officers. The panel's major recommendations are long overdue: fully integrate warrant officers into the officer corps; merge the Warrant Officer Education System into OES; formalize the warrant-officer recruiting program; seriously address the pay-compression problem; and finally, clarify warrant officers' roles.

The challenge will be to ensure all 63 recommendations are accepted and implemented as a package. For example, we must ensure merging WOES into OES doesn't result in less technical training. Training and Doctrine Command must understand we're merging the systems to provide warrant officers an expanded opportunity to take advantage of leadership training in OES – skills which will be critical to warrant officers in their expanded roles. In fact, the rapid pace of change in technology will require increased training opportunities for warrant officers as legacy systems are upgraded and new systems are fielded. Merely merging WOES into OES without implementing the recommendations for increasing technical training; establishing a robust assignment-oriented-training program that includes professional training; and establishing a lifelong-learning program available worldwide will cripple an already inadequate and underfunded WOES.

Proponents from all branches must be actively involved in the process to ensure the panel's recommendations are fully implemented and that final implementation takes into account each branch's unique requirements. Full implementation of the recommendations is critical if the warrant-officer corps is to provide the Army with the highly technical experts it will need to successfully integrate new technology as the Army transitions to the OF.

Acronym QuickScan

CGSOC – Command and General Staff Officer Course
FA – functional area
ILE – intermediate-level education
OES – Officer Education System
OF – Objective Force
PCS – permanent change of station
WOES – Warrant Officer Education System

A web-based solution for the Special Forces forward operating base

by CPT John Sipple

Second Battalion, 1st Special Forces Group (Airborne) created a web-based pilot project to use in its forward operating base to streamline the unit's operations. This project addressed methods to improve time management and staff synchronization, resource management and request tracking, and timely information distribution.

When the battalion commander tasked his S-6 section to develop the FOB webservices project, we were to develop the initial phase internally, then introduce and test it during the FOB's next deployment, which was as part of the joint/combined Exercise Cobra Gold in Thailand April 29-May 28. This article is a summary of the project and its implementation.

First, I give an overview of the FOB to assist readers who are unfamiliar with Special Operations. I also describe how the battalion operated prior to the webservices project and what the problem areas were. I'll also explain the project requirements and describe the initial solution. To provide readers some background on the necessary hardware and software, I'll then briefly address the server-side and client-side platforms and configurations.

Finally, I'll assess the project and recommend enhancements for future versions. While the outcome of this initial fielding was highly successful, Cobra Gold revealed several areas for continued development. This article summarizes how the project has automated FOB procedures and what can be done to continue improving them.

FOB procedures

The FOB is the Special Forces battalion's headquarters and is composed of five centers that support company (Operational Detachment Bravo) and detachment (Operational Detachment Alpha) operations. The battalion executive officer directs the FOB.

One of the FOB's centers is the operations center, directed by the battalion S-3. The OPCEN manages mission tracking and planning, sets timelines and issues taskings to the rest of the FOB. The Sensitive Compartmented Information Facility and S-2/intelligence section, weather section, psychological operations, civil affairs and the Air Force controller operate inside the OPCEN. Also from within the OPCEN, the area support team tracks the activities of each deployed unit.

Another center, the support center, provides all logistical and personnel support to the FOB and its subordinate teams. The SUPCEN's director, the Headquarters Services Company commander, manages the S-1, S-4, service detachment, ammunition section, rigger section, legal section, chaplain, staff surgeon and medical section.

The Signal center plans and operates all command, control, communications, computers and intelligence for the FOB. The SIGCEN – directed by the battalion S-6 – is composed of the S-6 section, multichannel satellite-communications team, Signal detachment and electronic-repair team. The S-6 section is responsible for planning and resourcing missions, including frequency management, equipment and batteries. The multichannel SATCOM team – attached to the SIGCEN from 112th Signal Battalion (Airborne) – provides wide-area network connectivity to the non-secure Internet protocol routed network and secure IP routed network, and telephone access to the Defense Switched Network. The Signal detachment operates high-frequency and single-channel SATCOM base stations, a message center and distribution desk, the tactical local-area network servers and client computers. The electronic-repair section troubleshoots radio and computer-hardware faults.

The fourth center, the base-defense operations center, is responsible for the FOB's security.

The fifth center, the isolation facility, manages the teams preparing for deployment. While a team is in isolation, its AST works closely with the ISOFAC and the other centers to ensure the team is prepared to execute its mission. Isolation is a critical element in FOB operations; all mission-specific information is compartmentalized to eliminate the possibility of one team compromising another team's mission.

When a team is in isolation, it submits requests for support to prepare for its upcoming mission. Our battalion's field standard operating procedure categorizes the requests into the following categories: medical supplies, medical intelligence, aircraft, rigger and air items, communications equipment, communications security, miscellaneous information, batteries, sup-

plies, maps, intelligence and ammunition. The ISOFAC validates the requests and forwards them to the centers for action. One of the FOB's primary activities is to fulfill RFSs in a complete and timely manner.

Previous methods

TIME MANAGEMENT. The OPCEN battle captain synchronized the FOB by posting the current timeline in the OPCEN and e-mailing an electronic copy over the TACLAN to all the staff primaries. During the last Joint Readiness Training Center rotation, the FOB improved its procedures by implementing the Microsoft Outlook 2000 Calendar, supported by a Microsoft Exchange 5.5 server. The centers could immediately see a new or changed event just by viewing their Outlook calendar. However, as the FOB adopted Outlook as a staff-synchronization tool, the calendar became cluttered with events and users couldn't easily correlate events with staff centers, sections, teams, etc. For example, the event "Staff mission brief" didn't clearly identify that it applies to the ISOFAC, FOB staff planners and ODA assigned to Mission SR002.

RFS PROCEDURES. ODAs prepared paper RFSs, and ASTs hand-carried them through the ISOFAC to the appropriate centers. The ODAs, ISOFAC and centers noted the times they received or forwarded the RFS on the form. Eventually, the SIGCEN extended the TACLAN to the isolating units, enabling them to prepare RFSs within Microsoft Word and attach them to an e-mail message. This approach reduced transit time but proved cumbersome and didn't provide a permanent solution to the RFS process.

RESOURCE MANAGEMENT. Each staff section within the centers managed and accounted for its resources independently. For example, the SIGCEN director controlled the stock and distribution of radios without direct oversight. Consequently, the FOB director couldn't review resource availability without first addressing it through his staff primaries.

ALERT NOTIFICATION. At times, information must be distributed quickly throughout the FOB (for instance, change in Mission-Oriented Protective Posture level, initiation of a planning cell, notification of a pending attack on the FOB). Before the FOB webservices project, an operator had to notify every center by calling each one over DSN or field phone. This consumed precious time.

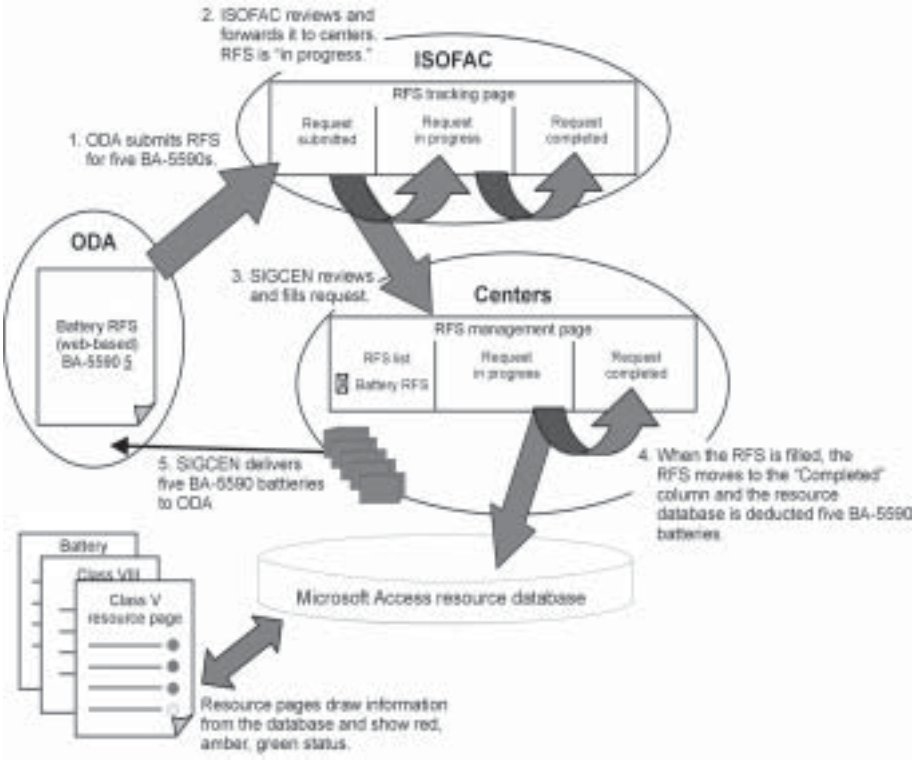

Figure 8. Automated RFS process.

Project requirements

The SIGCEN's S-6 section was tasked to address each of the process's shortcomings by providing an active, web-based synchronization matrix, an improved automated RFS process, a uniform resource-management page and a user-friendly broadcast message application. A "webservices" entity was born in the battalion.

SYNCHRONIZATION MATRIX. The first objective was to develop a synchronization matrix as described in Field Manual 101-5. We were given the following design specifications:

- The matrix must display subordinate units (centers, ODAs, ODBs) vertically on the left column, and times and events horizontally aligned with the respective units. Alternatively, mission identifiers could be shown instead of units.
- The matrix must be easily read and should be able to display additional remarks by clicking on the event.
- The battle captain should be able to add, modify or delete units, mission identifiers and events through an event-editor function.
- The synchronization matrix must appear on each computer and must automatically update itself; the user shouldn't be expected to refresh the screen manually.
- It must be obvious to the user if the matrix has lost its connection by providing some kind of error indication.
- The matrix must be available only to the centers and restrict isolating units from seeing each other's activities.
- Finally, the matrix must be embedded in a web browser.

RFS PROCESS. The general approach was to automate the RFS process by emulating the structure of an e-commerce site. The desired process is depicted in Figure 8.

The RFS system's design specifications were:

• The automated RFS forms' format and content must correspond to the paper forms found in the battalion's FSOP.

• An isolating unit must be able to access the RFS forms through the public-access pages. The RFSs must allow the user to specify quantities and remarks (Step 1, Figure 8).

• The webservices section must assign a tracking number to a new RFS automatically based on mission identifier and RFS sequence number.

• The ISOFAC must validate or cancel the RFS before the webservices section forwards the RFS to the centers (Step 2, Figure 8).

• The webservices section must automatically add timestamps to the RFS whenever it's submitted, validated or completed.

• The ISOFAC must be able to easily track RFSs in three categories: submitted, in-progress (validated) and completed on a single webpage called the RFS tracking page.

• Similarly, the centers must be able to track the RFSs specifically for their centers. For example, the ammunition section must be able to set up its page to only view ammunition RFSs. The centers must track their RFSs in two categories – in-progress and completed – via the RFS management webpage (Step 3, Figure 8).

• The RFS tracking page and RFS management page must automatically update themselves and must be hidden from the isolating units.

• When an RFS is completed, it must automatically deduct the number of items from the resource database (Step 4, Figure 8).

FOB-WIDE RESOURCE MANAGEMENT. The criteria used to design the resource-management webpages were:

• Each section must be able to add, modify or delete items from the resource pages.

• The resource pages must be categorized according to the FSOP.

• Item status must be indicated in a "red, amber, green" format, and each section must define the statutes based on quantity thresholds.

• Each change must be time-stamped automatically.

FOB ALERT BROADCAST. The solution must allow the user to broadcast a message from any computer to all computers. More specifications included:

• The application must load automatically at initial log-on and mustn't be embedded in a browser.

• It must be visible as an icon on the screen, and only an administrator can delete or disable it.

• The application must appear automatically and beep on all computers when a message has arrived. Any user must be able to respond to the message.

• The application must identify which computer generated the message.

Initial solution

PUBLIC PAGES. As the name implies, the public pages are available to the entire FOB, including the isolating units. We structured the public pages to be general in nature to avoid breaking the isolation standard. (See a screenshot of the public pages' homepage on ***Army Communicator***'s website, http://www.gordon.army.mil/AC/.)

Following is a list of pages used during the initial implementation at Cobra Gold '02:

• Daily intelligence summaries from the S-2;

• A library, termed resource pages, containing Special Forces-relevant field manuals and the Joint Electronic Library;

• A phone directory;

• The daily weather update;

• A morale, welfare and recreation page and a chaplain's page; and

• An RFS page allowing isolating units to submit requests.

RESTRICTED PAGES. The restricted pages contain compartmentalized information pertaining to individual missions and FOB resources. Therefore, access is controlled by means of password authentication.

• **SyncMat –** The synchronization-matrix application, SyncMat, automatically allows all centers to see a current timeline broken down by subordinate units or missions (Figure 9). Events less than 12 hours long (meetings, backbriefs) are viewable by clicking on the "Day View" tab. Events 12 or more hours in length are viewable by clicking

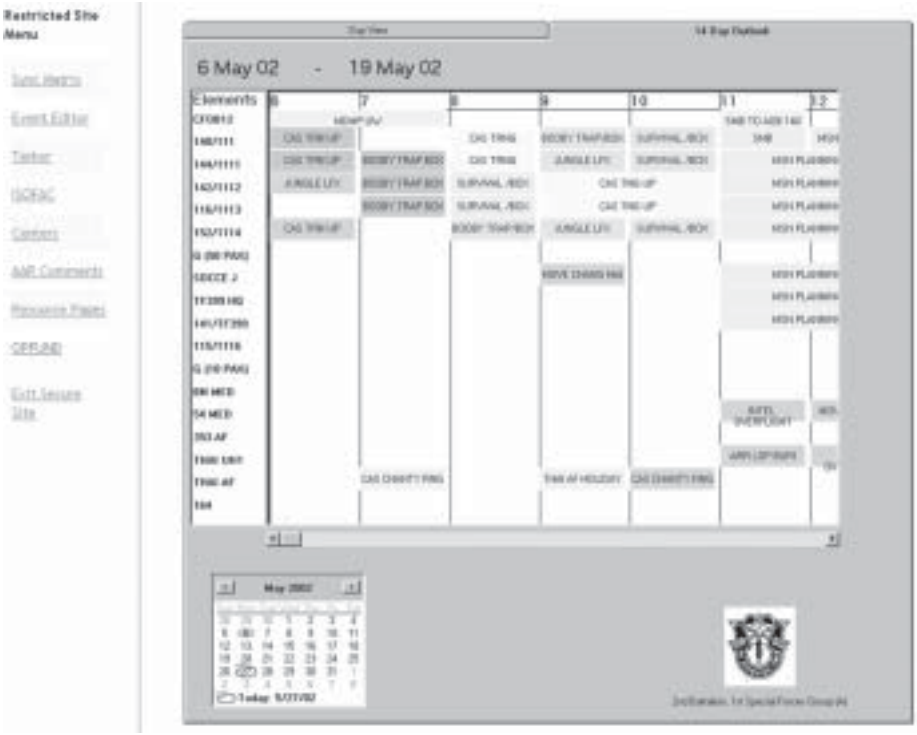

Figure 9. Web-enabled SyncMat synchronization matrix.

the "14 Day Outlook" tab. By clicking on an event box, a user can see supplemental remarks, which appear in a message box. By default, SyncMat updates itself every three minutes. Events are added, edited or deleted by the battle captain, who accesses the "Event Editor" page. Events can be color coded for easy viewing.

• **Resource pages –** The resource pages provide an automated bookkeeping worksheet, allowing users to add, remove and modify resource quantities. Resources and their quantities are retrieved from a Microsoft Access resource database located at the webserver. By depicting the status of resources in the red, amber or green format, the resource pages provide immediate and easy oversight for FOB leadership. One configurable field sets the "green" threshold; resources equal to or greater than the green quantity are assigned a green dot. Another field sets the "amber" threshold; resources quantities less than the green quantity, but equal to or greater than the amber quantity, are assigned an amber dot. All quantities less than the amber quantity are assigned a red dot (Figure 10).

Figure 10. Battery resource webpage.

• **RFS management –** The isolating unit selects the appropriate RFS form by clicking on its hyperlink. The RFS form is generated, listing the resources typically available in the FOB. For example, the battery RFS allows the isolating units to enter the desired quantities with optional remarks. (See a screenshot of the battery request form on ***Army Communicator***'s website.)

Once the isolating unit has submitted the RFS, the application provides the ODA a printable receipt, automatically inserts the start time and forwards the RFS to the ISOFAC. The ISOFAC then sees a new RFS automatically pop up under the "Submitted Requests" column on the RFS tracking page. (See a screenshot of the RFS tracking page on ***Army Communicator***'s website.) By clicking on its automatically generated identification number, the RFS can be viewed, validated or cancelled. Once the ISOFAC has validated the RFS, it moves to the center column labeled "Requests in Progress" on the RFS tracking page.

After the center has allocated resources for the request, the center director or designated representative completes the RFS, then the RFS moves to the rightmost column labeled "Requests Completed." After the ISOFAC validates the RFS, it's accessible to the centers and becomes visible in the RFS management page under the "Active Requests" header. The RFS management page allows each center to select only the RFSs that apply to it and filter out all others. (See a screenshot of the RFS management form on ***Army Communicator***'s website.)

As with the RFS tracking page, the RFS management page is automatically updated when the status of an RFS changes. The center completes the request, and webservices automatically updates the resource database.

• **Alert-message broadcast –** FOBAlert! is an application that enables rapid message broadcast to all TACLAN computers. When a user logs in to a computer, FOBAlert! loads automatically and appears as an icon with an exclamation mark on the computer's desktop. When the user clicks on the icon, a message box opens. After the user types a message and clicks the send button, a message box displaying the message opens on all terminals connected to the TACLAN (Figure 11).

Webservices system requirements

This section of the article describes system specifications used to support the FOB webservices project during Cobra Gold '02:

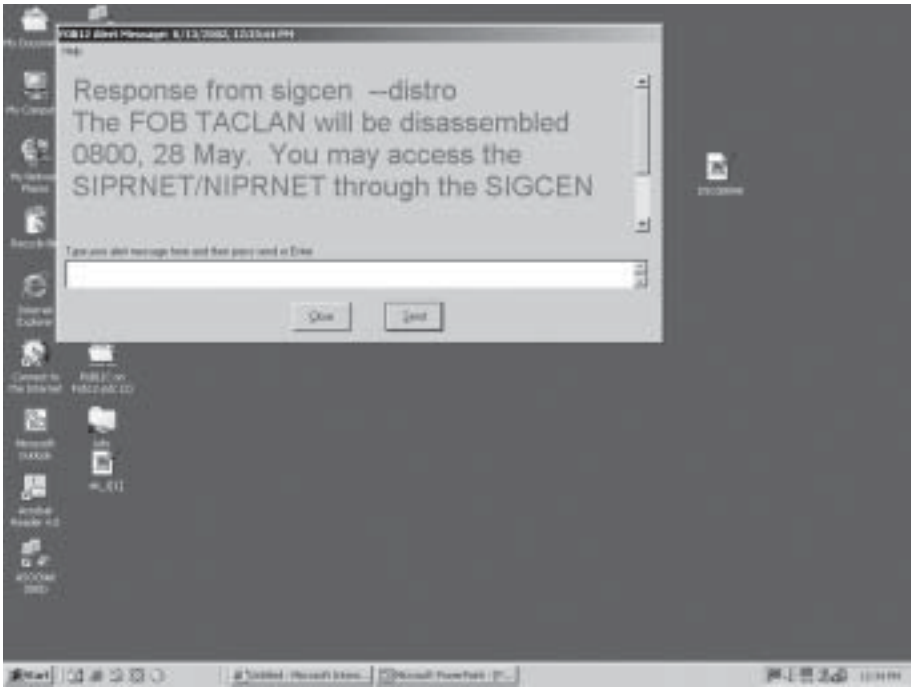

Figure 11. FOBAlert! message screen.

• Two Dell Poweredge 2550 servers running Windows NT 4.0's Service Pack 6a supported the TACLAN. We installed Microsoft Internet Information Server 4.0 on the backup domain controller. By installing the free IIS addition, Option Pack 4, we upgraded the server to run Active Server Pages 3.0. (The dynamic webpages were coded in Visual Basic script and required this configuration to operate.) The SIGCEN configured an open-database-connectivity connection to the Access resource database and shared its parent directory to the SyncMat application. Since we designed the webserver to operate only within the local network, we assigned it an IP address within the private network of 10.1.1.0/24.

• All client hosts ran Microsoft Windows 2000 Professional, Service Pack 1. We configured all browser start pages to be the FOB webservices homepage. We installed SyncMat and FOBAlert! on each terminal and issued each a private IP address in addition to an externally accessible IP address. We granted certain users write permissions to webpages – for instance, S-2 soldiers had permission to manipulate their INTSUM page, and the weather section could modify the weather page using Microsoft Word.

Implementation at Cobra Gold '02

The FOB tested the webservices project during Cobra Gold '02 in Lop Buri, Thailand. Here's a brief synopsis of how each module performed and how it can be improved.

SYNCMAT. SyncMat performed well; however, it wasn't used as heavily as we anticipated. This is due, in part, to the fact that the entire FOB was located in a single building, and events changed less frequently than in a JRTC exercise. We modified SyncMat twice, primarily expanding its capacity to display more events. (The original version was limited to 50 events, which proved much too limited.)

Because SyncMat is an ActiveX component, it must be installed on each computer. When introducing a new version, distribution is cumbersome. If developed for the Microsoft .Net platform, we could deploy the new version directly from the server, drastically reducing administrative overhead and delay. A second recommendation is to design SyncMat as a stand-alone Windows application using the entire display surface area. This modification could be used with a screen projector to create a "heads-up picture" on a wall.

RFS MANAGEMENT. The FOB used webservices for almost all RFS actions. With only 30 computers installed on the TACLAN, server response was excellent. Unfortunately, due to the dispersed FOB layout, we couldn't connect some of the isolating ODAs to the TACLAN. Consequently, they were forced to walk to the advance operating base's building to submit their RFSs. Since the FOB was operating without an ISOFAC, there was some confusion whose responsibility it was to validate RFSs. That task eventually fell to the isolating AOB, forcing the AOB's soldiers to validate their own RFSs!

Also, the servers crashed during numerous power outages. Even though the servers recovered most of their functionality, the IIS component experienced a critical failure, forcing us to reinstall Option Pack 4. The outage was prolonged because the necessary software wasn't readily available and had to be downloaded off the Microsoft webpage. Fortunately no data was lost.

A future implementation should include more RFS pages located in the restricted pages specifically for intra-FOB requests. The OPCEN would use this feature, for example, to place a request to the SUPCEN for more toner cartridges. Clearly, such requests shouldn't be validated by the ISOFAC but should be forwarded directly to the appropriate center.

RESOURCE PAGES. Before we deployed, we entered all RFS items listed in the FSOP into the resource database. However, before the resource pages are usable, each section must enter initial inventory quantities and determine the green and amber thresholds. Since we introduced most users to the webservices after arriving in Thailand, the resource pages received limited attention. However, where used (batteries, Signal systems and Class VIII), the pages allowed easy

oversight and reduced bookkeeping overhead as originally designed. The lesson-learned is to get each staff section to update its initial inventory before deployment.

PUBLIC INFORMATION. Despite its simplicity, the public library pages are an invaluable addition to the webservices and TACLAN. The pages provided immediate access to doctrinal resources and internal documents – such as standard operating procedures or standard reporting formats – to any TACLAN user. The response time clearly outperformed accessing the same resources from external sources.

FOBALERT! The Air Force weather noncommissioned officers broadcast weather advisories successfully on the TACLAN using FOBAlert!. A shortcoming of FOBAlert! is that it currently doesn't place itself on top of opened applications. If a user is working on a Word document, the message box opens and the computer beeps, but the message box remains hidden under the Word application. This modification can be easily made in an upgraded version.

Conclusion

FOB webservices' initial implementation at Cobra Gold '02 was highly successful; it was among our first effective advances toward a web-based environment used to track time and resources and to distribute timely messages. While it didn't achieve 100-percent solution yet, it's clearly an enhancement to FOB's mission and should continue, focusing on improving its reliability and functionality.

CPT Sipple has been with 1st Special Forces Group (Airborne) at Fort Lewis, Wash., since August 2001. He has served as a battalion Signal officer and is currently the Group Support Company's Signal detachment commander. In his spare time, he enjoys developing software and is currently working on a second web-based project for the group headquarters.

ACRONYM QUICKSCAN

AOB – advance operating base
AST – area support team
DSN – Defense Switched Network
FOB – forward operating base
FSOP – field standard operating procedure
IIS – Internet information server
INTSUM – intelligence summary
IP – Internet protocol
ISOFAC – isolation facility
JRTC – Joint Readiness Training Center
ODA – Operational Detachment Alpha
ODB – Operational Detachment Bravo
OPCEN – operations center
RFS – request for support
SATCOM – satellite communications
SIGCEN – Signal center
SUPCEN – support center
TACLAN – tactical local-area network

Doctrine update

Updates in Signal doctrine from Directorate of Combat Developments, Army Signal Center, Fort Gordon, Ga.

BATTLEFIELD INFORMATION MANAGEMENT

Knowledge is power – a truism we've all heard a hundred times. It's applicable to politics, business and the battlefield.

Modern military operations are characterized by complex and intricate interplay among military elements, political entities, government agencies, non-government organizations and civilians. Modern military operations span the entire range of activities from disaster relief to peacekeeping to major theater conflict. All operations require the exchange of information and knowledge for effective coordination and synchronization. Battle command has as its foundation the efficient exchange of information, knowledge and understanding – not just any information and knowledge, but complex, fast-paced and increasingly distributed operations require relevant information.

The proliferation of sensors, data processors and automated applications is producing an explosive growth of information within all echelons of the Army. At the same time, the introduction of faster, more pervasive communications means is providing a degree of connectivity never seen within the military environment. The increasing levels of connectivity provided by modern tactical-communications networks are combining with the explosion of information to create conditions of information overload within operations centers and within commanders' consciousness.

Army leaders recognize that successful operations, now and in the future, will require something new. They'll require the deliberate and effective management of information to enable Army forces to see and understand the battlespace faster and better than an adversary, allowing decisions to be translated into more effective operations, leading to operational success.

The emerging discipline of information management will be the catalyst that enables the synergistic interaction of the various battlefield functional areas to create new levels of effectiveness within the force. IM's purpose is to get the right information to the right person or place at the right time in a usable format to facilitate situation understanding and decision-making. IM uses procedures and information systems to collect, process, store, display and disseminate data and information. IM will turn knowledge into power and put the means to succeed into the commander's hands.

The Signal Center at Fort Gordon, Ga., is the Army's proponent for IM. IM is intricately related to the other facets of command, control, communications and computers operations. Figure 12 shows the component functions that constitute C4 operations.

C4 operations=IM + NETOPS
- C4=key enabler of decision superiority;
- IM=infosys + RI;
- Netops=NM + IA + IDM

Figure 12. C4 operations.

The key concept is that IM and the various aspects of providing and protecting the Army's communications networks are so closely linked that they're interdependent. Just as the various members of a football team perform individual functions skillfully but are only fully effective when working in concert, IM and network operations combine to contribute different, yet joined, aspects of the Army's information environment.

IM's elements are RI and infosys. The interconnected nature of communications networks and IM is apparent when these elements are examined.

RI. RI is simply defined as all information of importance to commanders and staffs in the exercise of command and control. The key word is "relevant." An ocean of information must be filtered to extract just the information required for awareness, understanding and decision. Of course, the term "relevant" is relative. For example, information relevant to the execution of a breaching operation may not be relevant to the establishment of a logistics support area.

Leaders at all echelons determine their specific information requirements. They'll recommend, and the commander will approve, appropriate commander's critical information requirements. Information relevancy is determined by applicability to information requirements and CCIRs. RI's delivery will be supported via new capabilities provided by the developing field of information-dissemination management.

IDM will be an automated function that manages information delivery according to content and end-users' stated needs. IDM applications will match information content with users' requests and automatically deliver it to support planning, decision-making and mission execution. IDM will achieve its full capabilities through four basic functions: information awareness, information access, information-delivery services and support services.

Information awareness will enable users to see what RI is available and to see information changes. Information access will enable users to state their information needs and access RI without knowing its exact location. Information-delivery services will optimize use of communications-transport systems by managing priorities, file size, access and format. Support services will provide interfaces to directory, security and operations functions.

INFOSYS. Infosys is defined as the equipment and facilities that collect, process, store, display and disseminate data and information. This includes computers – hardware and software – and communications, as

well as policies and procedures for their use. This definition is correct given that management functions occur from data collection through decision-making. Users' infosys won't be regarded merely as user terminals connected to a communications conduit. Current and future infosys will interact vigorously with the network. Infosys will rely on the network for processing support and, in turn, will support the network with connectivity applications. The information network, or grid, won't attain its fullest information-processing functionality without both the users' systems and the communications linkages present.

Managing information is captured in a four-step process as depicted in Figure 13. The first step is to identify the information requirements for planning and conducting operations. The second step is to collect and process information to obtain the information relevant to the user's needs. This leads to the third step of building a depiction of the situation with RI, usually referred to as the common operational picture.

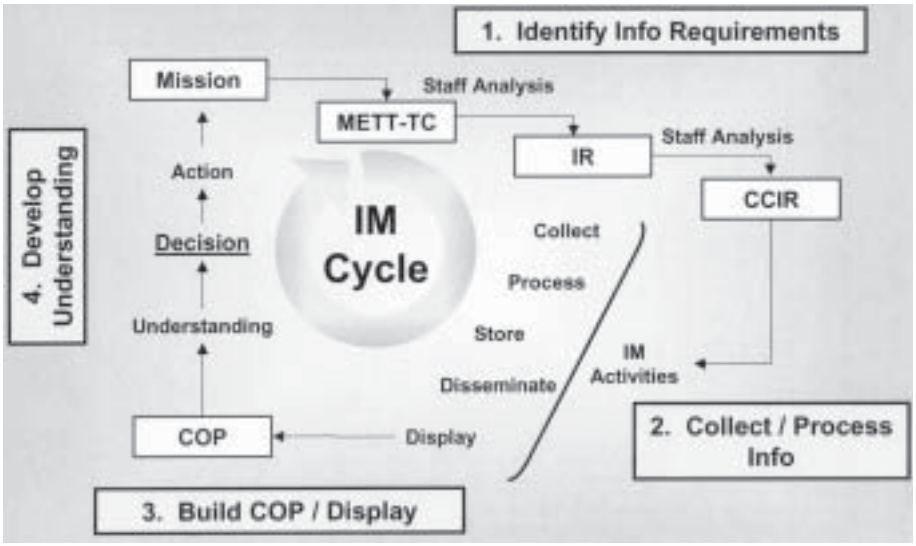

Figure 13. Information-management cycle.

When pertaining to a maneuver action such as a deliberate attack, COP is composed of terrain features, in-

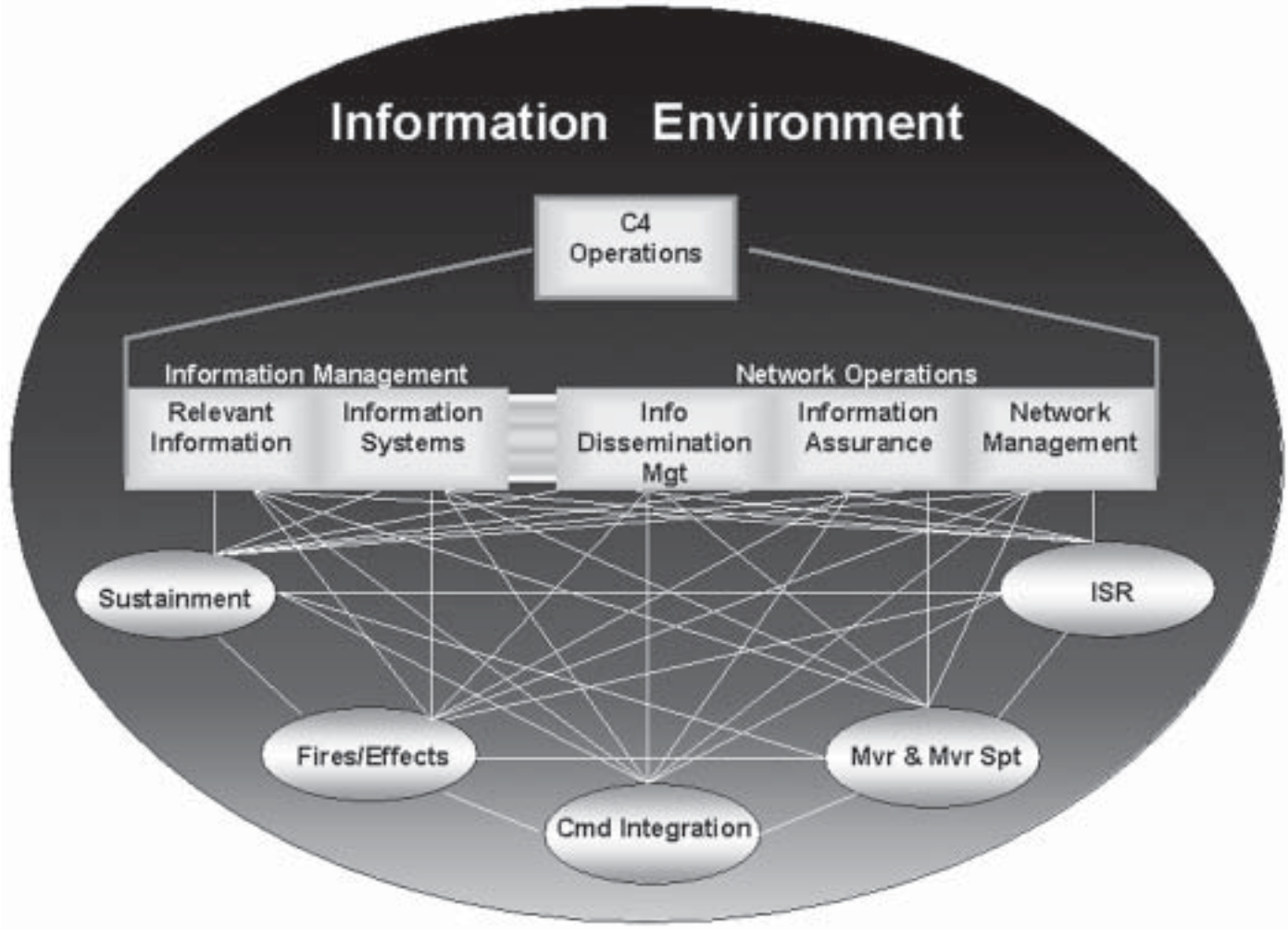

Figure 14. C4 operations in the information environment.

cluding blue-force situation information, threat-force situation information, airspace-management information or graphic control measures. COP may take a different form to support other operations – for example, a maintenance facility may use an interactive data matrix to depict the maintenance status of unit equipment, availability of parts and so on.

Whatever its form, COP supports the last step of developing understanding. While the display provides awareness, it requires judgment to extract inference, recognize patterns and anticipate consequences. It's understanding that leads to decisions that spur action. This simple IM process occurs throughout the depth and width of an organization and supports all action.

Within the four-step management process are five distinct tasks associated with IM. These are collecting, processing, storing, disseminating and displaying data and information. These tasks will become more and more integral to the communications networks as time goes on. Whereas today's user devices simply connect to Signal transmission paths and pump data through them, developing technologies are leading to user applications and transmission systems that cooperate in prioritizing, routing, scaling, caching and formatting data. More processing functions will occur automatically within the networked infosys to provide greater efficiencies. As the Army moves down the path of modernization and transformation, IM processes, tools and communications systems will become faster, more powerful and more automatic.

Signal staff elements will support Army commands via an organizational structure that reflects the C4-operations construct depicted in the new Field Manual 6-0, ***Command and Control***. Figure 14 shows the elements of a C4-operations section. C4 operations tie the battlefield functional areas together to enable synchronized battle command within an information environment.

Signal staff will coordinate all aspects of C4 processes and will manage the critical interface between infosys and the communications network. While IM processes and systems are, and will continue to be, inherent to all functional areas, the Signal community will provide the overall staff coordination and integration of the widely disparate functional-area IM processes and products to provide commanders and decision-makers with the awareness and understanding required for effective battle command.

As IM specialists, Signaleers will assist commanders in managing information resources. As an example, communications bandwidth is, and will remain, a finite battlefield resource. The information manager will assist the commander in determining priorities for data communications, the content of digital reports and the format for collaborative interactions to maximize the value of communications capabilities. The "digital rules of engagement" the information manager establishes will form the construct for information exchange within a command.

As the IM proponent, the Signal Regiment is producing a doctrinal field manual to explain the processes and procedures associated with IM at tactical levels. It will explain the roles, responsibilities and organization of Signal elements relating to IM and will describe the planning functions associated with IM support during the military decision-making process. The field manual will include principles applicable to both current and future forces and will provide the basis for IM operations applicable to the Army's transformation.

Mr. Svendsen is a retired Signal Corps lieutenant colonel with 22 years' experience in a variety of communications leadership positions around the world. He is currently working in the Concepts and Doctrine Division of the Signal Center's Directorate of Combat Developments.

ACRONYM QUICKSCAN

C4 – command, control, communications and computers
CCIR – commander's critical information requirements
COP – common operational picture
IDM – information-dissemination management
IM – information management
infosys – information systems
netops – network operations
NM – network management
RI – relevant information

The coalition common operating picture in Kosovo

by MAJ Michael McCaffery

No corner of the world exists where the American army isn't using digitization as a force multiplier, it seems. Digitization is alive and well in Kosovo, for instance, helping paint the coalition common operating picture.

Task Force Falcon in the Central Balkans country expanded our digital command-and-control system on the recently concluded force-projection Exercise Rapid Guardian. This C2 expansion included German, British, Finnish and Swedish vehicles, with the system automatically updating unit icons on the COP in tactical-operations centers across the brigade sector.

The digital peace-support operations COP is actually two systems (Enhanced Information System and the C2 personal computer) working as one.

EIS consists of commercial OmniTracs hardware with Force XXI Battle-Command Brigade and Below software fed into a virtual personal network in Germany, then sent via the Army's secure Internet protocol routed network to the Multinational Brigade (East) COP. EIS uses Ku-band antennas to communicate location and messaging with remote stations. OmniTracs, the commercial tracking system, uses Global Positioning System input to add tracking and location capability to coalition-partner and allied vehicles.

U.S. Army Europe's deputy chief of staff for operations runs EIS, on which Army digitization in the European theater is based. Task Force Falcon has more than 400 EISs mounted in up-armored humvees. The EIS module provides the driver with location information on a digital map as well as satellite-messaging capability back to the system's static version in the TOC. EIS' TOC also has a small, digital map display that provides locations of all EIS-equipped vehicles and messages. The system polls all EIS antennas every five minutes, which updates the locations represented on the TOC's and vehicle's graphical interface, making the system near-real-time.

C2PC is the map and database software in operations centers across the task force. C2PC receives EIS information via ASIPR and posts the current location of all task-force EISs and OmniTracs on a digital COP. C2PC is an important component of the overall PSO COP because it adds the operational graphics and overlays to EIS location input. The task force also shares operational information via C2PC overlays and vehicle tracks stored on a central server. All battalion and the maneuver-company TOCs remotely add their own local C2PC data and share that data via transmitted overlays with all task force TOCs across

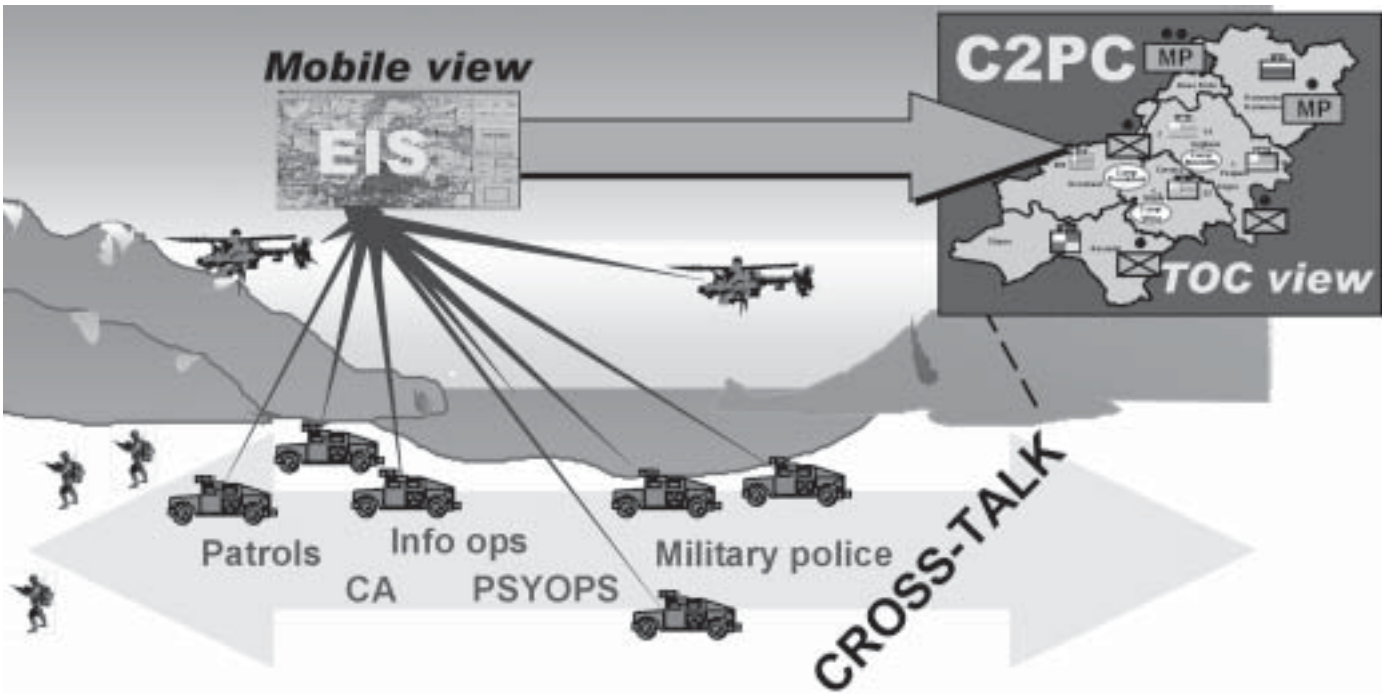

Figure 15. Task Force Falcon PSO COP provides situation awareness.

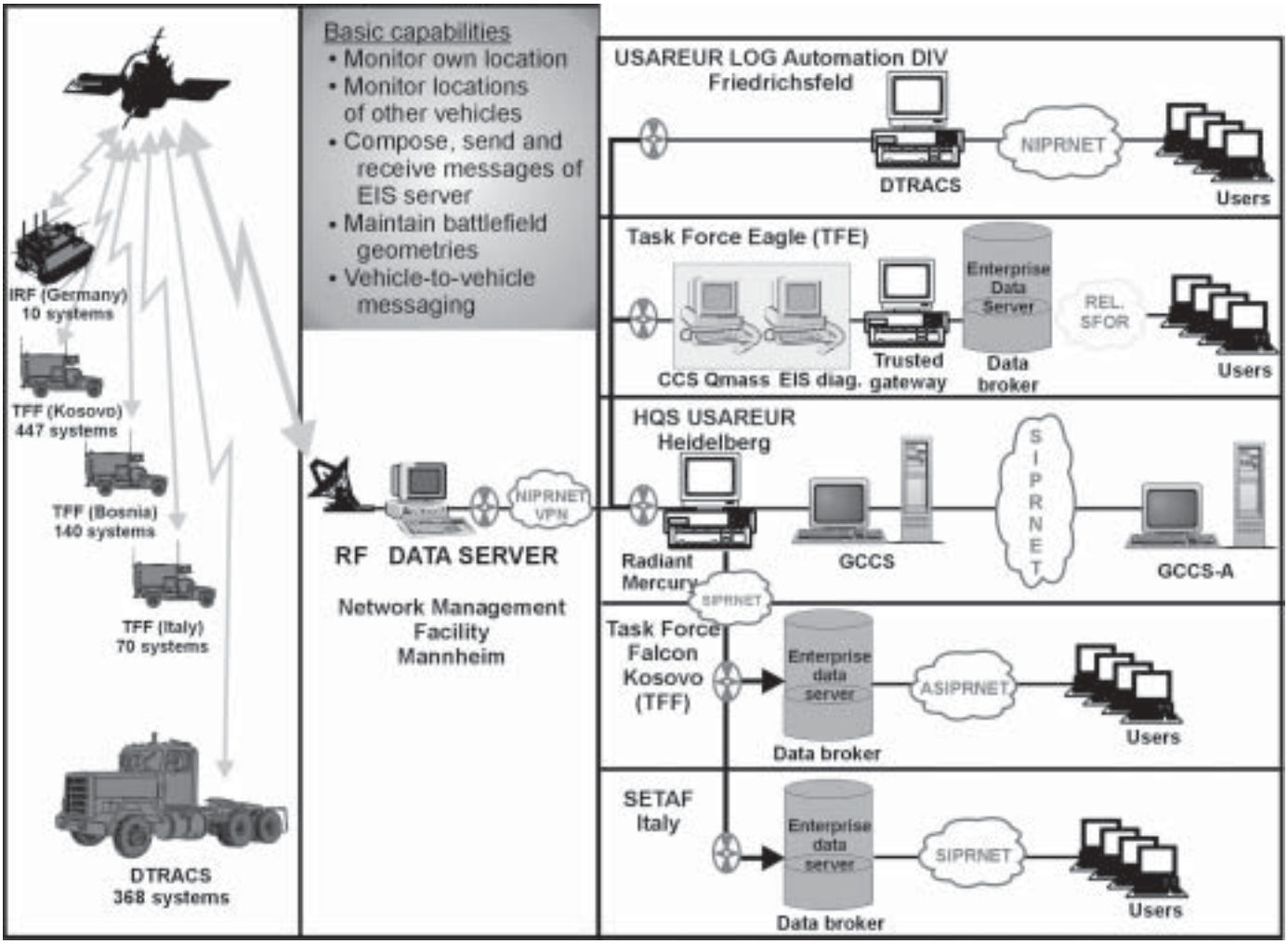

Figure 16. EIS systems architecture as created by USAREUR's DCSOPS office.

Kosovo, creating a common situation awareness for the unit.

As daily events are logged into the system and transmitted across the task force, a database is built that allows commanders to identify hotspots and local trouble areas, focusing their attention on those areas to provide a safe and secure environment.

When significant events happen in-sector, PSO COP allows commanders to address the situation more effectively by sharing accurate information instantly. For instance, an EIS in the vehicle of the commander on the ground enables him to see which of the myriad general-support units is in the area and available to employ. Back at the company, battalion or brigade level, C2PC tracks the movement of units as they respond.

Commanders of general-support units with overlapping responsibility areas – such as the military police, psychological operations or civil affairs – are directly plugged into the maneuver commander's primary C2 system, enabling a synchronized operation. Further, general-support-unit commanders all have instant access to databases of locations, previous events, significant persons, danger areas and bridge data to speed the decision cycle at all levels. Since the task force relies heavily on general-support units as key PSO enablers, these background data points are pooled on C2PC overlays and shared digitally in near-real-time.

Also, since the knowledge database has been built, the friction involved with unit changeovers every six months is diminished.

PSO COP provides a planning tool that allows commanders to visualize not only the current state of the operational environment but also potential courses of action for future operations. This future operational picture can then be shared instantly and dynamically with adjacent and subordinate commanders, greatly reducing errors born of different interpretations of orders or acetate overlays.

Furthermore, PSO COP allows commanders in Germany to more easily prepare their units for their Kosovo rotation. For example, 1st Infantry Division is already constructing its next mission-readiness exercise to incorporate C2PC and its resident, up-to-the-minute database. As the current rotation builds the database for current operations, future rotations are accessing that

database to better prepare their units.

Since 1st Infantry Division assumed the Kosovo mission in May, the task force has operated and expanded its PSO COP over tactical links the division Signal battalion provides to remote nodes. Until the recently completed remote-site commercialization, there were been as many as five remote tactical sites using the PSO COP.

The relatively low density of contract personnel is one reason why we believe this system is as adaptable to a high-intensity conflict scenario as it is for PSO. Right now four USAREUR-provided contract civilians support the PSO COP for the entire task force. EIS requires three civilians for installation, database and maintenance, and C2PC requires one contractor as a technical advisor and trainer.

The bottom line is that digitization, through PSO COP, is a force multiplier in the PSO environment using commercial-off-the-shelf equipment, initiative and, above all, innovation on the ground.

MAJ McCaffery is the G-6, MNB (E), Task Force Falcon, Camp Bondsteel, Kosovo. He holds a bachelor's degree in economics from Stonehill College, Mass., and two master's degrees: one in telecommunications management from George Mason University and one master of military art and science (thesis: C2 and digitization) from the Army's Command and General Staff College. His military experience includes battalion Signal officer in a Special Forces battalion; commander of Company B, 304th Signal Battalion; action officer, office of the Army's chief of staff, Pentagon; and command, control, communications, computers and intelligence instructor, Marine Corps University, Quantico, Va.

ACRONYM QUICKSCAN

ASIPR – Army secure Internet protocol routed network
C2 – command and control
C2PC – command-and-control personal computer
COP – common operating picture
DCSOPS – deputy chief of staff for operations
EIS – Enhanced Information System
MNB (E) – Multinational Brigade (East)
PSO – peace-support operations
TOC – tactical-operations center
USAREUR – U.S. Army Europe

Also see related letter to the editor in Pulse, Page 34

Ruggedized commercial-off-the-shelf voice switch supports joint exercise

Figure 17. An M1A1 tank from 2d Brigade, 3d Infantry Division, comes ashore during Exercise Native Atlas '02, a joint (JLOTS) exercise conducted by both the Army and Navy.

by MSG Alan DeWitt

Army tactical wireline communication is based around two systems: mobile-subscriber equipment, which allows access to the Area Common-User System for battalion-size elements and higher, and the venerable TA-312 field telephone and SB-22 switchboard for internal communications at battalion and below. While these communications solutions work well in a traditional mission setting, they don't always meet the command-and-control needs of units conducting operations and exercises in non-traditional roles.

This fact is even truer with combat-support and combat-service-support units. Case in point: the recent Joint Logistics Over The Shore exercise Native Atlas 2002 conducted by the Army and Navy at Camp Pendleton, Calif.

Native Atlas' purpose was to discharge 2d Brigade, 3d Infantry Division's equipment from a roll-on / roll-off ship two miles off the California coast near Camp Pendleton, then move it inland to the National Training Center at Fort Irwin, Calif., so the brigade could conduct its annual rotation. This exercise was very similar to a wartime mission in which units would deploy soldiers by air to the operations area and fall in on equipment unloaded from a prepositioned RORO ship.

The 32d Transportation Group commanded all Army Forces participating in the exercise. The ARFOR consisted of both active-duty and Reserve transportation, quartermaster and military-police units.

Communications challenge

Last-minute retasking of coordinated Signal support required units participating in Native Atlas to rely on organic communication capability. However, even if an MSE-equipped Signal unit had been available to support the exercise, its capabilities wouldn't have "translated" well to the participating units' C2 requirements. Because of the exercise's size and scope, ARFOR units required long-haul communications to coordinate with other military units and civilian / government agencies spread throughout the United States. These external organizations didn't have access to tactical "green phones." For this reason, access to the Defense Switched Network and Public Switched Telephone Network was paramount to the exercise's success, but access was extremely limited due to the base camp's isolated location on the vast Camp Pendleton reservation. ARFOR's total DSN allocation was only 10 lines to support 15 units at multiple locations in the base camp.

Non-traditional operations call for non-traditional solutions. In this case, the solution came in the form of a small, ruggedized commercial voice switch aptly named Warrior PBX.

Answer: Warrior PBX

Warrior PBX is a small, deployable, commercial-off-the-shelf voice switch, or private branch exchange, which supports up to 32 subscribers and 12 analog trunk terminations. (An optional upgrade allows for 48 subscribers and 16 trunks.) Subscriber equipment can be commercial wired and wireless telephones, fax machines, computer modems, Secure Telephone Unit-III / secure-terminal-equipment telephones, and even TA-312s with dual-tone multifrequency adapters. The trunk interface is a loop-start circuit allowing connection to standard analog DSN and PSTN phone lines.

Also, Warrior PBX is able to interface with MSE's large extension node, small extension node and force-entry switch for connectivity to ACUS. Even without outside connectivity, the system can act as a full-featured, closed-voice network exponentially more powerful than the current field phone system. Subcomponents of the system include an uninterruptible power supply, extension and trunk distribution panels, a system computer and an operator's hands-free telephone set mounted to a sliding shelf.

All components are mounted to a 19-inch aluminum rack contained inside an olive-drab-colored Hardigg transport case. The rack is isolated from the case by eight rubber mounts that absorb any shock or vibration during movement, allowing the equipment to withstand some rough handling.

Weighing only 165 pounds and taking up just 27 inches by 27 inches of floor space, Warrior PBX is relatively small when compared to the tremendous capability it brings to the fight.

Native Atlas use

The 24th Transportation Battalion took Warrior PBX to Native Atlas intending to use it to support the battalion's own C2 requirements. The 32d Transportation Group quickly decided that Warrior PBX would provide greater service supporting the entire ARFOR element. This decision not only increased access to the DSN network by more than 300 percent, but it also improved the quality and capability of internal communications among ARFOR units in the base camp.

Each of the 32 extensions was judiciously assigned to maximize impact. All 10 of the allocated DSN lines were terminated to the trunk side of the switch. Coordination was made with Camp Pendleton's directorate of information management to place each of the 10 telephone numbers into a hunt group. By placing all DSN numbers in a hunt group, incoming calls would automatically search for the first available open line. This action allowed exercise participants to give out only one access number to outside callers.

Terminating trunks and extensions to Warrior PBX was extremely easy due to the system's tool-less distribution panels. The screw-down binding posts don't require any special tools to terminate wire connections and can be used with either military field wire, such as WF-16 and WD-1, or commercial-grade wire, such as two-pair Category-3 and four-pair Category-5 cable. A mix of WF-16 and Category-5 cable was used to connect trunks and extensions during Native Atlas. While most cable runs were less than one kilometer, the system will support extension and trunk connections up to five kilometers.

After Signaleers connected the trunks and extensions, it was time to program the switch. The system computer, mounted on a sliding tray inside the transport case, allows full programming of the switch, monitoring of the system's UPS and ability to automatically log all call activity. The only programming requirement is that the installer knows the number of trunks and extensions connected to the system. With this information, the installer consults a configuration matrix to determine the name of the required configuration file. The configuration file is opened on the system computer and then uploaded into the switch via a serial-cable connection. Once loaded, the switch is fully operational. Total set-up time during Native Atlas was two hours, with most of that time consumed laying cable and connecting end-user equipment.

Figure 18. SPC Dennis Braun tests extension lines on the Warrior PBX during Exercise Native Atlas '02.

ARFOR units began using Warrior PBX minutes after installation was complete. Call volume during the exercise's peak was extremely heavy but very rarely saturated the trunk lines. The loop-to-trunk ratio was 3.2-to-1, which provided a high probability of trunk seizure equating to a high quality of service. As a good rule of thumb, the manufacturer recommends a ratio of no higher than 4-to-1 to ensure an acceptable QoS. Depending on your subscribers' calling characteristics, you may increase this ratio with minimal impact on QoS. In situations where subscribers far outnumber trunks, it's possible to limit trunk access to only select subscribers – other subscribers will still be able to take advantage of the internal network but can't place external network calls.

Operating procedures for the subscriber were simple and easily comprehensible. If an ARFOR subscriber wanted to call another ARFOR subscriber, he would simply dial a three-digit extension. For access to DSN, the subscriber would dial "9" to seize the first available trunk. When he heard the second dialtone, he could then dial the DSN or commercial number he wanted to call.

Subscribers also had access to features normally only found on their garrison telephone network like six-party conference call, call waiting, call forwarding, transfer, hold, hunt groups and pick-up groups. (Warrior PBX supports more than 100 features.) Units requiring secure communications connected STU and STE phones to Warrior PBX to conduct secure calls.

Voice quality on Warrior PBX is extremely clear due to the 64-kilobits-per-second sampling. This is the same channel size used on the commercial telephone network. The difference in voice quality is quite remarkable when compared with MSE's 16-kbps voice channel.

For incoming calls, Warrior PBX automatically greets callers with a prerecorded message asking the caller to enter the extension of the unit he or she wishes to reach. A unit can customize this 20-second message. Incoming fax calls are automatically detected by the switch and routed to a predetermined extension.

Warrior PBX performed

Figure 19. PFC Sharonda Freeman programs Warrior PBX.

flawlessly, providing uninterrupted service during the 30-day exercise. The hot, dusty, harsh environment of Camp Pendleton didn't faze the internal system components. Thanks to the internal UPS, the system remained operational even when base-camp power-distribution problems led to blackouts lasting more than an hour. The UPS battery is so powerful that the system can remain operational for up to three hours without external power.

Warrior PBX's strengths

Warrior PBX's many capabilities saved ARFOR both time and resources. One such savings was the reduction in the number of cable runs. With Warrior PBX, a subscriber's single telephone connection had access to both the internal and external network. Without this support, subscribers would have required both a DSN and TA-312 connection. In addition, a soldier was freed up from operating the field phones' manual SB-22 switchboard.

Another timesavings was gained by streamlining procedures for changing a telephone line's class of service. Normally any changes to a line's CoS would require exercise personnel to submit a local-service request to the DOIM. Depending on DOIM's workload, the request could take anywhere from a few hours to a few days to process. For a short exercise, this wait could be painful. During Native Atlas, all trunk lines were marked Class A, the highest possible CoS. Using Warrior PBX's system computer, subscribers' extension lines were given a CoS appropriate to their mission. When a change to a subscriber's COS was required, it was done in minutes with only a few mouse-clicks on the system computer.

Another capability that potentially saved ARFOR hundreds of dollars was the call-detail reporting feature. This feature is especially useful because it automatically documents all incoming and outgoing trunk calls in real time. The report displays the time of the call, the call's duration, which extension made the call, the number called and the trunk used. The report can be saved electronically as a text file or printed out, meeting Army Regulation 25-1's requirement that all toll calls be recorded on a log. Call-detail reporting is especially useful in identifying and eliminating toll-call abuse before it becomes a major expense. In the past, units wouldn't have realized abuse had occurred until after the damage had been done when they received the post-exercise phone bills. With real-time call-detail reporting, toll-call abuse can be quickly pinpointed and action taken. Warrior PBX allows you to block calls to area codes and specific phone numbers for each or all extensions.

Post-exercise maintenance of the system was straightforward, simple and quick. After we returned to home station, we wiped down the system case and components, and used compressed air to clean dust from circuit cards and fan intakes. Lastly, we visually inspected the extension and trunk distribution panels and wiring connections for any damage. Once cleaned and inspected, the system was secured in a storage facility to await its next mission.

As the pace of technological innovation quickens, COTS equipment will continue to play a larger role in our tactical and strategic communications infrastructure. Warrior PBX, a perfect example of blending COTS technology with military ruggedization, was the right solution for ARFOR's C2 needs during Native Atlas '02.

The application potential for Warrior PBX is enormous. Its ability to interface with a wide array of equipment and networks, both military and civilian, and its ability to use secure communications make it an asset for not only continental-U.S.-based exercises but also real-world operations. It can provide C2 support to command posts, field hospitals, logistic/support bases and other organizations connected by tactical and commercial networks, or even through point-to-point tactical-satellite connections at isolated locations. It's affordable and extremely easy to operate, allowing even non-Signal units at battalion

level to install, operate and maintain it. The fact that it was installed, operated and maintained by a small communications section of industrious 31U soldiers in a transportation battalion speaks volumes about just how easy this powerful system is to use.

Tactical Telecom LLC manufactures Warrior PBX. You can find more information on the company's ruggedized COTS products by visiting its website at www.tacticaltelecom.com.

MSG DeWitt is 24th Transportation Battalion's communications chief at Fort Eustis, Va. He has more than 16 years of tactical Signal experience and has spent the last two years expanding his battalion's C2 capabilities by exploiting COTS equipment.

ACRONYM QUICKSCAN

ACUS – Area Common-User System
ARFOR – Army forces
C2 – command and control
CoS – class of service
COTS – commercial-off-the-shelf
DOIM – directorate of information management
DSN – Defense Switched Network
JLOTS – Joint Logistics Over the Shore
Kbps – kilobits per second
MSE – mobile-subscriber equipment
PBX – private branch exchange
PSTN – Public Switched Telephone Network
QoS – quality of service
RORO – roll-on/roll-off
STE – secure terminal equipment
STU – secure telephone unit
UPS – uninterruptible power supply

TSM update

Updates from Training and Doctrine Command systems managers for satellite communications, tactical radio and Warfighter Information Network-Tactical

TSM-WIN-T

INTEGRATED-SYSTEM CONTROL

The Army moved a step closer to integrating tactical network management across the battlefield by approving the integrated-system control operational-requirements document May 30. The ORD establishes key performance parameters the ISYSCON system must achieve in an operational environment. The system consists of four interrelated hardware and software versions, which provide critical NM tools for Signal commanders and unit G-6 / S-6 sections from maneuver battalion through Army theater Signal command.

The four different ISYSCON versions – being developed by the product manager for communications-management systems – are in different stages of development, testing and fielding. The versions are fielded to units based on supported network size and unit mission to support warfighting information requirements and ensure tactical-communications networks are deployable, reliable and flexible.

The four ISYSCON versions are:

- ISYSCON (V)1. This version manages the Area Common-User System wide-area networks at theater through division level and requires interoperability with the objective Joint Network-Management System. ISYSCON (V)1 consists of two humvees – a heavy humvee and an expanded-capacity humvee. ISYSCON (V)1 also includes two standard integrated command-post shelters, two servers and four workstations. ISYSCON (V)1 supports Army theater Signal command, echelons-above-corps and corps Signal brigades; 40th and 86th Signal Battalions; and division Signal battalions. Currently the (V)1 manages mobile-subscriber equipment networks at corps-and-below Signal units. Fielding is underway or completed for I, III, V and XVIII Corps units. Fieldings to EAC units are scheduled to begin in 4th Quarter Fiscal Year 2003 after Network Enterprise Technology Command conducts a field test of the triservice-tactical communications NM software in 4th Quar-

Figure 20. ISYSCON V(1) and shelter.

Figure 21. Inside ISYSCON V(2).

ter FY03.

• ISYSCON (V)2. This version has the same functionality as the (V)1 but requires less hardware to support smaller networks. ISYSCON (V)2 consists of two humvees, one SICPS, two servers and two workstations. The (V)2 supports Signal battalion-control centers at EAC and corps; 44th, 72d and 112th Signal Battalions; and certain separate companies. The (V)2 fielding parallels the (V)1's fielding and is also underway or completed for I, III, V and XVIII Corps units. As with the (V)1, (V)2 fieldings to EAC units are scheduled to begin 4th Quarter FY03 after the NETCOM field test.

Figure 22. ISYSCON V(3).

• ISYSCON (V)3. Once developed, the (V)3 will be a reduced-capability, transit-case version of the (V)1 designed to support corps and division early-entry / split-base operations. It will support the ability of the Signal planner to plan, engineer, manage and monitor a small early-entry network until the more capable ISYSCON (V)1 arrives in the operation area. The (V)3 will consist of a workstation, router, printer and uninterrupted power supply integrated into preconfigured transit cases. Since the (V)3 is at the beginning of its development cycle, it won't be available for testing and fielding until at least FY04.

• ISYSCON (V)4. This version is deployed at maneuver brigade and below for combat-net-radio-based WAN management. The (V)4 also provides local-area network management at all echelons from maneuver battalion through EAC. Each ISYSCON (V)4 consists of two computers: a ruggedized Appliqué Paravant V4 for survivability, and a commercial Panasonic Toughbook laptop for configuring devices that have become unreachable through the network and require physical connectivity. Both computers host the same software, called the Tactical Internet Management System, which incorporates the Force XXI Battle Command Brigade and Below software. The (V)4 is currently being fielded to III Corps units to support FBCB2 networks' NM; this is to prepare for the Army's simultaneous initial operational test and evaluation of FBCB2, Maneuver-Control System and ISYSCON (V)4 in 3d Quarter FY03 at Fort Hood, Texas. ISYSCON (V)4 is also a key participant in the Stryker IOT&E 3d Quarter FY03 and will be fielded to the Stryker brigade combat teams.

The ISYSCON family of NM systems marks the Army's first baseline of a common set of NM products from the foxhole through EAC. In the future, as the Warrior Information Network-Tactical is developed, tested and fielded to support the Objective Force, the ISYSCON family of systems will provide a bridge for the Army to migrate toward the WIN-T Network-Management System, ensuring the Army maintains an integrated NM capability across all echelons.

TSM-Tactical Radio

ENHANCED POSITION-LOCATION REPORTING SYSTEM

The Enhanced Position-Location Reporting System continues fielding to selected Army units as the program moves forward to replace the current EPLRS network-control station with a smaller and less costly EPLRS network manager. Fielding of radio sets to 1st Cavalry Division and 1st Brigade, 25th Infantry Division (Stryker Brigade Combat Team 2), will be completed in Fiscal Year 2003.

EPLRS' Army program objective is 10,805 sets. There has been no change in the units to be fielded; however, there have been adjustments in both the year of fielding and the quantities to be fielded.

The ENM customer test was scheduled in October / November at Electronic Proving Ground, Fort Huachuca, Ariz. The test's focus was

Figure 23. FBCB2 Applique and Panasonic CF-28 Toughbook.

primarily operational in nature and emphasized ENM evaluation, radio-set training and technical-manuals-as-job-aids evaluation.

Evaluation results will be used to support the ENM fielding decision. Initial fielding will support SBCT-3 in FY03. This product improvement will be updated in the fielded units as a modification workorder in FY04/05.

Four training courses were developed and/or modified to support ENM's field operations and deployment. These courses, which kicked off in late September, include the ENM operator's course, ENM monitor's course, EPLRS system-planner's course and radio-set operator's course.

MULTIFUNCTIONAL INFORMATION-DISTRIBUTION SYSTEM

The Multifunctional Information-Distribution System Low-Volume Terminal 2 successfully completed its IOT&E in June. The Army's Test and Evaluation Command generating the IOT&E test report in October.

The MIDS contractor continues to address recently identified power-amplifier availability issues. The power amplifiers are required to complete the Army's reliability testing and support the Navy's operational evaluations. The shortage of reliable power amplifiers has identified a need to seek alternate suppliers; however, the lead-time required won't meet immediate requirements. The Army and Navy are coordinating activities to satisfy priorities and requirements for a full-rate production decision in December.

NEAR-TERM DIGITAL RADIO/ STEP 2C RADIO

The near-term digital radio and Step 2C radio are interim, experimental radios designed to provide tactical-operations center-to-tactical-operations center data communications to brigade-and-below units.

The NTDR system is a mobile packet-data radio network that links TOCs in a brigade area. Its main purpose is to provide data transport for automated systems in the Army Battle-Command System. Brigade networks of about 35 radios interoperate with other divisional networks, and a network-management terminal provides radio NM.

The Army's acquisition executive directed limited procurement of NTDR system to explore the limits of near-term technology and provide a technical baseline for developing a multiband, multimode, digital radio system.

Fielding NTDR to SBCT-2 was scheduled to be complete in October, while fielding to 1st Calvary Division is slated for completion in September 2003; 3d Armored Cavalry Regiment, FY05; and III Corps, FY06.

The Step 2C radio is designed to provide secure, mobile, data-networking capabilities for disseminating data throughout the warfighter battlespace, principally from brigade to battalion levels. The radio system includes an NMT. In its carrier-sense multiple-access protocol mode of operation, the Step 2C radio can scale to networks of up to 400 nodes. It can scale to up to 16 nodes in its time-division multiple-access mode.

The Step 2C is scheduled to be fielded to the SBCT-3 through SBCT-6 in FY03.

The NTDR and Step2C radios will be among the first to be replaced by the Joint Tactical Radio System.

JOINT TACTICAL RADIO SYSTEM

Our joint forces need a new tactical data radio to successfully support the Joint Chiefs' Joint Vision 2020 transformation. JTRS has long been touted as the solution, but we've never shown what the system is actually capable of until now.

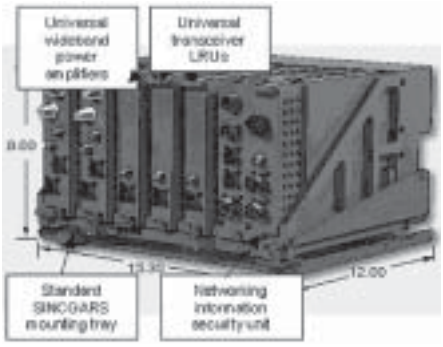

Figure 24. Boeing's design of the vehicular JTRS Cluster 1 radio.

The production contract award for the vehicular JTRS' Cluster 1 to the Boeing team has provided our forces with the first tangible outline of how this new system will operate. Boeing's design (Figure 24) incorporates a modular approach. Each channel or radio segment is comprised of a single line replaceable unit. This allows hardware replacement of these LRUs without having to take an entire three- or four-channel radio into maintenance. This concept reduces spare requirements while significantly increasing the unit's communications reliability.

The LRUs are mounted into a vehicle adapter that fits into a standard Single-Channel Ground and Airborne Radio System mounting tray. Single-channel universal transceiver LRUs (the three smaller modules in the center of Figure 24) operate from two megahertz to two gigahertz. More mounts can be used to incorporate more LRUs if necessary.

The wideband power amplifiers (in the photo's left) support all communications modes except Link 16. Special power amplifiers are required for Link 16 and high-frequency radio equipment.

The networking/information security unit (to the right in Figure 24) provides networking and cryptologic functions as well as radio control and interface. A single vehicle adapter can support up to four universal transceivers.

JTRS will be a family of radios that combines the functionality of our current single-function radio system into a single, interoperable joint radio. It will provide secure, software-programmable, multiband, multimode, digital systems that will eventually replace all existing radios in the tactical arena. And through the addition of the wideband networking waveform, JTRS will significantly improve tactical networking on the battlefield.

The Army's leadership has worked very hard to ensure that the Objective Force's command, control, communications, computers and intelligence capabilities are protected while simultaneously developing a strong, viable migration path for integrating the future tactical radio system.

ACRONYM QUICKSCAN

EAC – echelons above corps
ENM – E(nhanced Position-Location Reporting System) network manager
EPLRS – Enhanced Position-Location Reporting System
FBCB2 – Force XXI Battle Command Brigade and Below
FY – fiscal year
IOT&E – initial operational test and evaluation
ISYSCON – integrated-system control
JTRS – Joint Tactical Radio System
LRU – line replaceable unit
MIDS – Multifunctional Information-Distribution System
NETCOM – Network Enterprise Technology Command
NM – network management
NMT – network-management terminal
NTDR – near-term digital radio
ORD – operational-requirements document
SBCT – Stryker brigade combat team
SICPS – standard integrated command-post shelter
TOC – tactical-operations center
WAN – wide-area network
WIN-T – Warfighter Information Network-Tactical

Books

Book reviews of Signal-relevant published works

We Were Soldiers Once … and Young: Ia Drang: the Battle That Changed the War in Vietnam; *LTG Harold G. Moore and Joseph L. Galloway; New York: Random House; 1992. 432 pages. $20-$25. Hard-cover, mass-market paperback, audio editions.*

by David Fiedler

By now, most of us have either read the book ***We Were Soldiers Once … and Young*** or have seen the movie staring Mel Gibson. ***Army Communicator*** readers understand that the book tells the sad story of how – for a second time after the Battle of the Little Bighorn – the hard-luck 7th U.S. Cavalry was almost completely destroyed again as a fighting formation in 1965 in the Ia Drang Valley of South Vietnam.

Moore's and Galloway's book goes into the action in great (almost too much) personal detail and produces an almost minute-to-minute account as to who was doing what on the battlefield. For example, Moore's detail is so fine that he even describes sharing a C-ration breakfast with his sergeant major before the battle and the efforts of one of his junior officers to make a cup of C-ration hot chocolate during a lull in the fighting. Moore's emotional description of the heroic deeds of individuals in his command (he commanded 1st Battalion, 7th Cavalry, and elements of 2d Battalion, 7th Cavalry) goes down to the names, hometowns and ages of the members of his battalion, which can't fail to bring forth a poignant response from even the hardest professional soldier among us.

To recap the situation from the S-6 perspective, in mid-November 1965, 500 air-cavalry troopers from 1 / 7 Cavalry under then-LTC Moore's command were dropped into a small landing zone in the Ia Drang Valley. The operation was to be a classic light-infantry sweep of an area suspected of having an (size unknown) enemy force located in it. In infantry terms, it was supposed to be a "find 'em, fix 'em, fight 'em, destroy 'em" action. The LZ was identified on operational maps as LZ X-Ray and was near the Chu Pong massif (mountain) that dominates the Ia Drang Valley.

National, theater, corps or 1st Cavalry Division intelligence assets didn't alert Moore to the fact that the Chu Pong massif was home base for a multi-battalion Viet Cong force that far outnumbered Moore's battalion, and that this force was looking to do battle with Americans. The enemy objective was to engage 1st Cavalry Division units in battle so their commanders could devise effective tactics against the U.S. Army's new airmobile-division concepts.

Moore mentions a single radio-direction-finding fix provided by the Army Security Agency that indicated there was enemy in the area, but Moore had no clue as to the size, location and condition of the enemy force and went into LZ X-Ray blind, overconfident and piecemeal. Accordingly, first and foremost this book is the story of an intelligence failure, followed by other failures – including communications failures – resulting in tactical disaster. If anyone knew the real intelligence situation, they apparently didn't tell Moore, and he didn't have a clue about what he was facing until his lead elements landed on LZ X-Ray.

It's important to remember that in 1965 the concept of an airmobile division was a new and radical idea. The division, in spite of its name and mode of transportation, was in fact a light-infantry division (not the heavy armored 1st Cavalry Division of today) that once on the ground fought as light infantry but with heavy helicopter support. As stated in the Gibson movie, the 1st Cavalry's operational concept was that "we will ride into battle and the UH-1 helicopter will be our horse."

As a circa-1965 light-infantry division – particularly in the combat battalions like Moore's 1 / 7 Cavalry – tactical communications depended almost completely on the widely distributed AN / PRC-25 manpack very-high-frequency radio. The AN / PRC-25 was very similar to today's Single-Channel Ground and Airborne Radio System radio. The radio weighed about 20 pounds with battery, operated in the 30-75.95 megahertz frequency spectrum, transmitted about 1.5 watts of power and came with both three-

and 10-foot vertical whip antennas that gave a transmission distance of three to seven miles. Transmission mode was strictly frequency-modulation voice. Communications distance for the AN / PRC-25 could be extended to up to 20 miles by using the RC-292 ground-plane antenna and its associated 30-foot mast.

While this radio was the state-of-the-art solid-state tactical radio in 1965, it must be noted that, unlike SINCGARS, a critical deficiency of this radio was that it had no communications security – either internal or external with it. It also couldn't frequency hop. Around this time the AN / PRC-25 was modified into the AN / PRC-77 design that would accept COMSEC devices; however, Moore doesn't mention having any AN / PRC-77s in his force.

I don't intend here to go further into battle details other than to say 1 / 7 Cavalry's landing on X-Ray triggered a battle that decimated most of three American infantry battalions after a three-day running fight. For people interested in the tragic tactical details, I recommend you read the book, see the movie, view the History Channel special on the battle or go to the LZ X-Ray website. I would like to analyze Moore's and Galloway's book from the tactical communicator's (G-6 / S-6) perspective so that hopefully we can avoid making the same serious Signal tactical and technical mistakes 1 / 7 Cavalry made.

The first thing to note is that Moore states several times the big difference between his situation and Custer's was that he had "support." He dwells heavily on fire support, including field artillery located on two firebases within 105mm-howitzer range of the battle, close air support from the Air Force and aerial-rocket-artillery support from the division's rocket-firing helicopter gunships. Moore talks about engineer support, medical support, transportation support and other support, but he never once mentions ***Signal support!*** Even though all his command-and-control and combat-support activities were coordinated exclusively over the AN / PRC-25 FM radio, he barely mentions them in that context.

Moore talks about engineer support, medical support, transportation support and other support, but he never once mentions Signal support! Even though all his command-and-control and combat-support activities were coordinated exclusively over the AN/PRC-25 FM radio, he barely mentions them.

In addition, Moore names his officers and describes their functions in the battle in great detail throughout the book except for his Signal officer, who apparently either didn't exist, played no part in the battle or was held in such low regard that he wasn't considered worthy of mention. Also, brigade- and division-level Signal officers apparently were of no support worthy of mention – indicating either a complete breakdown of the S-6 chain or Signal planning during the operation.

I'm completely mystified with this situation. My own experience as the S-6 in an infantry battalion was completely the opposite. LTC William Singleton, my battalion commander, kept me so near that it was a standing joke among the officers that if the colonel stopped short on the trail he'd better watch out because I was going to bump him over. In my dreams, I can still hear his deep East Texas drawl at 4 a.m. saying, "Daaavid, get up, it's time to move out." He knew the value of good communications and communications personnel and kept us close to him.

Had Moore done the same with his S-6, the Ia Drang battle's outcome could have been less costly. S-6s, particularly at the combat-arms battalion level, need to live in the battalion commander's and S-3's shadows. The S-6 can't be timid but must insert himself forcefully as a primary staff officer into every phase of plans and operations to assure good tactical communications. (Sometimes this means you have to be loud to be heard!) A reading of Moore's and Galloway's book indicates to me that Moore had no relationship with any of his Signal support, while he maintained a very close relationship with other supporting arms. Obviously, Moore didn't believe Signal support could help him win battles, so he ignored it – both then and in his book.

The next thing of S-6 significance in Moore's description of the battle is the spotty way field-radio communications performed. By 1965, the Army had fully adopted the "user-owned and -operated" concept for field-radio communications, particularly for the AN / PRC-25 radio. Each branch of the Army was responsible for training field-radio and wire operations at its branch basic-training and advanced-individual-training courses; while the Signal Corps provided some instructors, it was clearly getting out of the field-radio-operator business – operators would no longer be professional communicators, particularly below battalion level.

Apparently in 1 / 7 Cavalry this was working OK, since the unit had forward air controllers (who were Air Force-trained on an entire suite of field radios) and field-artillery officers and men such as the forward observers (who had been very well instructed in radio subjects at Fort Sill, Okla.'s Artillery Center). Both FACs and FOs did fine with their radio communications at Ia Drang when communications were identical to those of the combat elements, and they clearly saved 1 / 7 Cavalry from annihilation.

Unfortunately, judging by Moore's and Galloway's book, the same can't be said about radio communications among infantry elements whose operators trained at infantry centers. Radio communications during the battle between the battalion command post and the fighting companies wasn't a problem, since they were all packed into a small area around LZ X-Ray and so were well within the AN / PRC-25's range, even when operators used the less-efficient short antenna. Communications from the CP at X-Ray to its rear-support

elements and 1/7 Cavalry's parent-brigade CP, however, were another story. Moore talks extensively about needing his battalion command-and-control helicopter overhead so he could have its crew and on-board battalion staff officers repeat voice messages for the battalion support base and brigade headquarters at Plei Me, a mere 15 miles away. When the helicopter wasn't available, there simply was no direct radio communications between X-Ray and the Plei Me base.

Well into the three-day battle, one of the communications noncommissioned officers at Ia Drang finally thought to erect an RC-292 ground-plane antenna to increase the distance the AN/PRC-25 could cover. Using the RC-292, Moore finally did reach Plei Me directly by radio.

Had the battalion had an effective S-6 with a good communications plan, the RC-292 antenna would have been up from the battle's start, and experience tells us the outcome of the fight could have been better for us because of it. At least the battalion's helicopter and its staff officers could have been doing more useful things to aid the battle other than repeating voice messages. That alone would have helped Moore's situation.

Had the battalion had a good S-6 and a good Signal plan, there also would have been AN/PRC-25 automatic-retransmission stations at the existing fire-support bases located between X-Ray and Plei Me. These stations would have been protected by the bases and would have provided another easy-to-install and easy-to-reach communications path back to the support area and brigade CP.

Manpack HF radios such as the AN/PRC-74 and AN/PRC-47 were also available to the 1st Cavalry Division at this time. These radios should have provided immediate direct communications with X-Ray from division bases at Plei Me and An Khe, but they were apparently also forgotten by the S-6 chain and its infantry-branch-trained user-operators.

Take heed; these lessons can still be applied to today's Army, where we still have the user-owned and -operated concept, and we still only talk about implementing a real S-6 program of instruction at the Signal Center to prepare Signal officers for service in combat-arms battalions.

Now for the most important lesson of all from the S-6 perspective. Clearly, 1st Cavalry Division used VHF-FM radio communications at every command level for almost every purpose you can think of. Such a wide distribution of information emitters rightly concerned ASA's experts.

ASA was the organization responsible for Army COMSEC and electronic warfare. ASA didn't believe 1st Cavalry Division's confidence (also shared by many other U.S. divisions) that 1st Cav's movements were so rapid and its actions so immediate that the enemy couldn't glean any useful information from the division's tactical unencrypted radio nets. To prove its point, ASA monitored almost 11,000 1st Cavalry Division radio transmissions as the division deployed.

ASA's conclusions were that radio operators and the non-Signal-branch-trained NCOs – and the officers who controlled them – had little regard for radio security. ASA found that operators – many of whom were senior NCOs and field-grade officers – were regularly broadcasting classified information in the clear. Examples of the information ASA was able to discover from clear voice-radio-net monitoring included unit call signs, unit radio-net frequencies and all sorts of operational information. ASA also discovered that operators rarely used their widely available off-line transmission authentication system.

ASA provided this information to MG Harry Kinnard, 1st Cavalry Division's commander, and his S-6 staff, but apparently it was ignored and didn't trigger any division-wide corrective action led by the G-6. Shortly after this, Moore's and two other battalions moved into the Ia Drang Valley.

ASA's findings were never widely publicized and were certainly not mentioned in Moore's book or the Gibson movie, but ASA monitored more than 28,000 radio transmissions during the actual Ia Drang battle. ASA found that COMSEC was almost never used, unauthorized codes that were easily broken by the enemy were in widespread use, and Army off-line (paper) codes and encryption devices while available were also never used. This kind of arrogance made it very easy for the VC to pick up all sorts of useful tactical information about the U.S. force, including its locations, strengths, weaknesses and battle plans.

It finally became so apparent the mail was being read that, in the middle of the battle, the division Signal officer (G-6) at last tried to do something. The DSO ordered a division-wide radio-call-sign change to regain some security. This action caused so much confusion among the radio operators and the branch-schooled-trained commanders and staffs, including the lower-echelon S-6 staff, that the change was cancelled to restore command-and-control to the division. The DSO's order was a great example of too little much too late.

Worst of all, after three days of intense battle, Moore's battalion had finally beaten back the enemy force and secured LZ X-Ray, thanks to overwhelming fire support and reinforcement by two more battalions. It was decided that Moore's battalion would be airlifted directly out of X-Ray, while the other two battalions (2d Battalion, 7th Cavalry, and 2d Battalion, 5th Cavalry) would withdraw on foot in column toward LZ Columbus, only a few miles away. Once reaching LZ Columbus, 2/5 Cavalry would be airlifted out of the area. The 2/7 Cavalry would break off on the line of march before reaching LZ Columbus and would move northwest a few more miles to LZ Albany, where they would also depart. All movements of both battalions when on the march were coordinated over the unencrypted radio command nets.

After a 2½-hour march, the lead battalion reached Columbus and was safely extracted by waiting helicopters. This cut the U.S. ground force in half. As 2/7 Cavalry closed on LZ Albany, the Americans were met by a fierce VC attack. The attack's intensity and the VC force's positioning, in my opinion, could only have been accomplished with foreknowledge of U.S. intentions. Intercepting U.S. radio transmissions and reacting to them (again, in my opinion) is the only way

the enemy would have obtained this knowledge. The result was a second, even worse disaster, and again, extremely high casualties.

In spite of ASA warnings about COMSEC, even after the Ia Drang battle, 1st Cavalry Division and other U.S. forces still didn't take the communications-intelligence threat seriously. To force some action, MG William DePuy, 1st Infantry Division's commander, decided to either prove or disprove that the enemy was conducting COMINT operations. In the summer of 1966, he had 1st Infantry Division radio nets send information in the clear that would indicate the division's armored-cavalry troop would be alone on the Minh Than Road north of Saigon at a certain time. Instead, DePuy had prepared a trap with four infantry battalions supported by artillery.

The resulting battle with the VC's 9th Division caused more than 300 VC dead and also proved to some (but still not all) the enemy COMINT capability. For a time, COMSEC in U.S. divisions improved, but it rapidly slipped back to pre-Ia Drang Battle levels in spite of both DePuy and ASA. Not until 1969 (almost three years later), when 1st Infantry Division troops physically captured an enemy COMINT platoon and conclusively proved the VC was able to gain tactical advantage by means of COMINT, did the picture change dramatically.

The information gained by the VC COMINT platoon's capture was detailed to the Army under Project Touchdown, a COMSEC training program that will be the subject of a future article from me.

There are several important points that today's S-6 can learn from Moore's and Galloway's book. They are:

• The S-6 is a primary staff officer at battalion level and above. You must first know your job, and then you can't be timid in asserting yourself, even to the point of being obnoxious. Signal planning, operations and COMSEC need to be drummed into the commander and the G-3/S-3 at all levels. You personally need to know what to do with your equipment and how to do it, and your commander must know that you do. If you see something wrong, like uncovered communications, you must fight it before it costs lives. This will be much easier if your commander has confidence in you.

• Don't be part of the arrogance; give even a Third World power like the VC credit for having some brains when it comes to COMINT. Our enemies aren't 10 feet tall, but they're not subhumans either. Don't let political, racial or religious prejudice fool you into thinking your enemy isn't smart. Some 58,000 American soldiers learned the hard way what it means when a command thinks that way.

• Know how to build tactical-communications systems and know what works in your environment. Strive to use all your capabilities instead of just one like 1st Cavalry did. Ideally, a mix of HF, SINCGARS and ultra-HF satellite communications needs to be deployed with the lower echelons of the combat arms. How would you feel if you lost soldiers because communications failed and all you had to do to fix it was change to another system, fix an antenna, change a frequency, throw a switch or some other simple action like that?

• Believe that COMSEC saves lives, and make sure your commander believes it also!

This last point is extremely important. The "user-owned and -operated communications" concept is with us to stay, at least for now. "Users" are sometimes not in love, for all sorts of reasons, with the radio equipment or the quantities of equipment the Army gives them. This leads to supplementing what's issued with unauthorized civilian equipment. In the 1960s, it was modified ham-radio gear; in the 1970s, it was citizen-band radios; and recently, it has been tactical units using Family Radio Service radios for unit operations. Not only does use of this sort of equipment break every COMSEC rule in the book, it's also against Army regulations, command policy and, in many cases, international law.

In the past, ignorant commanders and S-6s have condoned use of this equipment, or at least looked the other way, because it seemed to improve operations. This can't continue because the security risk is just too great. It's the S-6's job to stop this sort of thing dead in its tracks. If anyone asks why, just tell him or her to read Moore's and Galloway's book. When analyzed through an S-6's eyes, ***We Were Soldiers Once… and Young*** makes a great example of what not to do even in today's Army where, thanks to equipment like SINCGARS and KY-57, COMSEC is in common use.

Many of Moore's problems are still with us! In today's world ... the combat-arms battalion S-6 is a far more important player and ... the Signal Corps needs to assure they're better prepared.

Many of Moore's problems are still with us! In 1965, most S-6s in combat-arms battalions – if they were Signal Corps officers (some weren't) – had an O200 military-occupation speciality. "O200" meant basic Signal officer with no experience, just out of the Signal Officer Basic Course. The O200s were expected to learn the fine points of their jobs on their jobs. This was a hard thing to do when many of the battalions they were sent to were already in combat. There was no Signal Center course at that time dedicated to training S-6s, and SOBC didn't cover near what they had to know. Some lucky officers did get to go to the FA school at Fort Sill for some advanced field-communications training. Most did not, and those who did usually ended up in artillery units.

This situation isn't very different today. In today's world, military action – as it was in the Vietnam era – is again in the hands of "light fighters" at the combat battalion and brigade level. The likelihood of deploying large armored formations dependent on area communications and large CP facilities is far less than it was only a few short years ago. With this in mind, the combat-arms battalion S-6 becomes a far more important player and, as Moore's and Galloway's book proves,

the Signal Corps needs to assure they're better prepared for it.

Mr. Fiedler – a retired Signal Corps lieutenant colonel – is an engineer and project director at the project manager for tactical-radio communications systems, Fort Monmouth, N.J. Past assignments include service with Army avionics, electronic warfare, combat-surveillance and target-acquisition laboratories, Army Communications Systems Agency, PM for mobile-subscriber equipment, PM-SINCGARS and PM for All-Source Analysis System. He's also served as assistant PM, field-office chief and director of integration for the Joint Tactical Fusion Program, a field-operating agency of the deputy chief of staff for operations. Fiedler has served in Army, Army Reserve and Army National Guard Signal, infantry and armor units and as a Department of the Army civilian engineer since 1971. He holds degrees in both physics and engineering and a master's degree in industrial management. He is the author of many articles in the fields of combat communications and electronic warfare.

Acronym QuickScan

ASA – Army Security Agency
COMINT – communications intelligence
COMSEC – communications security
CP – command post
DSO – division Signal officer
FA – field artillery
FAC – forward air controller
FM – frequency modulation
FO – forward observer
HF – high frequency
LZ – landing zone
NCO – noncommissioned officer
PM – project manager
SINCGARS – Single-Channel Ground and Airborne Radio System
SOBC – Signal Officers Basic Course
VC – Viet Cong
VHF – very high frequency

Pulse

Commentaries and letters to the editor... to correct "the record" and express opinions

To the editor:

No doubt there will be more discussions and articles concerning the successful completion of a command-and-control proof-of-concept demonstration recently conducted at Fort Campbell, Ky. "Things were done and shown" at Fort Campbell that many people thought would be against basic principles of physics – for example, there's not enough bandwidth or antenna power to allow almost-real-time tracking / communicating with a helicopter flying nap-of-the-earth and / or at normal cruising altitude / speed.

As the liaison person between the Army's Movement Tracking System and its prime contractor, Comtech Mobile Datacom, I want to amplify the significance of Comtech's MT2011 transceiver and why the demonstration worked because of Comtech's technology.

An early effort in Fall 2001 charged the product manager for the Army Aviation Command-and-Control System to find and demonstrate a Blue Force Tracking capability. Part of A2C2S's responsibility is and has been the Balkan and Kosovo C2 system, known as the Enhanced Information System. The Army envisioned that EIS could be its main candidate for BFT.

Under present conditions EIS provides both Balkan and Kosovo users with a rudimentary C2 system. EIS includes an early version of the Force XXI Battle Command Brigade and Below software ported onto a Kontron Fieldworks computer, interfaced to a commercial trucking Ku-band antenna and mounted on wheeled vehicles. This

Figure 25. Fort Campbell's proof-of-concept demonstration tested EIS+ on both helicopters and humvees. Part of EIS+ is the MT2011 transceiver, seen as a small white box on top of the humvee.

design and technical characteristics of the Ku-band system can't support a tactical-aviation environment.

The challenge for a BFT solution would be tracking helicopters flying NOE. However, during the Association of the United States Army's spring symposium in Fort Lauderdale, Fla., experts and interested parties discussed the idea of putting EIS into a helicopter. They saw the size and physics of the MT2011 transceiver made it a good candidate for mounting on a helicopter. (An earlier Air Force demonstration had already used the Comtech transceiver on a helicopter).

The Fort Campbell demonstration architecture, now known as EIS+, consisted of FBCB2 Version 3.4.4, Fieldworks computer, Raytheon micro-router, precision lightweight Global Positioning System receiver and MT2011 transceiver. EIS+ was mounted on two humvees, a prototype Light Digital-Operations Center, an AH-64 helicopter and a UH-60 helicopter, which also housed the A2C2S.

The demonstration was conducted twice daily for two days. A "truth in lending" clause should be added here: the Aviation Applied Technology Directorate provided the necessary integration expertise and was able to do a "quick" safety-of-flight release for the integrated onboard packages for both the AH-64 and the UH-60. The AH-64 had to be flown by test pilots since the front cockpit had a quick, non-engineered mount for the Fieldworks computer. It basically took up the left side of the front cockpit. The UH-60 configuration didn't require test pilots since the computer system was mounted in the aft cargo compartment, co-located with the A2C2S equipment configuration, and didn't present any direct safety issues.

During the actual helicopters' flying and humvees' movements, each system sent formatted, limited overlays and free-text messages as well as automatic position-location updates for each system. The LDOC system was remoted into a classroom on Fort Campbell, allowing non-participants to monitor the demonstration systems' movements.

During one of the demonstrations, the AH-64's location wasn't being refreshed. A free-text message was sent to the pilot, who was more than halfway to Fort Knox, Ky., asking that he return to Fort Campbell. About 25 minutes later, he landed outside the classroom. Technicians determined that a wire supplying GPS data from the PLGR had worked loose. The wire was tightened, the AH-64 departed, and everyone watched the remoted screen showing his location as he flew north to Fort Knox. Position-location updates were defaulted to every 15 seconds or 300 meters in movement change.

See related article on the coalition common operating picture in Kosovo, Page 21

A demonstration of this complexity could never work without a dependable non-terrestrial communication system. Normal communications for the FBCB2 system are designed and depend on using the Enhanced Position-Location Reporting System. EPLRS are matrixed or positioned across the necessary real estate, allowing the FBCB2 systems to communicate and relay between nodes. However, this proof-of-concept demonstration depended on the Comtech-designed L-band satellite system for providing the necessary backbone. The transceiver – small in footprint: 8 inches by 8 inches by 4 inches, omni-directional, non-mechanical and requiring less than four watts of power – could be mounted on a helicopter and wired to an aircraft's external antenna, thus providing the necessary connectivity between systems. This communications capability is unparalleled.

I don't imply or conclude that FBCB2 using the L-band satellite has the same capability as FBCB2 using the EPLRS backbone. Each architecture, EPLRS or L-band, can work independently, or depending on the situation or requirement, together.

The MT2011 transceiver is part of MTS, the Army's main combat-service-support enabler. MTS is currently fielded to III Corps. More than 2,000 systems are at Fort Hood, Texas, and Fort Sill, Okla. MTS provides the CSS commander the ability to know where his assets are and redirect them if necessary. The system uses a Triple Digital Encryption System encryption algorithm and commercial satellite, and it has close to worldwide coverage. Also of note is that the MT2011 transceiver, although not Type 1 certified, could easily accommodate a Type 1 chip since it has room inside its case for the necessary expansion.

The demonstration's success was the result of lots of smart people working in synchronization with a common goal. The PM-A2C2S's leadership, the AATD engineers working the safety-of-flight issues and the Raytheon engineers' integration efforts were the main personnel reasons for the demonstration's success. But none of it would have worked without Comtech Mobile Data Comm's MT2011.

Jinx Springfield
Fort Lee, Va.

ARMY KNOWLEDGE ON-LINE: ONE SOLDIER'S PERSPECTIVE

by MAJ Ed Burke

I jotted down a few notes on the merits of Army Knowledge On-line in the hope I might use them to encourage others to use AKO. I soon found I had more than a few thoughts and later developed them into this commentary on AKO's strengths and weaknesses as an Army-wide communication system. My hope in doing so is that readers less familiar with AKO than I learn something about it and consequently find more utility in the service it provides. So too, my hope is that those who can do something to improve AKO take my critique seriously and work to make it better.

In its current state, AKO can capably provide solutions to many of the inconveniences a soldier's business entails, while at the same time it has some functions that can be a real chore to manage. I believe, however, that AKO has the potential to become a focal point and a repository for the Army's collective knowledge. Here are my thoughts.

AKO supports the soldier

Relocating is one of the few constants in today's Army. Be it a permanent-change-of-station move, an exercise or a deployment, each implies a requirement to gather one's things, package them for movement and drag them to a new location. Inevitably, something is forgotten. Increasingly easy to leave behind are things soldiers kept in their address book or in their professional library and carried with them when they traveled. Today, e-mail addresses, frequently used Internet links, on-line references and important documents carefully saved to disk are more likely replacing briefcases and even rucksacks. Unfortunately, when the need arises, these digits on disks are often on an office computer while soldiers are at a training center rotation, they're on a floppy disk at home while soldiers are deployed, or they're saved to a Zip disk in a box scheduled to arrive at a soldier's new quarters in a few weeks.

There is, however, a way to circumvent some of these challenges, and it takes the form of a website most soldiers have already visited.

In an August 2001 guidance memorandum, the Secretary of the Army and the Army's Chief of Staff directed that all Army individuals have AKO accounts by Oct. 1, 2001. AKO is available to active-duty Army, Army Reserve, Army National Guard, Department of the Army civilians, nonappropriated-fund employees, U.S. Military Academy cadets, contracted Reserve Officers Training Corps cadets and retired Army people.

Though not without limitation, this gateway to information on the Internet is easily accessible, easy to use, and it travels well. It all but ends the potential of leaving important data behind. AKO is the Army's solution to keeping important information readily available. Designed specifically for soldiers, from its homepage one can access e-mail, reach Army sites and search the worldwide web. A recently added capability also allows files to be saved on-line for access later.

Army information, news and announcements are its mainstay, but its built-in flexibility gives users the opportunity to customize their pages to suit. Each time users return to AKO, they find their pages just as they left them, and those pages are later accessible from any computer with a web browser and an Internet connection.

Though not a stranger to AKO, on a recent PCS move followed shortly by a deployment to Afghanistan, I soon came to realize I'd merely scratched the surface of the portal's potential. I found its ability to support communication with others one of its greatest strengths.

Many now use e-mail at work, and most have access to check it regularly. As closely attached as we've become to this tool, any move can disrupt this thing upon which we rely so heavily. AKO, however, assists with the continuity soldiers lose when they pull up roots. In my recent experience, I learned I could share my AKO e-mail address with others to allow friends and co-workers to stay in touch long after I was gone from an old posting. Similarly, old friends could find me by searching the AKO white pages, refining their search by rank or component. By automatically forwarding e-mails from that old address to my AKO account, individuals who misplaced or didn't otherwise have my AKO address were able to continue corresponding with the old address as an interim solution.

Another useful benefit I found was being able to set up AKO to automatically forward e-mails to other e-mail accounts. Associates armed with my AKO address were able to drop a line to my AKO account, and through its forwarding feature, I received their messages at any address I chose. This was especially helpful, as I find it more convenient to check a work e-mail account without going through the Internet. In effect, AKO provides a permanent e-mail address that won't change although a soldier's geographical location changes.

Instant Messenger is another useful AKO offering. The popularity of similar commercial, real-time, website communication systems makes AKO IM all the more valuable. IM supports messaging between AKO users just like other instant messengers, but it also decreases concerns of having your messages read by others with its encrypted protocol when communicating from AKO IM to AKO IM. (You can communicate from AKO IM to a commercial IM, but then you lose this encryption.) Also, since this system is web-based, there's no software required for the computer you're using to gain access. One better is AKO's ability to connect with others using several non-AKO IM systems.

I found AKO IM particularly helpful while deployed. Before MWR phones were established, or when time didn't permit access to them, this alternate link to family, friends and important contacts was tremendous. IM ensured I could make contact whenever I had access to a computer. A great morale booster, instant communication – especially with family members through AKO to other IM systems – was an added benefit.

Digging a little deeper into AKO's capability, one can find the wealth of information it makes available. Without changing a single setting from the AKO homepage, you can access a number of Army websites. I found the Army-wide announcements, Army news and frequently used links channels most useful, each being updated regularly and linking directly to other sites of interest for most Army users. These and many others provide a quick way of staying current and relevant on the latest Army, Defense Department and world information. Capitalizing on this service often seemed a well-suited replacement for newspapers that, if they arrived at all, lagged behind by days or weeks during deployment.

Yet another functionality incorporated into AKO is the ability to establish and save links to other websites. AKO isn't, as some might believe, limited to Army links. Soldiers may prefer a specific search engine, unit website, news website or entertainment site; he or she can build these links into personalized pages. A distinguishing characteristic, however, is that the links aren't saved to the computer. By saving them to the AKO server, instead of a local hard drive, the links are available whether logging on at home, while on temporary duty or at public computer. Some may

even be able to log on in the field or while deployed.

Having documents available when needed is always a chore. Typically, we save those we need to disk to take them with us. Inevitably, a disk is misplaced or corrupted. While in Afghanistan, I found the use of floppy disks a risky venture. The dust permeated everything and rendered most disks useless after a few days. Hard drives, too, were susceptible to corruption, as I learned first-hand. After a few months, very few of my coworkers survived the toll dust took on automation equipment.

On AKO, a tab to the "collaboration center" may end floppy disk problems forever. Aimed at providing a place to share files with other AKO users, not only does this service support document collaboration, but it also allows soldiers to post and limit access to those documents by others, thus eliminating the need to save important files to disk. This helpful feature ensured I was able to keep important files, like this commentary, in a safe place that was available whenever and wherever I needed it. Storing files on a server that's always backed up mitigates the threat of lost data. Also, by posting this article to the collaboration center, I was also able to gather the input of others and effectively ended the need to e-mail multiple versions of the text to multiple addresses as I sought assistance.

Though access to AKO has yet to reach every level of the Army, simply because not every soldier has direct access to a networked computer, I found tremendous potential for its use by deployed soldiers. Its compilation of Army links puts everything from forms to field manuals and regulations just a few clicks away, reducing the number of hard-copy versions of those documents units need to transport.

Accessing "AKO Chat" further assisted by providing soldiers an opportunity to work through issues that may not have web-based information posted on-line. Perhaps a unit experienced a problem with a piece of equipment that it couldn't resolve locally, and information on-line failed to provide a solution? Most continental-U.S.-based Army institutions, as wired as they are – like the various branch centers and schools – have subject-matter experts willing to lend a hand, especially with creative fixes to unusual problems. An e-mail worked well, particularly if time zones interfered with direct communication, but short of a phone call, nothing beat chatting through a problem to get to its root.

Personal concerns, too, may soon be a thing of the past with the dawn of the web-enabled personnel file and direct access to leave-and-earnings statements from the Defense Finance and Accounting Service. Armed with information gleaned from these sites, a quick note to assignment officers, the S-1 or your supporting personnel-service center can often bring resolution to matters that only get worse over time. A link through AKO to a soldier's financial institution, too, can provide easy access when resolving personal banking matters. All told, AKO doesn't replace the efficiency of a face-to-face conversation, but it can make the difference between fixing a challenge long distance but in a timely manner, in lieu of waiting until after a deployment.

I've spent some time getting familiar with AKO, and I've made a concerted effort to use it to its current potential. Some people have spent considerable time working with it and realized even more promise than I've managed. I'm afraid that, from what I've seen, most use AKO for little more than an occasional e-mail. Others still have explored it only long enough to secure a user name, password and e-mail address to meet the CSA's guidance. AKO has a lot to offer, as I've attempted to show in the preceding discussion. Unfortunately, much like one must scratch below the surface to find AKO's strengths, digging into it also reveals its weaknesses. Thus, just like soldiers must rapidly adjust to change, AKO too must continue to improve if it's to be ready for the future.

AKO saps the soldier

Security is an important part of communication systems, but with it comes certain degradation in convenience. Illustrating this are two issues I've come to disdain. One detracts from the AKO IM experience.

IM users find they lose connections if they don't actively participate in a chat. One of IM's strengths is its ability to let people know when others in their contact list log on to the system, but frequently the connection closes, dropping users and their ability to see that others connected. This safety feature ensures that others don't abuse profiles but, as with most security features, it reduces the level of convenience the system provides to the point many find it useless. Allowing users to adjust the length of time before AKO disconnects would let individuals determine the level of risk they're willing to assume. Thus on a home or office personal computer, where access to computers by others is minimal, a user may be ready to accept more risk than one might on a computer that's open to others for access.

*(**Editor's note:** AKO "guru" MAJ C.J. Wallington notes that Burke's comments discuss a deliberate security feature tied to the AKO portal itself. The portal is designed to time-out one hour after an AKO session is established to minimize the risk of someone just walking away from his or her computer and leaving an active session connected to potentially sensitive information.)*

The other security feature many people find frustrating is the requirement for multiple usernames and passwords to access Army sites. Soldiers have passwords for DFAS, on-line banking, government credit cards and Internet sites, to name a few; it would seem the collection of Army websites would be a great place to start sharing databases that track who people say they are. It's unlikely that while in transition users will have, and even less likely remember, all the usernames and passwords they might need. Logging on to some sites through AKO sometimes requires one username and password for AKO and another username and password for the destination site.

I would submit that as AKO continues to develop, it should include database links with other Army sites so the initial AKO log-on meets the requirements of subsequent links to other Army sites. Few would question

the importance of maintaining the integrity of websites and the information they hold, but the closer AKO comes to a seamless system where security becomes invisible to the user, the more convenient and therefore the more used AKO will become.

*(**Editor's note:** per Wallington, AKO strongly encourages other applications to use the AKO user identification and password. "Some systems would require software revision, while others just hold us in disdain and think they can do better," Wallington said. "We can't force someone to use our user ID/password, but we can save them a significant amount of money by allowing us to be the authenticator. DFAS is reconsidering its position and may use AKO user ID/password in the future." Incidentally, the Signal Center's University of Information Technology homepage (https://uit.gordon.army.mil) uses the AKO user ID/password for access.)*

Recently, I've seen calendars from various Army organizations crop up on AKO. An organizational calendar makes available information that would otherwise require an individual to e-mail conference schedules, important meeting information and notice of key events to those interested. Calendars are a tremendous source of information. As such, another consideration that might make AKO more useful, and one that's not currently available, is a personal calendar on individual AKO accounts. The ability to log on to any machine for AKO access to e-mail, links and IM is an irrefutable strength, but adding a personal calendar can truly round out AKO's suite of personal-information-storage capability.

Taking it a step further, an integrated system that's compatible with the synchronizing capability seen in personal digital assistants could further allow users to manage calendars and – while providing an ability to share the information with others – can further augment service to AKO customers. At home, in the field or while deployed, a system with these capabilities is bound to succeed.

*(**Editor's note:** Wallington responds that "Personal calendars, which can include scheduling with other AKO users – similar to Microsoft's Outlook – will be available in a future mail upgrade. We're working on that issue; it's very high on our priority list.")*

AKO offers a similar version of its service over the secure Internet. "AKO Secret" is fantastic, especially in a classified operation where secure communication is essential. In concept, this is a step in the right direction. Its problems, however, include lack of access from most computers, for users must log on to a computer connected to a classified local-area network with secure Internet capability.

Also, operations and intelligence personnel gravitate toward AKO-S for information, while logisticians and personnel managers gravitate toward the traditional AKO. Unfortunately, some users have requirements for both, but without two separate computers connected to two separate networks, users miss out on the value that the system they don't have provides. Operating from separate systems is clearly the most secure approach to maintaining the integrity of classified information. Improving log-on security functions in an unclassified system to a level that ensures only the authorized individual has access may be the solution to a one-network system.

Alternatively, by incorporating the same AKO functions into AKO-S with links to secure copies of the other Army sites, soldiers might enjoy the same utility available on AKO in a secure environment. Simply said, two systems may be best for security, but the arrangement is far from practical.

A final shortfall is doubly challenging. Access and speed are the two biggest complaints I've heard others share, and they're interrelated because both deal with infrastructure. Improving access requires not simply the availability of computers, but the availability of computers connected to the non-secure Internet-protocol routed network. In an operation like Enduring Freedom, NIPRNET access by most soldiers was limited because secure communications were key to supporting the fight. Available computers were primarily connected to the secure Internet-protocol routed network, and so the number of NIPRNET connections were limited to all but senior leaders and support soldiers who required access to conduct business available only by non-secure means.

Compounding the situation and further limiting access to AKO is bandwidth. The competition for SIPRNET access, rightfully so, consumes most of the networking equipment required to establish a connection. Assets dedicated to non-secure Internet access, however, quickly became overwhelmed as users took advantage of the popular services that AKO and other Internet sites provided. The result was not only a system with limited access but also access times that were exceptionally slow.

Most problems I experienced with AKO during my deployment were a direct result of slow communication rates: for instance, IM hang-ups, difficulties logging in and session time-outs. And I was one of the few with ready access. To combat the problem of slow access, the only available solution is further limiting access. This never-ending cycle therefore further reduces the value AKO provides to our soldiers and undermines the concept of proliferating AKO as the Army's knowledge repository.

*(**Editor's note:** Wallington notes that Burke's comments here aren't entirely true, as soldiers can access AKO from any Internet connection, not just via the NIPRNET. Wallington says a host-country Internet service provider could be contracted to provide network connections, for instance.)*

It's not perfect, but it has potential

Without a doubt, AKO is a useful tool, but as with any tool, there's room for improvement. Initiatives for future improvements, increasing interest from soldiers and support from senior leadership will likely drive AKO forward. As these improvements take place and as AKO continues to develop, AKO will take center stage as a critical force multiplier for the Army. Army leaders need to embrace it, encourage others to use it and work to make it better.

Connect with AKO

For those without established accounts, go to https://www.us.army.

mil in your browser. Click the "I'm a new user" button and follow directions. After entering some personal information, the AKO server will verify eligibility, assigning a username and password. For those who have established an account, gaining access is simple, using the same link by clicking the "Sign in" button. When prompted, enter both username and password, and the Internet browser will launch the AKO homepage.

MAJ Burke is 10th Mountain Division's G-4.

*(**Editor's note:** Using the "https" URL rather than "http" will help users get into AKO more easily if they're connecting from an overseas ISP. AKO asks, "What other features would you like to see? What format would you like to use to provide more suggestions? How can we do a better job of telling you what's in the next version, and what method should we use to spread the word? Even more important, how can we do a better job of reaching out at the grassroots level?" Send your comments to Patrick.Swan@us.army.mil.)*

LEADERSHIP

by SGM Ulysses Mays

Be loyal to your country, leaders, soldiers – but above all be loyal to yourself.

Figure 26. SGM Ulysses Mays.

Treat everyone equally, and treat each decision as though someone's life depends on it. It just might one day.

All your soldiers deserve outstanding leadership. You should be the one to provide it.

Decisions shouldn't be made in haste or anger – when time permits, seek a second opinion.

Every decision you make may not be the best one. Be smart and strong enough to recognize this.

Reach out to soldiers, peers and people in general. The great decisions are made when dialogue takes place.

Share information; a well-informed soldier is a well-rounded fighting machine.

Hold to the moral high ground, even if you're holding it alone.

Inspire your troops to greatness. Encourage growth and participation in the leadership process. Disagreement can be a good thing.

Be able to part with anything in the leadership process that's nonproductive. This may include people.

Great leadership isn't a battleship. Nor is it a sinking ship, but when applied correctly, it can be one of the greatest partnerships known to humankind.

*SGM Mays is the division Signal noncommissioned officer for 24th Infantry Division, Fort Riley, Kan. He wrote his thoughts on leadership as a student in Class 52 – he graduated May 30 – at the U.S. Army Sergeant Major Academy, Fort Bliss, Texas. This piece was also highlighted as **NCO Journal**'s "Frame a Page" feature in the Summer 2002 edition.*

DEMYSTIFYING TRANSFORMATION

by Linda Kozaryn

SUFFOLK, Va. – When Thomas Edison's electric light replaced oil and gaslights, that was transformation. When Henry Ford's Model T replaced the horse and buggy as the common mode of transportation, that was transformation. When computers replaced typewriters and began talking to each other, that was transformation.

Simply put, transformation is broad, sweeping change. It's the kind of change that affects the way we live, how we think, work, play – and even the way we fight. Such sweeping change has affected the military throughout history.

Red-coated troops no longer march shoulder-to-shoulder when they face a line of musket fire. Automatic weapons replaced single-shot rifles. Aircraft and armored vehicles replaced horses and wagons. Precision strike, rather than carpet-bombing, is now the rule.

Air Force BG Jim Smith, deputy commander at the Joint Warfighting Center here, is heavily involved in the military's current transformation. The center, part of U.S. Joint Forces Command, recently hosted Millennium Challenge 2002, a transformation experiment involving 13,500 troops fighting a virtual battle.

Millennium Challenge 2002 reflected the scope of the changes underway in today's military and those needed to meet future challenges, defense officials said. Military officials are preparing an after-action report. "If you look at this experiment," Smith said, "we're looking at changes in doctrine, training, organization, leader development, personnel facilities."

Military officials looked at how they can better employ current equipment and resources. Future experiments will focus on what new weapon platforms and other resources are needed for the future.

"Everybody comes down here, and they want us to show them a 'transformation,' like they're expecting to see something about the size of a desk with antennas and a gun that comes out of it, and you push a button, get an answer and shoot," Smith said. "That's not what transformation is all about."

The general's perspective on transformation goes beyond Millennium Challenge. He served two years as the Air Force chair at the National War College and is a military history buff. He said the past holds examples of military transformation.

"Throughout our history," Smith said, "the Army as an institution has been the leader in looking at the military to focus on the nation's powers." In 1802, he noted, West Point was the first and the best engineering school in the country. The military responsibility at the time was to shape Manifest Destiny and build the infrastructure of our nation.

"After the Civil War, you saw the military focused on the 'Indian challenge,'" he continued. "If you look at 1898, the Army redefined us to be expeditionary and then took a real hard look at our technology, our rifles and our logistics, so we could go expeditionary in World War I."

One of the major changes affecting the military today, according to

Smith, is the need to blend the services into one fighting team. Joint operations in Afghanistan are a prime example of the transformation underway, he said.

In Afghanistan, U.S. special-operations forces, air power and the Central Intelligence Agency worked with the Northern Alliance to eliminate Taliban and al Qaeda forces. "You notice I didn't say any service," the general said. "Service (branch) to me is irrelevant in this construct."

In a traditional scenario, he noted, the military going into Afghanistan would have had the Marines on the coast, the Army in another sector and the Air Force in another. "They'd be divided by lines on the map," he said. "There are no lines in Afghanistan."

"Classic Marine doctrine for an amphibious operation," he added, "is to control a 30-mile area for about 30 days, then pull out and let the Army take over. In Afghanistan, the Marines controlled an area 435 miles inland."

Afghanistan called for a whole new look at employing and integrating military forces, Smith said. "The Marines went in and connected with indigenous forces, agency officials and special-operations forces. You never heard of any rift or any testosterone battles about who was in charge or who was most important."

Instead of advancing along a fixed front, he pointed out, U.S. forces struck targets throughout Afghanistan. The portions of the map under enemy control would shrink as coalition forces took over.

Smith said one problem that's emerged in such joint operations is in linking the services' command-and-control communications. As an example, he used the Army's Maneuver Control System and the Marines' Tactical Control Operations, both used at battalion level and higher.

"Do you think they talk to each other? No. To do operations, you had to draw lines saying, 'You stay on that side, and you stay on the other, because these two don't talk to each other,'" Smith said. Military officials developed a technical bridge between the two legacy systems, he noted. "The Joint Forces Land Component commander now has the technical ability to integrate the ground forces, and that's exactly what he's doing. We never had that ability before."

In Afghanistan, Smith said, military officials had problems with the "seams" between service capabilities. Korean War-era communications procedures offset the advanced technical capabilities of B-1s, B-2s, B-52s and precision munitions.

"The problem is the two coming together," he said. "You're making a radio call to call out coordinates, which is what we did in Korea. Is there any reason at all you shouldn't have a laptop with a Global Positioning System grid so you've got a laser designator that designates the target, you hit a button and it goes up?"

Because the adversary in Afghanistan didn't have a strong conventional warfighting capability, Smith said, U.S. and coalition forces had air superiority and were free to move about the country. Therefore, some defense officials said that what worked in Afghanistan won't necessarily work anywhere else.

Military officials are looking at how the effort in Afghanistan came together, Smith said. "If we had to do it all over again, how would we shape that? How would we dissuade an adversary? How would we do it against an adversary who has a strong conventional capability?" he said.

Overall, Smith said, the Afghanistan construct is a good starting point because it brought together all the tools we can use. "As we look back," he said, "I think we'll see Afghanistan as a sea change of thinking. Now it's a question of whether we're going to move toward joint application of combat power or continue to fight in service lanes."

If you ask the services if they're joint, the general said, "they'll say, 'Sure, I'm joint. I bleed purple.' What they mean is, 'I'm joint so long as I'm the decisive element in a joint campaign and everybody comes and fits into my structure.' That doesn't help us very much in the modern world."

Over the last decade, the great debate has been over who controls the battle, the Army or the Air Force, he said. "As a joint guy, I don't care. Air power is the most dominant form of kinetic warfare today and probably for the foreseeable future," he said. "This does not mean the Air Force is the dominant service."

Focusing on airpower as the nation's "dominant instrument" would make the military one-dimensional, Smith said. "If you're an adversary and you've got a high-tech nation that is singularly focused on airpower, what do you do? You disperse," he said. "You disperse strategically and you disperse operationally."

During the air campaign over Kosovo, he said, defense officials learned they could clean the skies very quickly and hit key strategic operational targets. But, in the same vein, the enemy learned to hide his armor and not move it. "The only way to get them to mass is a ground force that threatens them," Smith said. "Once they mass, air power can kill them."

In Afghanistan, al Qaeda also learned to disperse strategically.

"If an adversary figures out they can avoid our air power and we don't have a ground capability anymore, we as a nation are hurting," Smith concluded. "I'm the strongest advocate for saying, 'Wait a minute. You have to have a ground capability.

"I'm also the first to criticize my Army friends who insist on corps-level maneuver operations as the centerpiece of the Army. They've spent an awful lot of their research-and-development budget in the last 15 years trying to compete with the Air Force over the deep battle. Why? The Army's job ought to be to seize and hold terrain in whatever form that is. If we lose that, we're in trouble," Smith said.

The nation's unified commanders, not the services, are responsible for integrating warfighting, logistics and joint training in theater, he stressed. "The services don't fight. The combatant commander fights," he said. "But most of what's driving his capability is service decisions. How do you integrate that?"

"Most of the processes we've got in place today are oriented toward (integrating) after everything gets over in the theater," he said. "What gets deployed and what form it is (are left to) the services. So the unified commander has to do what he can with

what the services deploy."

In the future, Smith predicted, Joint Forces Command is going to be the central advocate for the combatant commander and what he needs to be able to do his warfighting.

Ms. Kozaryn writes for American Forces Press Service.

ACRONYM QUICKSCAN

A2C2S – Army Aviation Command-and-Control System
AATD – Aviation Applied Technology Directorate
AKO – Army Knowledge On-line
AKO-S – Army Knowledge On-line-Secret
BFT – Blue Force Tracking
C2 – command and control
CSA – Chief of Staff of the Army
CSS – combat service support
DFAS – Defense Finance and Accounting Service
EIS – Enhanced Information System
EPLRS – Enhanced Position-Location Reporting System
FBCB2 – Force XXI Battle Command Brigade and Below
GPS – Global Positioning System
ID – identification
IM – Instant Messenger
ISP – Internet service provider
LDOC – Light Digital-Operations Center
MTS – Movement Tracking System
NIPRNET – non-secure Internet-protocol routed network
NOE – nap-of-the-earth
PCS – permanent change of station
PLGR – precision lightweight G(lobal Positioning System) receiver
PM – product manager
SIPRNET – secure Internet-protocol routed network

Circuit check

News and trends of interest to the Signal Regiment

NEWS

ARMY SIGNAL COMMAND REDESIGNATES TO NETWORK ENTERPRISE TECHNOLOGY COMMAND/9TH ARMY SIGNAL COMMAND

FORT HUACHUCA, Ariz.– The Army redesignated U.S. Army Signal Command Oct. 1 to U.S. Army Network Enterprise Technology Command / 9th Army Signal Command.

The new command is composed of organizations from the former ASC, including its tactical and strategic units worldwide, and realigned operational-staff elements formerly under the Army's chief information officer.

ASC's commander, MG James Hylton, is now NETCOM / 9th ASC commander. Plans call for NETCOM / 9th ASC to be headquartered at Fort Huachuca. However, the command will maintain a presence in the National Capitol Region and will operate regional offices at Fort Monroe, Va.; Rock Island, Ill.; Fort McPherson, Ga.; and Fort Sam Houston, Texas.

The redesignation of ASC to NETCOM / 9th ASC was directed under the secretary of the Army's Headquarters Department of the Army Realignment Task Force. The new command is a direct reporting command to Army headquarters under the oversight of the Army's chief information officer, LTG Peter Cuviello, the deputy chief of staff / G-6. The G-6 administers the Army's overall infrastructure for information technology and information management.

NETCOM / 9th ASC will operate, maintain and defend the Army's communications networks. It will be responsible for the technical integration of the disparate capabilities for command, control, communications and computers Armywide. It will provide an "infostructure" responsive to the Army's warfighting missions through one strategic-communications network to forward-deployed forces.

"By creating an enterprise-level infostructure, the Army is now postured to execute the functions critical to information management," Hylton said. "These include functions associated with network operations, management and defense, information-dissemination management and information assurance. Centralization of authority over these functions will ensure secure, dependable and timely communications across the Army from the foxhole to the White House."

DISA, NATIONAL SCIENCE CENTER SIGN MEMORANDUM OF UNDERSTANDING

ARLINGTON, Va. – The Defense Information Systems Agency commemorated the signing of a memorandum of understanding with the National Science Center July 30. The ceremony, held at DISA headquarters here, marks the beginning of a partnership between the two organizations.

DISA and NSC are combining their resources to attract America's youth to math, science and technology careers. In this technological age, the demand for employees in these fields exceeds the available talent. NSC and DISA realize that college is too late to peak youths' interest in technical fields and plan to start earlier.

"Compelling research shows without a doubt that if you're going to capture the minds and energies of American youth today in math, science, engineering and computers, you

Figure 27. DISA and NSC officials sign a memorandum of understanding to partner in youth math, science and technology programs. From left are Shannon Teates, DISA/NSC program ambassador; Phyllis Hendry, NSC's president; and MG David Bryan, DISA's vice director.

have to do it in middle school," said MG David Bryan, DISA's vice director. "If you miss them, you catch very few later."

NSC works to improve technical literacy and to encourage an interest in math and science careers among youth. DISA, responsible for the command, control, communications and information systems serving the Defense Department, will be able to expand the NSC focus to include more information technology.

NSC's headquarters, "Fort Discovery," is located in Augusta, Ga., and serves as a family-oriented math and science center of more than 270 interactive exhibits. It's also the base of several national educational-outreach programs.

Shannon Teates, a DISA employee working to implement the partnership, says that DISA intends to not only become involved in NSC's existing programs but also help establish new programs and initiatives with an IT perspective.

"A major initiative is setting up a technology-oriented camp for kids," said Teates. Children at the camp would learn things such as how to build a website or create a robot.

ONE-OF-A-KIND SIGNAL COMPANY TO PROVIDE RAPIDLY DEPLOYABLE, HIGH-TECH CAPABILITY

by Sue McKinney
and SGT Kelly McCargo

FORT HUACHUCA, Ariz.– The U.S. Army Network Enterprise Technology Command/9th Army Signal Command here activated the only strategic and tactical Signal-network installation and restoration unit in the Army – 518th Signal Company (Tactical Installation and Networking) – Oct. 16.

The company is a bi-component, split-based company comprising active-duty and Reserve Component soldiers. It consists of a headquarters and two platoons co-located with two primary NETCOM/9th ASC units – 93d Signal Brigade at Fort Gordon, Ga., with one platoon attached to 11th Signal Brigade headquartered here – and will support units worldwide.

"You see a one-of-a-kind unit – it's a multicomponent company ... and there is no other unit in the Army with their extraordinary capabilities for strategic installation of tower, data, video and wire systems," said COL Daniel Gerstein, 93d's commander, at the Oct. 16 ceremony. "The unit provides rapid Global Information Grid installation, reinstallation and restoral. Their mission statement speaks volumes about their mission and its significance."

Integration of the Reserve Signal brigade and Signal battalion support at Fort Gordon ensures availability and retainability of trained Signal Reserve personnel.

"In accordance with chief of staff of the Army guidance, our active and Reserve Component integration azimuth is focused on total integration of active and Reserve Components into a seamless force," said Elizabeth Patten, deputy assistant chief of staff, G-3 (operations) at NETCOM/9th ASC headquarters here.

The 518th Signal Company is a rapidly deployable, highly skilled, highly technical unit that will be capable of providing support to any established joint task force, Army service-component command, theater Signal command (Army) and the warfighting combatant commanders. It's designed to deploy in teams, sections or platoons to provide immediate support where needed.

"The Army and the joint communities have critical requirements for rapid installation and restoration capability supporting strategic, tactical and sustaining-base communication infrastructures," said Patten. "The 518th is designed to fill this requirement."

The 518th Signal Company will be able to restore or install critical pieces of the Defense Satellite Communications System and the Defense Information Switching Network. The company will provide software-application expertise, network installation and administration and information-systems and network-security support, as well as information-management quick-response teams to the warfighter worldwide.

"The 518th is part of an ever-changing Signal mission with the current mindset to 'move information, not people.' This mandates a highly mobile, modular and flexible organization capable of providing early-entry information technology," said MAJ Bruce Holland, 56th Signal Battalion's

executive officer. The 56th Signal Battalion is part of 93d Signal Brigade.

"This one-of-a-kind unit would have been ideal to have when the Pentagon was hit Sept. 11 [2001]," said Patten. "It could also have been deployed to install and restore communications during [Operations] Enduring Freedom, Stabilize (East Timor), Joint Guardian and Joint Force."

The 518th was initially formed on paper in October 1933 as 1st Radio Intelligence Company. It has been deactivated and reactivated five times since then, with the last inactivation coming in September 1993. The company has been equipped with state-of-the-art satellite-communications technology as part of its mission to be a rapidly deployable unit that can immediately install satellite communications, automation, videoteleconferencing and official-mail-distribution support.

Ms. McKinney is assigned to U.S. Army Network Enterprise Technology Command/9th Army Signal Command's public-affairs office at Fort Huachuca.

SGT McCargo is 93d Signal Brigade's public-affairs noncommissioned officer.

ARMY CONTRACTOR WINS BRITISH QUEEN'S AWARD FOR ENTERPRISE

by Stephen Larsen

FORT MONMOUTH, N.J. – A member of the Army's contractor team that produces the Vehicle Intercom System was among 131 United Kingdom firms honored with the Queen's Award for Enterprise, the UK's most prestigious award for business performance.

The Lord Lieutenant of Lancashire, representing Queen Elizabeth II, presented the award in August to BAE Systems, Land Platform Communications Division, at BAE's facility in Blackburn, Lancashire. BAE was a first-time winner in the international-trade category.

Charles Penta of the project manager, Defense Communications and Army Transmission Systems here – who manages the VIS program for the Army – received a replica of the Queen's Award, which is now on display at PM DCATS' offices at Fort Monmouth. PM DCATS, part of the program executive office for Enterprise Information Systems headquartered at Fort Belvoir, Va., has to date fielded more than $200 million worth of VIS systems.

Figure 28. VIS headset. PM-DCATS has to date fielded more than $200 million worth of VIS systems.

"Without a doubt," said Penta, "we (the Army) have 18,000 systems out there – or 21,000 if you include the light-vehicle variant used in humvees."

Penta was asked to speak at the Lancashire ceremony. He congratulated BAE and its employees for their achievement and thanked them for the quality of their product. Noting that VIS has provided increased voice and data communications in the high-noise environments of vehicles such as tanks and Stryker Interim Armored Vehicles for brigade combat teams, Penta lauded the system as a "major advance" in vehicular digital intercommunications.

"The product has operated beyond our expectations," said Penta. "Our soldiers in the field love it – and that's the most important comment you can ever receive. Compared with its predecessor, the VIC-1, it's the most dramatic improvement we could do for them."

Penta said the VIS provides clear, noise-free communication between crew members inside combat vehicles and externally over as many as six combat net radios. It provides digital data distribution, voice-activated switching, a redundant architecture to mitigate battle damage and a built-in test capability.

Northrop Grumman's Electronic Systems sector, Baltimore, Md., and BAE jointly developed VIS, first procured by the Army in 1993. The Army awarded Northrop Grumman a new five-year, indefinite delivery / indefinite quantity follow-on contract in February to continue supplying VIS. BAE is a subcontractor under the contract.

Mr. Larsen serves as PEO-EIS-Fort Monmouth's public-affairs officer.

UPDATES

TOBYHANNA MEETS SURGE REQUIREMENT FOR ARMY, AIR FORCE SATELLITE SYSTEMS

by Anthony Ricchiazzi

TOBYHANNA ARMY DEPOT, Pa. – Technicians here have cut the time to repair and test satellite terminals by up to 50 percent.

They've been carrying out a quick turnaround schedule for the AN / TSC-93C and 85C satellite terminals for the Army, and the AN / TSC-94 and 100 for the Air Force.

"We started this surge requirement after the 9-11 terrorist attacks last year, repairing terminals for units at Fort Bragg [N.C.], Fort Stewart [Ga.] and Germany," said Bill Telesco, chief of the Tactical Multiband Systems Division, Satellite Communications Systems Directorate. "We've completed eight so far."

The terminals are usually repaired in about 120 days, but the requirement is 60 to 90 days, no matter what the terminal's condition. They're located worldwide and provide video, data and voice communications.

Stanley Maros, electronics integrated-systems mechanic, TMS Division, said the depot has always had accelerated schedules but they've increased since Sept. 11, 2001.

"All the components are checked and repaired, down to the wiring

racks," said John Morelli, electronics mechanic leader. "This surge requirement is ongoing, so we'll be working on it into the foreseeable future. The systems will be used until about 2012."

Mr. Ricchiazzi is assigned to Tobyhanna's public-affairs office.

Figure 29. Stanley Maros begins stripping an Army AN/TSC-85 satellite terminal at Tobyhanna to prepare it for repair and testing.

NORTHERN COMMAND SETUP BECOMES CLEARER

by Jim Garamone

WASHINGTON – When U.S. Northern Command stood up Oct. 1, the new organization in charge of homeland defense had a "combatant command" of a small number of specialized units.

Combatant command gives combatant commanders the authority to organize, train and operate units. It's different from operational control, which allows commanders to use forces that have been trained and are supported by someone else.

When the command unfurled its flag at Peterson AFB, Colo., Air Force GEN Ralph Eberhart had COCOM of the joint-forces headquarters homeland security. The JFHQ is based at Norfolk, Va., and now comes under U.S. Joint Forces Command. The headquarters has 130 civilian and military personnel assigned.

Other units will come under operational control of the new command if they're needed, Defense Department officials said. "If there's an incident, other units may come under command of Northern Command," said one official. "This would be much the same as units coming under the control of U.S. Central Command when needed."

In addition to becoming the commander of U.S. Northern Command, Eberhart commands the North American Aerospace Defense Command. Wearing his Northern Command hat, he has operational control of U.S. contributions to the joint U.S.-Canadian defense organization.

The JFHQ homeland security coordinates the land and sea defense of the United States. In addition, the command serves as the liaison with lead federal agencies and supports those agencies in the event of an attack. The headquarters will work with other agencies on prevention of attacks, military response if an attack is successful and military aid to such agencies as the Federal Emergency Management Agency.

Two subordinate units to the JFHQ also transferred to the new command Oct. 1. These were the Joint Task Force Civil Support and Joint Task Force 6.

JTF-Civil Support is based at Fort Monroe, Va. Established in 1999, the JTF supports civil authorities in the event of an attack on the United States. The 160 task-force members coordinate military support requested by civilian authorities.

JTF-6 is based at Fort Bliss, Texas. The JTF is the Defense Department's counterdrug support unit. It provides resources to local, state and federal law-enforcement agencies. Since it was established in 1989, the JTF has helped more than 430 federal, state and local agencies in more than 5,300 missions. Officials said the JTF's counterdrug mission will remain, but its mission will probably expand into other border security realms.

Northern Command will have direct coordinating authority with the U.S. Coast Guard. In the event of attack, Joint Forces Command will provide any additional forces Northern Command may need.

Mr. Garamone writes for American Forces Press Service.

DOD 'OK' IN RADIO BANDWIDTH TRANSFER TO PRIVATE SECTOR

by Gerry Gilmore

WASHINGTON – The Defense Department retains access to valuable radio bandwidth needed for national security, although the government gave up a segment July 23 to facilitate growth in the U.S. telecommunications industry.

The Department of Commerce announced its plan July 23 called the "3G (3d generation) Viability Assessment." DoD and some other government agencies will transfer 45 megahertz of radio bandwidth to the private sector. The frequencies will come from the 1710-1755 mhz range.

One of the challenges in developing the 3G plan was how to reallocate bandwidth without impairing DoD's network-centric warfare and information-superiority missions, according to Commerce Department officials. Military transformation calls for quantum leaps in the use of computerized information technology that depend on wireless systems.

However, the bandwidth transfer won't hurt DoD's missions, said Steven Price, deputy assistant secretary of defense for spectrum, space,

sensors and C3 (command, control and communications) policy.

"We welcome the findings in the 3G viability plan and believe the plan supports national-security needs," Price noted. He noted the plan "requires some changes" to certain military systems, but said DoD doesn't lose because it will have access to more bandwidth if needed.

DoD will relocate its affected systems to other bandwidths before December 2008, according to the Commerce Department.

Commerce officials said the 3G plan also calls for the private sector to gain another 45 mhz of bandwidth from the 2110-2170 mhz range, used by nongovernment entities.

Mr. Gilmore writes for American Forces Press Service.

Leader Transitions

MULTI-BILLION DOLLAR REACHBACK PROGRAMS GET NEW LEADERSHIP

by Stephen Larsen

FORT MONMOUTH, N.J. – Two programs that provide the forward-deployed Army reachback to its continental-U.S. infrastructure received new leadership here July 9.

COL Lee Price became the project manager for Defense Communications and Army Transmission Systems. William Smith became project manager, Defense Communications and Army Switched Systems.

As PM DCATS, Price is responsible for managing programs valued at more than $2 billion that support the Army, joint services, National Command Authority and combatant commanders. These include the AN / GSC-52 (satellite terminal) modernization program, Multiplexer Integration and Digital Communications Satellite Subsystem Automation Systems, the Defense Department's Teleport program, Wideband Antijam Modem Systems, the Objective Defense Satellite Communications System Operations Center, Wideband Gapfiller Satellite System, Vehicle Intercom System program, defense-wide transmission systems and command-center upgrades.

As PM DCASS, Smith is responsible for managing programs, valued at $2.8 billion, that provide troops deployed around the world access to sustaining-base information systems. These include the Outside Cable Rehabilitation program, Digital Switched Systems Modernization Program, Common-User Installation Transport Network, the Army's Defense Information Systems Network Router Program, as well as upgrades of telephone switched systems and networks in Korea, Japan and Europe.

Mr. Larsen serves as PEO-EIS-Fort Monmouth's public-affairs officer.

Signal Units

IOWA NATIONAL GUARD SIGNAL UNIT TESTS MULTIPLEXERS FOR HOMELAND DEFENSE

MERRIMACK, N.H. – The Iowa National Guard's 234th Signal Battalion and the Iowa Communications Network designed and oversaw testing that checked how to bridge commercial and tactical networks toward enhancing homeland-defense communications capabilities. The tests used equipment provided by Codem Systems, Inc., a leading supplier of internetworking equipment for military and commercial networks headquartered here.

The test also demonstrated a solution for saving the National Guard some training time and recurring costs.

"Our goal is to better employ tactical communications during disaster-response and homeland-security missions by linking forward command posts back to state or national command posts or emergency-operations centers," said LTC Rusty Lingenfelter, 234th Signal Battalion's commander. "The key to providing this capability is a tactical-to-commercial interface such as Codem provided."

The homeland-defense capability demonstrated was the ability to extend existing T1 voice and data circuits from a stable infrastructure site to a deployed emergency location. In the testing scenario, a T1 circuit from the ICN in Des Moines was assigned voice, video and router traffic and passed over existing fiber to the 234th armory in Cedar Rapids. The T1 was then routed into the Codem TTI-1000, which enabled the circuit to be passed over existing tactical transmission equipment.

The test demonstrated the ability to quickly deploy military assets in domestic emergencies and provide critical communication between affected areas and the commercial infrastructure. The tests were part of ongoing proof-of-concept testing to establish optimum emergency communication procedures in Iowa.

Different tactical and commercial interfaces connected by the TTI-500 / 1000 systems can also be used to enhance National Guard training. "The TTI-500 / 1000 allows the National Guard unit to install and train a deployed tactical network over existing T1 lines," said a Codem spokesperson. "This enables the National Guard unit to increase actual time spent training by overcoming physical distance, making better use of time usually spent convoying. Also, this capability saves resources such as fuel and maintenance on vehicles."

142D SIGNAL BRIGADE FIELDS TACTICAL MESSAGE SYSTEM

by CPT Brian Hagood

FORT LEWIS, Wash. – Eight soldiers from 142d Signal Brigade recently participated in an operational testing exercise here nicknamed JUICE (for Joint User Interface Communications Exercise) of the Tactical Message System. The 142d, a multicomponent brigade based in Alabama, was first to field and test TMS.

The exercise was designed to validate TMS in a tactical environment and verify backward compatibility to existing secure mail circuits. More specifically, soldiers verified TMS setup, teardown and packing procedures, and they tested the durability of TMS transit cases by driving on improved and unimproved surfaces in a cargo humvee.

"Being a multi-compo command with a presence here at Fort Lewis is

quite a privilege," said LTC Anthony Cottles, 142d Signal Brigade (Forward) officer in charge at Lewis. "Vendors often ask us to field-test various pieces of Signal equipment. It helps them to know Active Component and Reserve Component soldiers will test the equipment. This organization [142d Signal Brigade] defines AC/RC integration in today's Total Army."

The testing, which included normal operations under field conditions, was validated by the Army's Operational and Test Command at Fort Lewis.

TMS is the Army's solution to extend the Defense Message System into the tactical environment. TMS is composed of a group of laptops and a router operated from transit cases. TMS' mission is to provide area-control-center service to the tactical environment. TMS will replace the five-ton-truck-mounted AN/TYC-39 Automated Digital Network message switches and will provide new email-based messaging functionality that permits writer-to-reader messaging based on public-key-infrastructure signed and encrypted message technology.

TMS provides the essential messaging backbone for the battlefield with three scalable equipment suites. A TMS set is comprised of one TYC-24 Version 2 (unclassified), one TYC-24 Version 3 (secret) and one TYC-24 Version 4 (top secret / sensitive compartmented information) suite. A complete TMS section includes two TMS sets operated by 12 military-occupation specialty 74B soldiers (two per suite). Each TMS suite consists of three transit cases, one cargo humvee and one two-kilowatt generator. Each TMS version is capable of operating independently of the other suites and is set up inside a Signal-unit tent.

TMS will operate in all battlefield environments and support all types of military operations. TMS operates over the Army's existing tactical high-speed data network-enabled Area Common-User System (mobile-subscriber equipment, triservice tactical equipment and tactical local-area network, for example). TMS is capable of directly interfacing to sustaining-base military networks such as non-secure Internet protocol route network, secret Internet protocol route network and Joint Worldwide Intelligence Communications System.

Figure 30. Dan Schaaf of 5th Signal Command teaches a class on information-dissemination management, a relatively new but critical component of network operations, to members of 2d Signal Brigade during a conference at Taylor Barracks in Mannheim, Germany.

Two TMS sets are provided for divisions, corps and most echelons-above-corps units to provide continued service during unit movement by moving one TMS at a time. TMS is doctrinally deployed in pairs, so each supported user's local groupware server is connected to two TMSs or TMS equivalents so that single TMS movements don't interrupt service to supported users.

The transit-case design is flexible to operate from different locations. One advantage to the transit-case solution is that it allows each security domain to be transported separately if air cargo space is limited.

CPT Hagood is a Regular Army officer assigned to Headquarters 142d Signal Brigade in Decatur, Ala., as the S-3 operations officer.

SIGNAL CONFERENCE DEFINES WORLD-CLASS VISION FOR U.S. ARMY EUROPE COMMUNICATIONS

by Robert Kramer

MANNHEIM, Germany – With an emphasis on 5th Signal Command communications-transformation initiatives, 2d Signal Brigade here hosted a two-day network-operations service center and network-service center conference Sept. 5-6.

More than 50 soldiers and civilian employees from Germany, Italy, Belgium, the Netherlands and Luxembourg attended the conference at Taylor Barracks here.

The conference's purpose was to train attendees and discuss issues that will lead to standardizing all communications services. Soldiers and civilian employees rotated through leadership-training classes, technical training and briefings on communications-transformation issues.

The 5th Signal Command has established six network-operations service centers and 21 network-service centers throughout the European theater. With 21 network-service centers positioned throughout all major U.S. Army Europe military communities, the command maintains world-class theater access to the Global Information Grid.

"The Army is in the midst of high-velocity change. We're transforming theater information services through standardized, one-stop, customer-focused support," said COL Hubert Newman, 2d Signal Brigade commander, in describing the network-service center vision.

The vision's core element is "to be the best customer-service provider of information-technology and -management services in the world" and to have "innovative and versatile soldiers and civilians who enable theater ac-

cess to the Global Information Grid, delivering the right information, in the right format, at the right time, to the right place, to the warfighter."

"The 2d Signal Brigade has accelerated change and its transformation to meet new world-communications challenges of a dynamically changing European theater," Newman said.

The 2d Signal Brigade's transformation is based on developing standardized local network-service centers with uniform tactics, techniques and procedures for strategic-communication support throughout the European theater. This includes all types of communication for U.S. Army Europe's soldiers, including voice (Defense Switched Network, commercial and red phone), data (secure and nonsecure), e-mail, video (training and documentation), messaging (Defense Message System), official mail, publications, printing and records management.

Mr. Kramer works for 2d Signal Brigade, 5th Signal Command, in Mannheim.

OF INTEREST

ARMY GAME DEBUTS AT EXPOSITION

by Jayson Sawyer

LOS ANGELES – The official U.S. Army Game was launched May 22 at the 2002 Electronic Entertainment Exposition held at the convention center here. E3, the interactive gaming industry's annual worldwide convention, is the largest annual show of its type in the world, and the largest of any type to take place in the largest city on the nation's West Coast.

The Army Game is designed to be a strategic communications tool to portray the Army to the public in an entertaining, informative and engrossing fashion. Tailored to a computer- and Internet-savvy target audience, it was conceived as a way to create awareness of and intrigue about the Army, its soldiers, training, environment, culture, values and combat operations.

The game, which is being distributed to the public for free, consists of two major game modules: "Soldiers," a single-player, two-dimensional role-playing and career-building piece, and "Operations," a three-dimensional first-person action training and combat simulation that features both single-player and Internet-connected multi-player scenarios.

"The game is an educational tool," noted SSG Marisol Torres, a software analyst with the Office of Economic and Manpower Analysis. "It lets the community know and understand what the Army is like. You get to build the soldier from the ground up, instilling the Army values that are important: leadership, duty, respect, selfless service, honor, integrity and personal courage. You get to go through basic training. You get to go to airborne school. You follow your career path as you see fit within the game. It gives a more realistic view than all the other games that are out there as far as what the Army has to offer."

A game-support website, americasarmy.com, contains more information on the game, including how to receive it. It's available for download from the Internet and via free CD-ROM. Because of the "Teen" rating by the Entertainment Standards Rating Board, the Army will only consciously distribute the game packages to people aged 13 or older.

The game-support website is a joint effort among the game project managers, the game developers at the Naval Postgraduate School and information-technology contractors at U.S. Army Recruiting Command headquarters.

Mr. Sawyer is assigned to Recruiting Command's public-affairs office. This article was excerpted from ***Recruiter Journal's*** *July 2002 edition.*

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY COMBATS INFORMATION OVERLOAD

by Jim Garamone

ARLINGTON, Va.– In the civilian world, it's called "information overload."

That's when so much information is coming in that the receiver cannot separate the wheat from the chaff.

In the military, information overload can get you killed. That's why the Defense Advanced Research Projects Agency set up the Information Exploitation Office.

"What we're all about is finding and killing bad guys on the battlefield," said office director Dick Wishner. "We're focused on land and surface targets."

There is any amount of information a servicemember needs. The services collect data in a number of ways, from satellites to communications intercepts to human intelligence to remote sensors. Part of the rationale for setting up the office is the "military gets a lot of data but not enough information," Wishner said. "What we're trying to do is extract information out of this huge stream of data."

But even with all the information coming in, Wishner doesn't claim that everything is known. "I'm not trying to imply that all the data we need is available," he said. "We actually have a shortage of high-quality sensors." The office will work with offices inside DARPA and the services to develop new sensors.

Wishner said the office is particularly focused on what the military is finding to be the norm: situations where service members have restricted rules of engagement.

"You can't shoot at somebody you think is a bad guy unless you can verify there are no neutrals or good guys in the weapons splash radius," he said. "So we're invoking the new sensor technology to do very precise target identification and make sure we don't make any mistakes." The technology would take an image, identify it as friend or foe and give that information to the servicemember.

"We don't want people trying to make an identification from a screen," Wishner said. "By the time they see it, the vehicle is already labeled with what it is."

He said the office would work to speed up reaction time. He said the services now have similar deliberate planning processes. "The Air Force has something they call 'find, fix, tar-

get, track, engage and assess,'" he said. "That's a fine methodology, but there are segments between these that take too long."

Wishner said the office is looking to synchronize everything "so that when you find a guy who's potentially a threat, we can precisely identify him quickly. Then we'll have a shooter platform nearby that can launch a weapon and destroy him if we deem he's a bad guy."

He said the office would work with warfighters and service laboratories to ensure the products are real, usable and needed. The office will also address other problems like pinpointing targets under foliage and the problems entailed with finding enemies in urban environments.

Mr. Garamone writes for American Forces Press Service.

OFFICERS MAY QUALIFY FOR JOINT-DUTY CREDIT

by Jim Garamone

WASHINGTON – Officers who served at joint-task-force headquarters in nine operations can qualify for retroactive cumulative joint duty credit, Joint Staff officials said recently.

The 2002 National Defense Authorization Act allowed the Defense Department to give officers credit for time served. To be eligible, officers must be on active duty; majors or lieutenant commanders or above; and served at least 90 consecutive days on the JTF headquarters staff.

The nine operations are:

- Operation Northern Watch (northern Iraq) from Aug. 1, 1992 to the present;
- Operation Southern Watch (southern Iraq) Aug. 27, 1992, to present;
- Operation Able Sentry (Macedonia) June 23, 1993, to Feb. 28, 1999;
- Operation Joint Endeavor (Yugoslavia) Dec. 25, 1995, to Dec. 19, 1996;
- Operation Joint Guard (Yugoslavia) Dec. 20, 1996, to June 20, 1998;
- Operation Desert Thunder (Kuwait) Jan. 24, 1998, to Dec. 15, 1998;
- Operation Joint Forge (Yugoslavia) June 20, 1998, to June 10, 1999;
- Operation Noble Anvil (Italy) March 24, 1999, to July 20, 1999;
- Operation Joint Guardian (Kosovo) June 11, 1999, to present.

Officers who believe they qualify can apply for credit via the JTF joint credit request page at https://www.dmdc.osd.mil/jtf/owa/jtf_main.home.

Mr. Garamone writes for American Forces Press Service.

ACRONYM QUICKSCAN

3G – 3d generation
AC – Active Component
ASC – Army Signal Command
COCOM – combatant command
DARPA – Defense Advanced Research Projects Agency
DISA – Defense Information Systems Agency
DoD – Department of Defense
E3 – Electronic Entertainment Exposition
ICN – Iowa Communications Network
IT – information technology
JFHQ – joint-forces headquarters
JTF – joint task force
Mhz – megahertz
NETCOM – Network Enterprise Technology Command
NSC – National Science Center
PEO-EIS – program executive office for Enterprise Information Systems
PM-DCASS – project manager for Defense Communications and Army Switched Systems
PM-DCATS – project manager for Defense Communications and Army Transmission Systems
RC – Reserve Component
TMS – Tactical Message System
TMS – Tactical Multiband Systems
UK – United Kingdom
VIS – Vehicle Intercom System

Marines adopt new broadband very-high-frequency antenna for combat-net radios -- should the Army follow suit?

by David Fiedler and Edward Farmer

Historically, to increase transmitted signal strength, coverage area and point-to-point ground distance for tactical very-high-frequency (30-88 megahertz) radio systems, the Army and Marine Corps turned to elevated (30-foot mast-mounted) ground-plane and biconic antennas such as the widely used RC-292 (Figure 31) and OE-254 (Figure 32). Both antennas perform acceptably electrically but are much too heavy and complicated for today's fast-moving operations, particularly for light infantry, Special Forces and airborne/airmobile units.

Also, they both contain many separate parts that are easily lost. Both require much too much time to erect and tear down. Assembling and adjusting the mast, and assembling the multisection screw-together antenna elements that form both antennas, take most of the installation time.

The Marines have found another answer; now we need a better way.

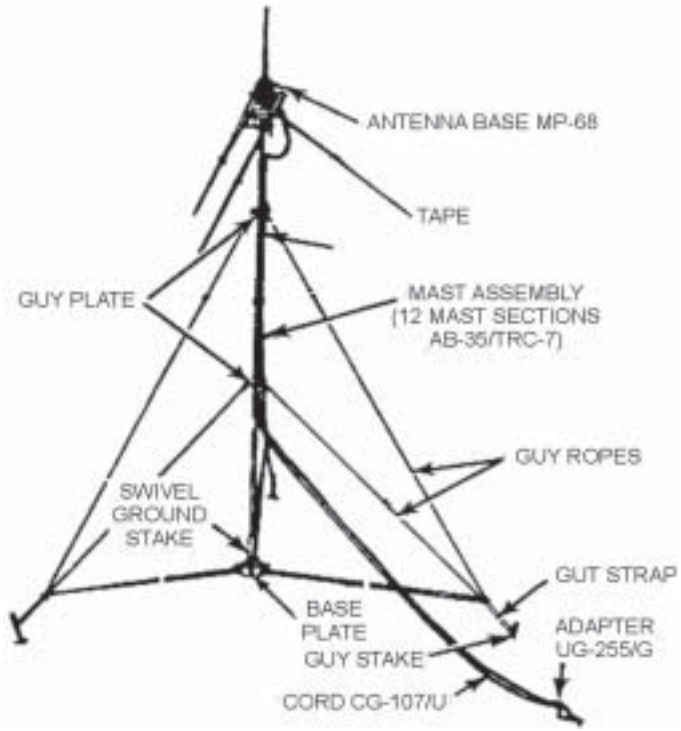

Figure 31. The RC-292 is a general-purpose, stationary, ground-plane antenna used to increase the transmission/reception range of tactical frequency-modulation radio sets. The radiating and ground-plane elements must be adjusted to the proper length for a particular operating frequency. The RC-292's technical characteristics are: frequency range, 20-76 mhz; planning range, about twice the planning range of a radio set using a quarter-wave whip antenna; height when erected, 11.28 to 12.56 meters (37 to 41.2 feet); and weight, about 19.5 kilograms (43 pounds).

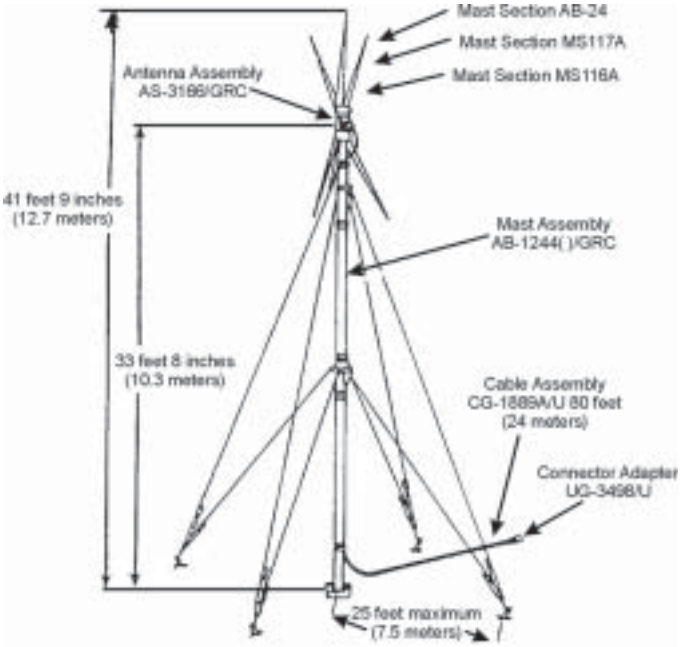

Figure 32. The OE-254 is a general-purpose, stationary, broadband, omni-directional antenna used to extend the range of tactical FM radio sets. Under normal field conditions, the antenna will be mast-mounted. Once installed, the OE-254 doesn't have to be taken down for adjustment when a new frequency band is assigned to the radio net. The OE-254's technical characteristics are: frequency range, 30-88 mhz; planning range, 57.9 kilometers (36 miles), average terrain, or 48.3 kilometers (30 miles), difficult terrain; radio-frequency power capability, 35 watts nominal; antenna-erection time (one person), 15 minutes; height when erected, 12.8 meters (42 feet); input impedance to radio, 50 ohms; and weight, 20.4 kilograms (45 pounds).

Antennas compared

A new antenna is available that has ground-plane and biconic radiation characteristics but is designed specifically to improve both electrical and tactical characteristics. The Marine Corps and other government agencies are procuring this antenna from Atlantic Microwave Corporation.

Commercially named the COM-201 (NSN# 5985-01-450-3798, USMC PN 960-15A 1008), the antenna is a 30-88 mhz, vertically polarized, omni-directional, ground-plane type. It's unique because it's designed so it can mount directly on the ground using a built-in "snap out" tripod that's also the antenna's complete ground-plane structure. The COM-201 is also fitted for mast-mounting on standard antenna masts if a more elevated antenna is needed. The eye fitting at the antenna's top facilitates suspending it from buildings or trees when a mast isn't available but more height is desired.

One of the COM-201's best features, however, is that the antenna breaks down into five parts that can be assembled in less than a minute.

While the OE-254 gains bandwidth by simulating frequency-independent biconic construction, the COM-201 gets its broadband characteristics (variable standing-wave ratio less than 3-to-1 across 30-88 mhz) by using large-diameter elements and a very well-designed broadband matching network built into the antenna base at the feedpoint. When the COM-201 and OE-254 antennas are modeled using the EZNEC-PRO implementation of the NEC-4.1 antenna-analysis software, they show similar frequency response, gain and antenna patterns when both are elevated at 30 feet (Figures 33–37).

At the high end of the frequency range, the OE-254 shows some overhead modes that waste useful signal

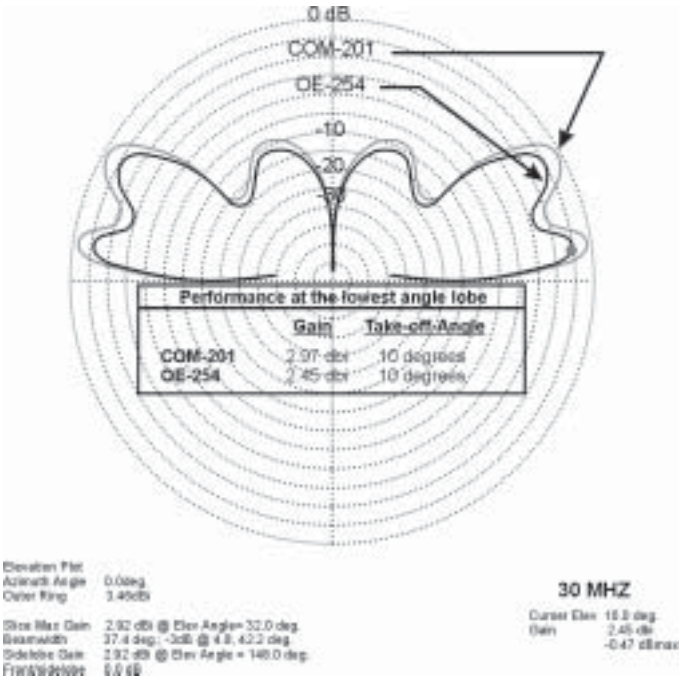

Figure 33. Comparison of COM-201 to OE-254 at 30 mhz.

RC-292 and OE-254 characteristics, problems

When compared to manpack or vehicular vertical monopole antennas (whips), both the RC-292 and OE-254 get improved performance (signal gain) due to several factors:

- Physical height, which increases clearance of path obstructions, lengthens distance to the radio horizon and reduces terrain masking;
- Electro-mechanical construction that places a more perfect radio signal ground (ground plane) under the antenna's radiating element to increase antenna efficiency and remove the effects of less-conductive "real ground"; and
- Higher antennas with good ground planes tend to produce more energy on lower angles that enhance surface-wave radio propagation.

Unfortunately for radio operators, both these standard antenna designs have a large number of parts, and each includes up to 30 feet of cumbersome mast supports required to mount and elevate the antenna. Tactically, this makes them hard to install, operate and maintain in a combat environment.

RC-292. The RC-292, in addition, consists of a single vertical element and three ground-plane elements that form the antenna "ground" or "counterpoise." The integral ground plane improves efficiency markedly over a vertical monopole (for example, a whip antenna) operating over real ground. The ground plane also ensures the pattern will be concentrated at low-elevation angles, more or less independently of the earth over which the antenna is installed. Effectively, the ground plane electrically raises the earth to the antenna's height to complete the antenna circuit while also gaining the wave-propagation advantages of elevating the antenna.

For the RC-292 to produce an acceptable impedance match to the radio and transmission line at any particular frequency, however, it's necessary to physically lengthen or shorten the antenna's elements to a physical point near electrical resonance. That means that the antenna is "tuned" physically by adding or removing metal elements to/from the radiating and ground-plane assemblies so the antenna-radiation impedance will be close to that of the radio and the transmission line, and therefore the maximum amount of signal will be radiated from the antenna. Resonance also implies that most of the energy applied to the antenna is radiated as signal, and very little is reflected back down the transmission line toward the radio. This being the case, an antenna near resonance will have a low voltage standing-wave ratio. This indicates low levels of reflected signal and high antenna performance.

No electronic matching network is provided in the RC-292 antenna.

Changes in operating frequency of more than about 20 percent will cause the RC-292 to "de-tune" since each physical configuration only provides a good impedance match over a small portion of thereduced frequency range. Obviously, this isn't a good design to use when frequency hopping across the entire 30-88 mhz tactical radio spectrum, but it may be OK when hopping over a narrow band if the band is aligned to be near the range of one of the RC-292 physical/electrical configurations. When signals of a frequency outside the resonance band of a configured RC-292 are used, the result is that a large amount of signal energy is reflected back down the transmission line and very little energy is radiated from the antenna as signal.

power for desired ground communications. Energy at these high angles is generally produced at the expense of radiation on the much more tactically useful low angles, and therefore it's detrimental to good communications. The COM-201 with its lower takeoff angles delivers more energy (gain) at the radio horizon to make it more useful in ground-to-ground operations.

COM-201 better

Why should the COM-201 be considered to replace existing antennas? Part of the answer lies in its mechanical design. The antenna is designed with quick deployment and ease of operation in mind. The unique tripod metal-tube leg-structures that serve as both mount and electrical ground plane allow the antenna to be installed directly on the ground or atop roofs, shelters, bunkers, etc. (Care should be taken to keep the radiating element vertical to the ground to avoid distorting the antenna-radiation pattern.)

When time and situation permit, the antenna has the fittings required so it can be mounted on standard or makeshift masts, or roped into trees and buildings to gain the advantages of increased height. The antenna can be moved assembled, partially assembled or broken down. The antenna's active element has a threaded interconnect at the midpoint to reduce its disassembled length to only 36 inches.

The tripod / ground-plane radials telescope and can either be removed or folded up parallel to the active element. This results in a package 36 by 10 inches weighing about 10 pounds. If deployed on its tripod / ground plane, the COM-201 needs only a few feet of coaxial cable to connect it to a radio. This is a feature not available with other antennas.

At platoon and company level, the load reduction of about 30 pounds (when compared to the OE-254) is a very attractive feature that will allow units who couldn't previously afford to carry a more efficient antenna to do

Very few RC-292 antennas are now left in the Army's inventory because the mechanical adjusting and reduced bandwidth of each antenna configuration makes the RC-292 unsuitable to use with now-common frequency-hopping-type radios such as the Single-Channel Ground and Airborne Radio System. This antenna may still be found in some units that use single-channel operation for certain applications.

OE-254. The OE-254 is based on a different idea. The SINCGARS frequency-hopping concept requires operation over the entire tactical-frequency range (30-88 mhz) without physically adjusting the antenna elements. The OE-254 is based on a frequency-independent design consisting of two simulated cones (biconic) arranged apex-to-apex on a common axis. In the OE-254's case, three pairs of elements arranged symmetrically simulate the upper and lower cones. The feed-point impedance is stable over the VHF-FM band because of the biconic design, but it's significantly greater than the 50 ohms our radios and transmission lines are designed for.

Consequently, a broadband matching network is provided in the antenna central-feed assembly to provide a proper impedance match to both the radio and transmission line. A small amount of signal energy is lost in the matching network, but it effectively adjusts the antenna's complex impedance characteristics to eliminate reflections of energy (standing waves or VSWR) back down the transmission line. Broadbanding the antenna in the frequency sense is produced by the antenna's biconic construction. Biconic structures are inherently broadbanded if they are large (long) compared to the lowest frequency with which they are used.

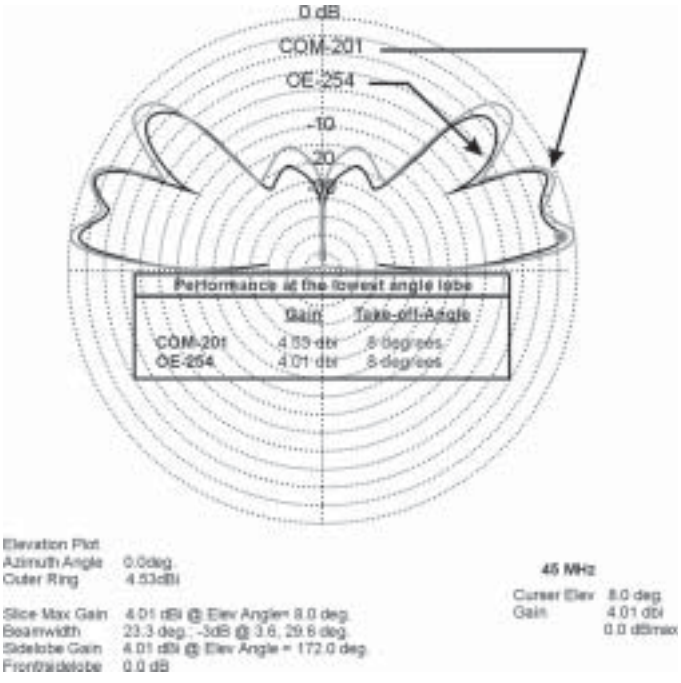

Figure 34. Comparison of COM-201 to OE-254 at 45 mhz.

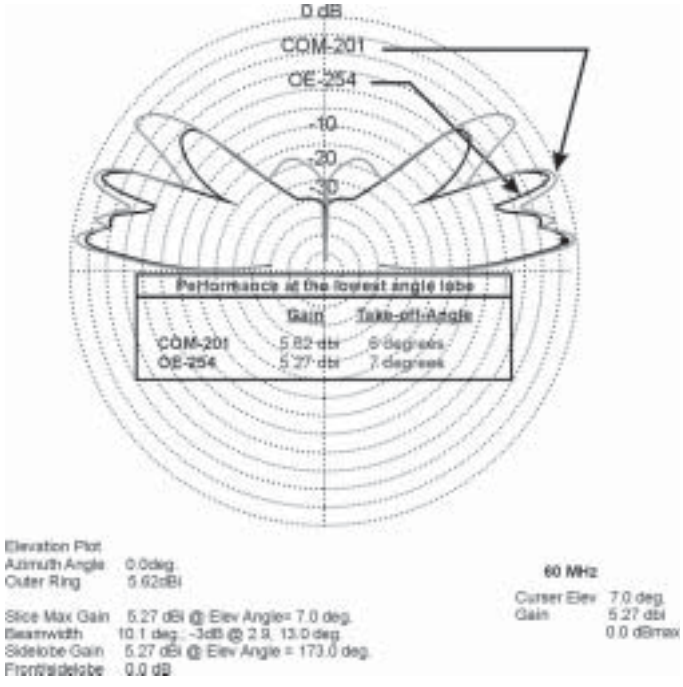

Figure 35. Comparison of COM-201 to OE-254 at 60 mhz.

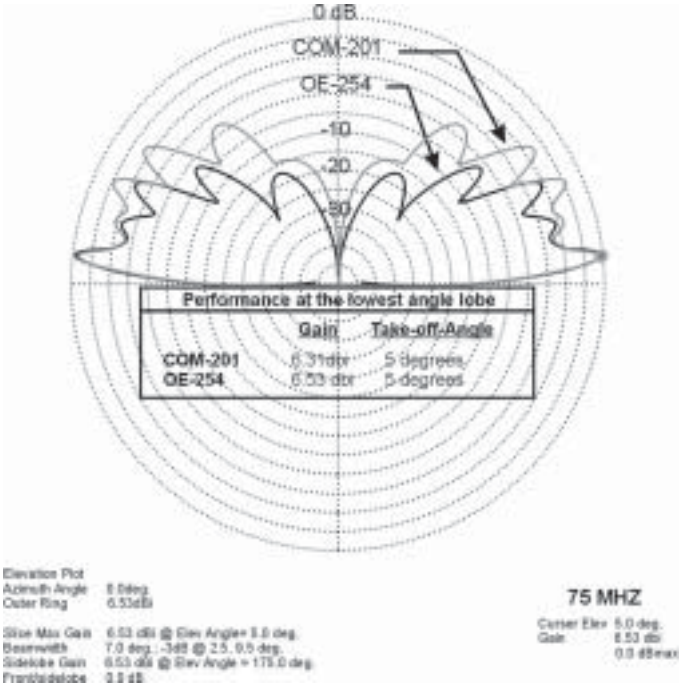

Figure 36. Comparison of COM-201 to OE-254 at 75 mhz.

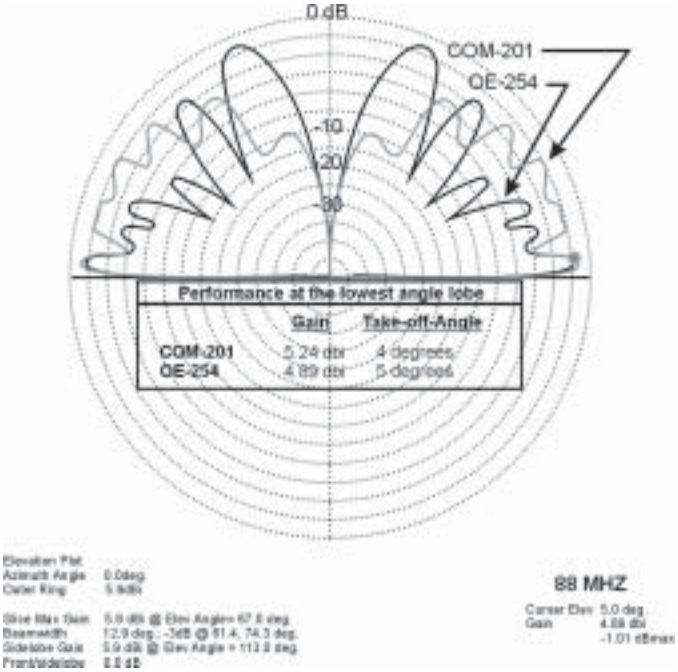

Figure 37. Comparison of COM-201 to OE-254 at 88 mhz.

so by using the COM-201. Communications distance loss (if any) generated by locating antennas close to the earth is less of a factor at these lower echelons where distance requirements are shorter to begin with.

In most cases, overall results will be much better because more effective ground-mounted COM-201s can replace the far less efficient 10-foot or three-foot standard-issue manpack vertical antenna with minimal additional effort.

Part of the answer also lies in the COM-201's electrical- and signal-radiation characteristics. The first thing one notices about the antenna's construction is that the radiating element has a much wider diameter than anyone familiar with our current antennas might expect. This is because increasing the diameter at a constant length (increasing the distance / length ratio) has the effect of decreasing the electrical reactance of the antenna's elements, which, in turn, increases the frequency range (bandwidth) over which the antenna can be efficiently operated.

The "why" of this takes a bit of explanation. At radio frequencies, all conductors (for example, antennas) inherently have resistance, capacitance and inductance. The resistance is made up of two components we call "loss resistance" and "radiation resistance." Loss resistance comes from the flow of radio-frequency electrical current through the antenna's elements and connections. This energy is dissipated as heat, isn't useful for communications, and is small in antennas such as these. Radiation resistance accounts for the portion of the energy we apply to the antenna that actually does what we're trying to do: produce an electromagnetic field and get a radiated signal into the air.

Capacitance and inductance present in an antenna structure produce an effect similar to resistance that we call "reactance." Reactance opposes the flow of current, as does resistance, but doesn't result in lost energy since the energy is stored in the inductive field or as electric charge on the capacitive structure.

Taken together, an antenna's resistance and reactance are called its "impedance." By definition at the resonance frequency, the inductive reactance and capacitive reactance are equal in magnitude and opposite in phase; consequently they cancel each other, and the antenna presents a pure resistive load (the radiation resistance) to the transmission line and radio. At the resonance frequency, the pure resistive electrical load causes the antenna to be the most efficient radiator of signal possible for that structure.

As the frequency of operation strays above the resonant frequency for the antenna, the antenna begins to have inductive reactance in addition to its resistance. When the frequency strays below the resonant frequency for the antenna, the antenna begins to appear capacitive. Capacitive or inductive reactance not canceled in an antenna circuit reduces the effective radiated power of the signal the antenna generates.

All this becomes particularly interesting when frequency hopping with radios such as Single-Channel Ground and Airborne Radio System because the bandwidth of an antenna – that is, the range of frequencies over which it operates efficiently – is proportional to the ratio of its resistance to reactance. The smaller an antenna's reactance, the wider its frequency bandwidth.

The COM-201's physical construction is such that the diameter-to-length ratio is optimized to produce radiation (signal) across the 30-88 mhz frequency band using a structure that has reasonable physical size and radiation-efficiency characteristics. This optimized

construction produces more signal (gain) and lower takeoff angles for the COM-201 when compared to an OE-254 at the same height, as the plots show. This means better electrical performance as well as better mechanical performance can be expected from the COM-201 under tactical conditions.

Another part of the answer lies in how the COM-201 electrically "matches" its complex antenna impedance (resistive, capacitive and inductive components) to the transformed 50-ohm impedance of the radio and transmission line to reduce reflected power (voltage SWR) and produce maximum radiated power. To do this, a matching network is incorporated at the antenna's feedpoint. It provides the inductive and capacitive reactance necessary to compensate for the antenna's inherent reactance as the operating frequency varies over the 30-88 mhz frequency range. As you can see from Figures 38 and 39, the network transforms the antenna's complex impedance into a 50-ohm resistive impedance that closely matches the radio and transmission-line impedances and produces a VSWR of less than 3-to-1 across the frequency range.

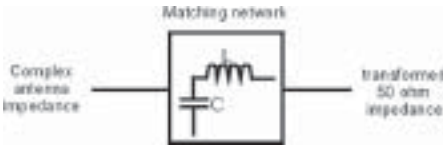

Figure 38. The network transforms the antenna's complex impedance into a 50-ohm resistive impedance.

Since deploying the OE-254 antenna in 1978, the Army has had to live with the mechanical and electrical shortfalls inherent in its design. The OE-254 antenna was clearly the best available at that time, and it did well as we moved the Army from the AN/VRC-12 family of single-channel radios to the SINCGARS family of frequency-hopping equipment. The OE-254's 24 years of service and the huge number of antennas fielded prove the antenna worked well; however, time marches on. Just as we're not driving the same vehicles and

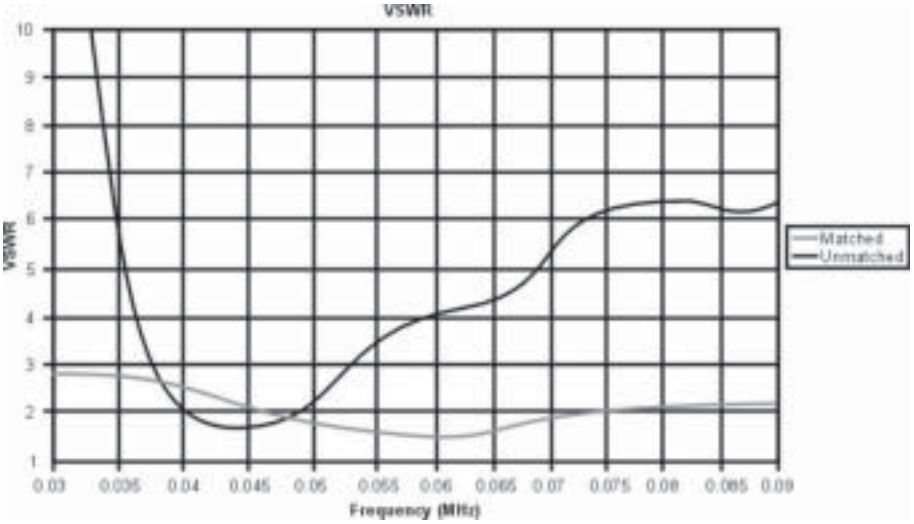

Figure 39. Comparison of tuned COM-201 vs. untuned antenna.

shooting the same weapons we did in 1978, we shouldn't be using the same field antennas.

The authors believe the Marine Corps made a good decision to adopt the COM-201, but we're not advocating change for change's sake. There have been real advances in antenna technology over the last 24 years. The Marines' successful use of the COM-201 shows that if nothing else, the antenna will provide at the least a better physical package since the COM-201 is quicker to deploy and has far fewer small parts to lose or break. A soldier's ability to set up the COM-201 without need of a mast is a great tactical advantage – particularly in the type of mobile warfare, urban warfare and homeland-defense operations we're now conducting. Another bonus the COM-201 provides is the higher gain and the lower takeoff angles to help improve tactical combat-radio operations. The Army needs to very seriously consider following the Marines' lead when replacing our aging stocks of these types of antennas.

Mr. Fiedler – a retired Signal Corps lieutenant colonel – is an engineer and project director at the project manager for tactical-radio communications systems, Fort Monmouth, N.J. Past assignments include service with Army avionics, electronic warfare, combat-surveillance and target-acquisition laboratories, Army Communications Systems Agency, PM for mobile-subscriber equipment, PM-SINCGARS and PM for All-Source Analysis System. He's also served as assistant PM, field-office chief and director of integration for the Joint Tactical Fusion Program, a field-operating agency of the deputy chief of staff for operations. Fiedler has served in Army, Army Reserve and Army National Guard Signal, infantry and armor units and as a Department of the Army civilian engineer since 1971. He holds degrees in both physics and engineering and a master's degree in industrial management. He is the author of many articles in the fields of combat communications and electronic warfare.

Mr. Farmer is a Vietnam-era Signal soldier and former lieutenant colonel in California's State Military Reserve, where he ran intrastate emergency communications. He's a professional engineer, has an extra-class amateur radio license and is president of EFA Technologies, Inc., in Sacramento, Calif. He has a bachelor's degree in electrical engineering and a master's in physics, both from California State University. He has published three books and more than 40 articles, holds four U.S. patents and is a frequent guest speaker at communications and antenna-oriented conferences.

ACRONYM QUICKSCAN

FM – frequency modulation
Mhz – megahertz
PM – project manager
SINCGARS – Single-Channel Ground and Airborne Radio System
SWR – standing-wave ratio
VHF – very high frequency
VSWR – voltage standing-wave ratio

Soldier earns doctorate while on active duty

by 1LT Traci Gift

FORT HUACHUCA, Ariz. – Starting from the ground up isn't always easy, but one soldier proved you could do anything you put your mind to – even earn a doctorate degree while serving as an active-duty senior noncommissioned officer in the U.S. Army.

For SFC Clinton Covert, 11th Signal Brigade's equal-opportunity advisor here, the oral defense of his dissertation at the University of Southern California in September was the culmination of more than 10 years of higher education while on active duty.

Figure 40. Dr. (and SFC) Clinton Covert.

Covert's dissertation focused on senior-enlisted Army soldiers' motivational orientations and perceived barriers to college participation.

Covert, who earned his doctorate in education, explained why he chose this topic for his dissertation.

"I entered the Army at age 17, and getting a college degree was something I didn't give much thought," he said. "In fact, like a majority of the soldiers I interviewed [for the doctoral dissertation], I was a first-generation student. That is to say, my parents held no more than a high-school diploma. Growing up, college was something that wasn't really talked about as a possibility. I

A doctorate on active duty = determination

How SFC Clinton Covert gained his graduate degree with the Army's help

by 1LT Traci Gift

1989-1990: Then-SGT Covert enrolled in four college courses per semester with the University of Maryland while stationed in Korea. This included weeknights, weekends and lunchtime classes. "My supervisor agreed that I could take lunchtime courses as long as I was back at work at 1 p.m.," said Covert. "I accomplished this by leaving class about 10 minutes early each day and literally running back to work."

As he began his college work, Covert enrolled in the Servicemembers Opportunity Colleges program, which allows servicemembers to move from station to station and stay enrolled in a college program. With the evaluation of his military experience for college credit, along with two CLEPs, Covert left Korea one class or three semester hours short of his associate's degree. *[If one scores high enough on College-Level Examination Program tests on specific subjects, one receives credit for passing the CLEP test same as if one passed the college course; in common usage, this is called "CLEPping" and the credit one receives are called "CLEPs."]*

1990-1992: While stationed at Fort Huachuca, Ariz., then-SSG Covert completed his associate's degree and started work on his bachelor's in business administration with the University of Phoenix. Again, all the classes were scheduled in the evenings and on weekends.

"When I learned my next assignment would be Augsburg, Germany, I researched what colleges and universities were operating in the Augsburg military community," Covert said. "I then had the educational counselors at Fort Huachuca list the specific courses needed for transfer credits and degree completion."

1992-1995: While stationed in Germany, Covert completed his bachelor's degree with his "home" college at Fort Huachuca by a combination of correspondence courses and college transfer credits. Covert then enrolled in a master's program with the University of Oklahoma.

"At this time, I only had 1½ years remaining in Germany," he said. "Instead of waiting for the required courses to be scheduled at the Augsburg education center, I used my leave to travel and take the coursework at different education centers throughout Germany. I stayed at the different military communities' guesthouses out-of-pocket in addition to using my Army leave. However, I was able to finish a two-year program in 12 months. Other admissions requirements [for the master's program] such as the Graduate Management Admission Test or Graduate Record Examination were waived based on my undergraduate grade-point average.

"[Getting a degree] has to be something you really want to do and take advantage of as opportunities present themselves," Covert said. "When I was stationed in a nontactical unit, I sacrificed time and the money for doing other things to take advantage of educational opportunities."

1995-1998: By this time promoted to sergeant first class, Covert was assigned to 1st Cavalry Division, Fort Hood, Texas. Before his next assignment with 25th Infantry Division, Fort Shafter, Hawaii, Covert researched what doctoral programs were offered in Hawaii. Covert scheduled and completed the required admissions forms, including the GRE, prior to his arrival in Hawaii.

While at 1st Cav, Covert had a three-year break between master's degree and doctoral program because of 1st Cav's many field deployments and rotations to the National Training Center, Fort Irwin, Calif. "By completing my master's before leaving Germany, I didn't experience what a lot of soldiers experience when they

had more than eight years in the Army before I enrolled in my first college course."

Covert's study found that a primary barrier for enlisted soldiers' college participation was assignment to tactical or "field" units where mission requirements resulted in frequent deployments.

"Soldiers who named this variable also provided examples of how they were able to overcome this obstacle to participation when a supportive supervisor or chain-of-command was present," Covert said.

Covert will attend the formal doctoral hooding ceremony at USC's Spring 2003 commencement in Los Angeles, Calif.

"I hope that my story will serve as an example and inspire other soldiers who desire to participate in college while on active duty. Many soldiers I've talked to assume I must have had easy assignments throughout my career to accomplish this," said Covert. "But I point out that I've also been assigned to tactical units that required many deployments and field-training exercises. The key for me was taking advantage of opportunities as they presented themselves."

As an example, in 1994, instead of waiting for the required courses for his master's degree to be available at his duty station, he used leave to take the coursework at different education centers throughout Germany. (See adjacent sidebar.) By doing this, he was able to finish a two-year program in 12 months.

Bell & Howell Information and Learning Company published Covert's dissertation this fall with the study's complete findings available at http://www.umi.com. Covert, who is scheduled to retire July 1, 2003, plans to enter the federal system as an equal-employment-opportunity administrator and teach as a university professor.

1LT Gift is 11th Signal Brigade's public-affairs officer.

Acronym QuickScan

USC – University of Southern California

start a program and then run into obstacles – such as tactical units or the college or university not being available at their new assignment – and never finishing," Covert said. "I never took courses on field deployments, just correspondence courses."

1998-2001: Covert immediately enrolled in the University of Southern California's doctorate in education program in Fall 1998 as part of USC's off-campus Hawaii cohort. "The doctorate of education totaled 70 credit hours, with 25 semesters hours credited from my master's degree," Covert said. "I completed the remaining coursework, the required summer residency at USC's campus and the oral-qualification examination before I left Hawaii in September 2001. My brigade commander in Hawaii allowed me to take 45 days' leave to complete my summer-residency requirement at USC when others in my chain-of-command were against it. So this was big, because I had to complete this requirement before the end of the coursework and the qualification exam."

2001-2002: Covert wrote and defended his dissertation while again assigned to Fort Huachuca. "The Army's tuition assistance paid for 75 percent of my college tuition up to my master's degree," Covert said. "For my doctorate, I paid out-of-pocket because I was one of those soldiers covered by neither the Montgomery GI Bill nor the [original] GI Bill. By the time the Army offered conversion to the GI Bill for soldiers like myself, I was almost finished with my coursework. However, all the other military members in the program used their GI Bill on active duty to pay for about two-thirds of their tuition each term."

For soldiers wondering how Covert balanced grades and job performance, Covert said he put his whole heart into both his schooling and work. This soldier's standards were high enough that, on one hand, his performance appraisals were exemplary and his career progression commensurate with his career field. (He was selected for promotion to master sergeant but declined, he said.) On the other hand, his GPA was high enough for the master's program admission requirements to be waived. "If anything, participation in higher education has only enhanced my Army job performance – for example, my critical thinking and communication skills," Covert said.

"For most of my career, my wife and I were enrolled in college courses at the same time," Covert noted. "This was a positive factor, because I think the support and understanding of a significant other is vital."

1LT Gift is 11th Signal Brigade's public-affairs officer.

Acronym QuickScan

CLEP – College-Level Examination Program
GPA – grade-point average
GRE – Graduate Record Examination
USC – University of Southern California

Figure 41. U.S. Military Telegraph civilians set poles and string wire during the Civil War. The military's critical telegraph lines were operated by civilians who worked for USMT.

The Stager ciphers and the U.S. military's first cryptographic system

by CPT Kevin Romano

During the Civil War, the Signal Corps had an unwelcome competitor (as Chief Signal Officer BG Albert Myer saw it) in providing telegraphic communications for the Union Army. U.S. Military Telegraph employed civilian operators and was managed by a civilian, Anson Stager, under Secretary of War Edwin Stanton's control. Stager also created successful ciphers and is credited with being one of the United States' pioneer cryptographers, since he developed the first cryptographic system formally adopted by the U.S. military.

Figure 42. Anson Stager, Civil War era.

The Stager ciphers consisted of 10 numbered cipher systems. The Stager ciphers' integrity was unbelievably robust; the ciphers were never broken in the Civil War by cryptanalysis.

Cryptography's birth

Stager was 19 when Samuel Finley Breese Morse tapped the telegraph into existence in 1844 with the words, "What hath God wrought?" Morse's invention brought rapid, long-distance communications into a world where, for the most part, they hadn't previously existed. Morse also envisioned the telegraph as a private means of communication, where transmissions between stations would be secure, but other people designed the methods of encrypting telegraphic messages.

In his book, ***Secret Wires: the U.S. Military Telegraph Corps and Civil War Communications***, Fred Chesson points out that these early telegraph ciphers were motivated by

secrecy but, more importantly, by saving money. During the period leading up to the Civil War, a host of telegraph and railroad agencies employed ciphers in their telegraphic messages. More often than not, the telegraph operators themselves devised these early ciphers and so were this nation's cryptographic pioneers.

When Stager became an apprentice printer for Henry O'Reilly of Rochester, N.Y., he hoped to work in the printing business, but O'Reilly introduced the 21-year-old Stager to the telegraph in 1846. O'Reilly constructed a telegraph line between Harrisburg, Pa., and Philadelphia, Pa., which Stager was placed in charge of at the Lancaster, Pa., station. As the O'Reilly telegraph lines expanded, so did Stager's responsibilities. Stager moved to Ohio to manage telegraph lines there and eventually served as the first general superintendent of Western Union Telegraph Company, newly formed in 1856.

With the attack on Fort Sumter April 12, 1861, and the outbreak of the Civil War, the need for secure telegraphic communications became paramount. Ohio's governor summoned Stager to the state capital with a twofold request: develop a system so the governor could securely communicate over the telegraph with the governors of Illinois and Indiana, and assume control of the state's telegraph lines.

Stager developed a very simple cipher system for the governor that was a basic route and transposition cipher. The incredible feat of Stager's cipher was that, before this, he'd had no formal training in cryptology or had even expressed a very strong interest in the field.

The benefits of Stager's cipher soon reached Union GEN George McClellan. McClellan asked Stager to prepare a cipher he could use in the field, thus beginning the U.S. military's first formal cryptographic system.

USMT's start

Soon after the outbreak of hostilities between the states, the Union government formed an organization that would need Stager's services: USMT. USMT was created as a means for the government to manage and control the many existing private telegraph lines. The Union leadership realized that use of the telegraph would be critical in the war effort. Stager joined USMT as a colonel in May 1861.

Figure 43. USMT operators talk during downtime at Army of the Potomac headquarters, July 1863.

In 1862, President Abraham Lincoln seized control of all commercial telegraph lines. With this act, Stager was appointed as supervisor of USMT lines. Stager was an obvious choice to serve as supervisor given his experience with commercial telegraph lines.

However, the newly formed U.S. Army Signal Corps, under Myer's leadership, was often at odds with Stager and the USMT. The Signal Corps felt that all telegraph responsibilities should fall under its jurisdiction, whereas USMT and Stager understandably didn't share this view. Part of the conflict between Myer and Stager stemmed from the competition to recruit trained telegraph operators. Myer brought this issue to a head by advertising for qualified telegraph operators in the September issue of the ***Army and Navy Official Gazette***.

Stanton thought Myer was insubordinate because he didn't clear this ad with the secretary of war before printing it. In the personal conflict and rivalry between Stager and Myer, Myer was the loser, as Stanton favored Stager; Stanton dismissed Myer as Chief Signal Officer Nov. 10, 1863, and reassigned him to duty in Memphis, Tenn. With this act, Stanton also turned over all telegraphic responsibilities to Stager and USMT. *(**Editor's note**: for more details on the Stager/Stanton vs. Myer relationship, read Rebecca Robbins Raines' Signal branch history, **Getting the Message Through**.)*

The ciphers

Throughout the Civil War, Stager developed 10 cipher systems for the Union Army. These ciphers were numbered 1 through 12, with numbers 8 and 11 being omitted. (See Figure 44.) The ciphers were developed in four general groups, with ciphers from the same group sharing similar characteristics. The cipher groups were: 6, 7; 9, 10, 12; 1,

Cipher	Initiated	Terminated
1	February 1864	Sept. 24, 1864
2	1864	1864
3	Dec. 25, 1864	March 23, 1865
4	March 23, 1865	June 20, 1865
5	Not used	June 20, 1865
6	Early war, 1861 (?)	August 1862
7	Early war, 1861 (?)	August 1862
9	January 1863	February 1864 (?)
10	Spring 1863	February 1864 (?)
12	1862	August 1864

Figure 44. Stager's cipher system.

2; 3, 4, 5.

Among all 10 of the Stager ciphers, the basic underlying mechanics are the same. The different versions reflect the addition of more arbitrary words or code words, and more routes. This expansion is understandable, since the codes were used when different tactical situations called for different arbitrary words to represent them.

The Stager cipher is a route and transposition cipher. First, keywords from the message are substituted with their corresponding arbitrary or code words. Next, the message is written down in a predetermined number of lines and columns. The number of lines and columns determine the commencement word and route to be used with the message. Depending on the cipher used, a time would be placed on the message with a corresponding code word. Finally a route, determined by the number of lines and columns, would be used to encipher the message.

As the Stager ciphers grew more complex, so did the routes and number of arbitrary words. The most complete listing of arbitrary words and routes is found in William Plum's work, ***The Telegraph During the Civil War in the United States***.

For example, using Stager Cipher 9 (a complete version of Cipher 9 appears in Plum's book in Appendix A), here's a possible message that GEN Ulysses Grant could have sent to GEN William Sherman in November 1863 during the battle of Chattanooga:

"To General Sherman,

Your division will cross the Tennessee River at midnight and advance and attack General Bragg's fortifications, then capture Chattanooga. Please advise on wounded, killed, arms, artillery, rations and ammunition.

General Grant, 6 p.m."

The telegraph operator would then look in the USMT codebook and put the appropriate "arbitraries" into this message. The arbitraries from the Cipher 9 codebook are listed in Figure 45.

General Sherman	BLACK
Division	WHARTON
Tennessee River	GODWIN
Midnight	MARY
Advance	WAFER
Attack	WALDEN
General Bragg	QUADRANT
Fortifications	SAGINAW
Capture	WAYLAND
Chattanooga	JASMINE
Wounded	WHIST
Killed	WALRUS
Arms	RANDOLPH
Artillery	RICHARD
Ammunition	RAMSAY
General Grant	BANGOR
6 p.m.	JENNIE

Figure 45. Arbitrary assignments for substitute words in Cipher 9, as listed in the cipher's codebook.

The message with the corresponding arbitraries would be:

"To BLACK your WHARTON will cross GODWIN at MARY and WAFER and WALDEN QUADRANT SAGINAW then WAYLAND JASMINE. Please advise on WHIST, WALRUS, RANDOLPH, RICHARD, rations and RAMSAY. BANGOR. JENNIE."

The message then was broken down into a division of five lines and six columns (see Figure 46) if the route of enciphering it was determined to be CONGRESS. Thus Grant's message in the CONGRESS route would be enciphered going up the sixth column, down the fifth, up the fourth, down the third, up the second and down the first. The telegraph operator would then append CONGRESS as the first word in the message to specify the route used to encode the message. The resulting message would then be sent over the telegraph as:

"CONGRESS JENNIE RANDOLPH JASMINE AND CROSS WILL WAFER WAYLAND WALRUS BANGOR RAMSAY WHIST THEN AND WHARTON YOUR MARY SAGINAW ON AND RATIONS ADVISE QUADRANT AT BLACK TO GODWIN WALDEN PLEASE RICHARD"

USMT secrecy

As I mentioned, the Stager ciphers were very robust, as the Confederacy was never able to break any of them. The Confederacy, in fact, was so baffled by Stager's ciphers that intercepted messages were often placed in Southern newspapers in hopes that someone could decipher them.

The ciphers' security rested solely only the limited number of people who had access to the codebook. For example, the codebook for Cipher 6 was available to only 14 people. As the use of Stager's ciphers increased, so did the number of codebooks, but Stager and Stanton kept close hold on the operators and codebooks.

This control of the codebooks led to problems between the USMT and the field commanders. (It's what also led to some of the conflict between Stager and Myer.) Union field commanders felt they had little to no control over the cipher system and the operators employing it, since ultimately the cipher operators were responsible to Stager. This at times presented some problems, as Grant wrote in his memoirs.

"I ordered the cipher operator

TO	BLACK	YOUR	WHARTON	WILL	CROSS
GODWIN	AT	MARY	AND	WAFER	AND
WALDEN	QUADRANT	SAGINAW	THEN	WAYLAND	JASMINE
PLEASE	ADVISE	ON	WHIST	WALRUS	RANDOLPH
RICHARD	RATIONS	AND	RAMSAY	BANGOR	JENNIE

Figure 46. As an example of a Stager cipher, the route of enciphering called Congress was broken down into five lines and six columns. Enciphering was done going up the sixth column, down the fifth, up the fourth, down the third, up the second and down the first.

to turn over the key to Captain Cyrus B. Comstock of the Corps of Engineers, whom I had selected as a wise and discreet man who certainly could be trusted with the cipher if the operator at my headquarters could," Grant wrote. "The operator refused point blank to turn over the key to Comstock as I directed, stating that his orders from the War Department were not to give it to anybody – the commanding general or any one else. … He said that if he did, he would be punished. I told him if he did not, he most certainly would be punished. When I returned from Knoxville, I found quite a commotion. The operator had been reprimanded very severely and ordered to be relieved."

Grant wasn't the only one barred access to the Stager ciphers. The security of these ciphers even extended to the president, as Raines wrote in ***Getting the Message Through***.

"The fact that the military telegraph functioned independently of the army commanders it was supposed to serve created potential problems of command and control," Raines said. "Only the operators themselves knew the cipher codes used to transmit messages, and even President Lincoln, a frequent visitor to the War Department telegraph office, was denied access to them."

The Civil War's end also brought an end to the need for Stager's ciphers, so the Union Army declared all the ciphers obsolete as of June 20, 1865.

At war's end, Stager was made a brevet brigadier general, but more notably went on to serve as president of Western Electric, president of the Chicago Telephone Company and president of the Chicago Edison Company. He died March 26, 1885, and was buried in Cleveland, Ohio.

CPT Romano is an instructor in the Department of Mathematical Sciences at the U.S. Military Academy, West Point, N.Y. Previous assignments have included platoon leader, executive officer and assistant S-3 with 40th Signal Battalion, Fort Huachuca, Ariz.; battalion Signal officer, 5th Battalion, 5th Air Defense Artillery, in Korea; and commander, Company B, 122d Signal Battalion, Korea. He's a graduate of the U.S. Marine Corps Command and Control Course, Quantico, Va., and holds a bachelor's degree in mathematics from the University of Utah and a master's in applied mathematics from Naval Postgraduate School, Monterey, Calif.

More reading

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Acronym QuickScan

USMT – U.S. Military Telegraph

GRECIAN FIREBOLT

Part II of Grecian Firebolt 2002 coverage, with a look at the key players and major focus of this year's exercise

Grecian Firebolt 2002: looks different, tastes the same

by 1LT Shawn Herron

The premier Signal exercise, Grecian Firebolt, added yet another notch in its belt of successes after this year's iteration. GF '02 provided the same level of support to the same number of subscribers spread across the United States with literally one-quarter of the tactical-communications equipment.

GF, an annual Signal exercise, is normally directed on alternate years by the two Reserve Component theater Signal commands: 311th Theater Signal Command at Fort Meade, Md., and 335th Theater Signal Command at Fort McPherson, Ga. Two to four Active Component Signal brigades and two Army National Guard brigades – as well as an assortment of operationally attached RC Signal battalions and companies – normally execute the exercise.

However, contingency operations following the terrorist attacks of Sept. 11, 2001, precluded 335th Theater Signal Command and all the AC brigades from participating in this year's exercise. This left Signaleers at 311th Theater Signal Command with a daunting dilemma: how to provide communications support to eight independent exercises spanning 32 continental U.S. sites and Puerto Rico without AC tactical-communications support and sponsorship from Network Enterprise and Technology Command.

Figure 47. PFC Matthew Robinson of Company C, 280th Signal Battalion, adjusts cable supports for an antenna.

Facing these challenges, 311th Theater Signal Command – with the support and funding of U.S. Army Reserve Command – not only provided communications support to all the concurrent exercises but also expanded the mission to include interoperability tests with the

Federal Emergency Management Agency.

The solution was to combine tactical and strategic (commercial) communications into an integrated architecture that wove tactical communications from the ARNG in the form of switches and troposcatter links, satellite-communications capabilities from the Air National Guard and 311th Theater Signal Command's new AN/TSC-93C SATCOM van, with strategic directorate-of-information-management support provided by the AC's 1110th Signal Battalion and various DOIMs at exercise sites.

A network-operations stack was built to ensure data confidentiality, integrity and availability. It combined commercial firewalls, intrusion-detection systems, routers programmed with access-control lists and military-encryption tools to meet its goals. The netops equipment was installed, operated and maintained by a team of NETCOM and 311th Theater Signal Command data engineers. The resulting network architecture optimized using the CONUS-based Defense Information Systems Network infrastructure and standard tactical-entry point facilities.

Many valuable lessons were drawn from GF '02 as well as many successes marked. Highlights included integration with FEMA's mobile-emergency-response communications teams in all areas of command, control, communications and computers, as well as successful integration of tactical and strategic assets to provide seamless communications.

Information-assurance and netops training were conducted through a partnership with the Army Reserve Information Operations Command headquartered in Adelphi, Md. This provided an opportunity for 311th Theater Signal Command communicators to receive valuable training in both these areas, with the promise of more interaction in future exercises.

Plans include continuing to build on the IA infrastructure and training in netops equipment and software, as well as follow-on integration with FEMA, the DOIMs and the information-operations commands.

1LT Herron is dual-hatted as the network systems engineer and public-affairs officer for 311th Theater Signal Command.

ACRONYM QUICKSCAN

AC – Active Component
ARNG – Army National Guard
CONUS – continental United States
DOIM – directorate of information management
FEMA – Federal Emergency Management Agency
GF – Grecian Firebolt
IA – information assurance
NETCOM – Network Enterprise and Technology Command
Netops – network operations
RC – Reserve Component
SATCOM – satellite communications

Grecian Firebolt tests homeland-security commo

by Chris Walz

FORT MEADE, Md. – This year's annual Grecian Firebolt exercise tested a worldwide communications network that could be used for homeland security.

"We're basically AT&T for the Army, with a lot of encryption," said node switcher PVT Leland Hughes, a member of 280th Signal Battalion from Wilmington, Del. "We want to make sure this system can talk to that system hundreds of miles away."

The Federal Emergency Management Agency joined the exercise as part of the homeland-security scenario, as did U.S. Joint Forces Command.

FEMA directors said they like the Army's signal reliability and the versatility of using several communication paths. They also like any path increasing their speed in contacting the Defense Department.

"We want to stay in a readiness posture, especially after 9-11," said Ozzie Baldwin, telecommunications manager at the Texas Mobile Emergency Response Support office, referring to the Sept. 11, 2001, terrorist attacks. "Now we know we have several ways of communicating. It's reassuring to know we can contact DoD should a crisis or emergency situation come up."

Joint Forces Command was involved in the exercise to observe the interoperability between Army and Air Force communications assets. The command is evaluating the infrastructure for a homeland-security defense-communications template.

"Everybody is pushing for joint efforts and joint communications," said MAJ Anthony Britton from Joint Forces Command. "There's not much in the military anymore that is just Army-specific or Air Force-specific."

"Single-service missions are a thing of the past," agreed the commander of 311th Theater Signal Command, MG George Bowman. "We're looking wider and broader and helping one another keep America's freedoms."

The exercise costs about $1.2 million and is budgeted annually by Reserve Component units participating in it.

"In the past, the Army couldn't communicate with the Air Force or the Navy, and vice versa," said Bowman. "We're not completely there yet. That's why we have these exercises: to see what we need to do to make it all work."

Another purpose of the exercise is to give RC Signal troops valuable time with the equipment.

"We need to know what to do in a wartime situation," said satellite

operator Senior Airman Paul Rolla. "Satellite time is limited, so we need to take advantage of the time we have with the equipment."

Troops at Fort Meade experienced minor technical difficulties during the June exercise, most stemming from the sweltering heat and equipment age, Hughes said.

"We had some minor problems, but that's the purpose of these training exercises. We need to learn how to fix these problems," Hughes said. "I've learned more in this exercise than I have in the past five years."

*Walz is a staff writer for **The Pentagram**, the newspaper for the Fort Myer, Va., community.*

ACRONYM QUICKSCAN

DoD – Department of Defense
FEMA – Federal Emergency Management Agency
RC – Reserve Component

Military Affiliate Radio System plays big part in Grecian Firebolt '02

Oriented to homeland defense, exercise employs more than 600 MARS stations in 42 states

by SSG Gary Watson

FORT HUACHUCA, Ariz. – The Army's Military Affiliate Radio System played a significant part in the U.S. Army Network Enterprise Technology Command/9th Army Signal Command's annual communications exercise Grecian Firebolt 2002 that focused on homeland security.

MARS, headquartered at NETCOM/9th ASC here, played a bigger role than ever in the June exercise.

Army MARS chief Robert Sutton just completed compilation of reports and statistics from this year's exercise, and he said member participation was by far the highest ever and was the highest recorded for an emergency-communications exercise.

Over four weekends in June, more than 600 Army MARS stations in 42 states, in addition to Puerto Rico and Germany, took part. The exercise involved a series of simulated terrorist actions requiring actual emergency radio links with military and civilian relief agencies.

Sutton said 124 nets were established, and many included participants from Air Force and Navy-Marine Corps MARS – an important goal of the exercise.

The impact of the terrorist attacks last year was evident from the start of the exercise June 1, Sutton said. Participation jumped from 469 stations in 2001 to 604, an increase of about one-third. Also, use of emergency power increased dramatically, he said.

MARS area coordinators Bob Hollister (Eastern) and James Banks (Western) logged 823 messages handled during GF '02. The agencies receiving communications support ranged from local National Guard armories to the U.S. State Department and included state and local emergency-operations centers, Army Reserve components, Veterans Affairs hospitals and a U.S. Air Force base.

This kind of networking – providing long-distance communication when commercial phone and cellular links fail – is only part of the MARS role in homeland security. Another is the early warning capability offered by MARS members in thousands of communities across the country.

Formal integration of MARS information services into the government's overall homeland-security apparatus was under discussion in Washington this summer, and the GF '02 record is now part of that planning.

Figure 48. Army MARS members Mike Hagle, left, and Harv Frye handle high-frequency radio communications from a tent at the Lexington Reserve Center in Lexington, Ky., during Grecian Firebolt '02 in June.

"You did good, MARS," said Sutton in his after-action message to members. "Once again, we appreciate all the dedication and effort that you, the volunteer membership, put forth in GF '02." Next year's exercise, he added, will be even bigger. MARS is already involved in planning for GF '03, and its involvement will increase in scope.

The focus of GF '02 was on homeland security, using scenarios that simulated terrorist activities, vs. natural-disaster relief, Sutton said. It also was the first time during a GF exercise that MARS provided direct support simultaneously to Reserve Components and disaster-relief

Figure 49. John Scoggin, eastern area emergency operations coordinator, takes a radio message at the Region 3 gateway in Delaware during Grecian Firebolt '02 in June.

agencies, he said.

State MARS networks developed exercise scenarios to which their members responded, in some cases by relocating their stations.

In Delaware, for example, MARS members responded to a suspected biological attack on the state Army Reserve Center. The center was actually evacuated to the MARS regional-gateway station.

Alabama members coped with "bombing" of a federal courthouse in one city and theoretical release of toxic gases from an Army depot at another.

Kentucky established emergency communications between a major Army Reserve center and the state emergency-operations center.

Rhode Island coped with destruction of the bridge that links two halves of the state.

The high Army MARS participation drew positive comments.

"All traffic for the eastern United States got shipped to me," said John Scoggin, eastern-area emergency-operations coordinator. "It's been a while since Army MARS was the centerpiece of Grecian Firebolt."

Barry Thayson, station manager for the eastern-area gateway at Fort Detrick, Md., noted the record-high participation and said it was very good.

A key part of the exercise was preparation by MARS participants of Essential Elements of Information reports, Sutton said.

"EEI reports provide standardized information concerning the disaster area that may be useful to military decision-makers," Sutton said.

This information is captured immediately after a natural disaster – such as an earthquake, flood, major power outage or hurricane – or after a manmade disaster – such as those caused by terrorists. EEI reports are prepared and transmitted by individual volunteer MARS members when a situation occurs that dictates the need for using the MARS network. This information is transmitted via digital means to military decision-makers.

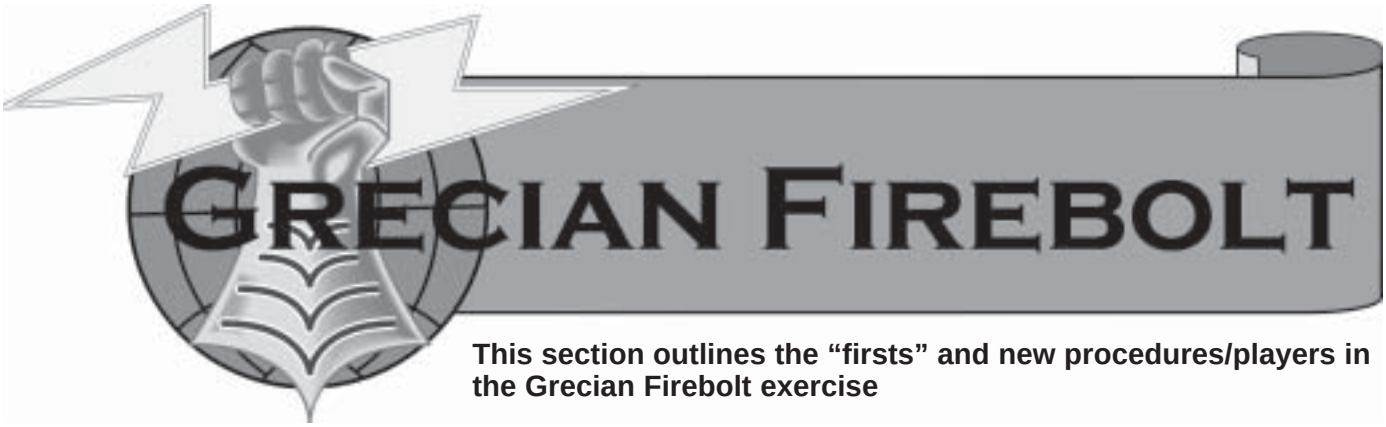
The number of EEI reports for all of 2001 was 2,928, including 641 actual and 2,286 exercise reports, which was a significant increase over 2000, Sutton said. During the first seven months of 2002, more than 2,867 EEI reports were recorded, he said.

"The dedication and support provided by our volunteer membership is outstanding," Sutton said. "You could not pay anyone to do the job our volunteers accomplish daily. I'm very proud of being a member of the MARS team. They are the best of the best. The volunteer MARS membership met the challenge of GF '02 and lived up to the Army MARS motto of 'Proud, Professional and Ready.' One couldn't ask for anything more."

SSG Watson is assigned to U.S Army Network Enterprise Technology Command/9th Signal Command's public-affairs office at Fort Huachuca.

ACRONYM QUICKSCAN

ASC – Army Signal Command
EEI – Essential Elements of Information
GF – Grecian Firebolt
MARS – Military Affiliate Radio System
NETCOM – Network Enterprise and Technology Command



This section outlines the "firsts" and new procedures/players in the Grecian Firebolt exercise

Information Operations Command partners with 311th Theater Signal Command in major exercise

by LTC Timothy Haight

ADELPHI, Md. – A relatively new organization, the Army Reserve Information Operations Command headquartered here, supported Grecian Firebolt 2002 and its quest to test homeland-defense communications.

Activated in October 2001, ARIOC is a U.S. Army Reserve asset charged to conduct information operations. The organization, commanded by COL Bert Mizusawa, has five subordinate IO centers. IOCs are located at Adelphi, Md.; Fort Devens, Mass.; Oakdale, Pa.; Dublin, Calif.; and Fort Sam Houston, Texas. Each IOC is commanded by a lieutenant colonel and is authorized 90 soldiers with the mission to conduct information-assurance and computer-network-defense operations.

IOCs are staffed with officers, warrant officers and noncommissioned officers who are IA and information-technology professionals in their civilian jobs. The IOCs are able to attract and retain this top technical talent because they offer an opportunity to contribute to the Army's expanding cyberwarfare role – no other USAR organization is able to focus on such an important task.

ARIOC contributes to a variety of Army and defense IO missions. For example, ARIOC members – specifically from the National Capital Region IOC and North Central IOC – deployed in June to Fort Meade, Md., to support 311th Theater Signal Command during Grecian Firebolt '02. There, members of both commands collaborated to develop a concept of operations and techniques, tactics and procedures for 311th Theater Signal Command's network operations. The 311th Theater Signal Command has tremendous depth and experience in network management, which was enhanced by ARIOC's IA capabilities. It was a perfect opportunity for ARIOC to contribute its expertise in IA and proactively influence 311th Theater Signal Command's IA / CND planning.

In addition to development and planning, IOCs provided training on current NM and IA tools. IOCs leveraged 311th Theater Signal Command's Cisco Academy classroom to bring concentrated and focused training to their soldiers. In two weeks, IOCs provided instruction that otherwise would have stretched out over several months and cost 311th Theater Signal Command thousands of dollars had they obtained pursued this training from other sources.

The collaboration during GF '02 was a perfect partnering of resources and capabilities for soldiers of both commands. ARIOC's soldiers were able to exercise their civilian-acquired IA skills in a military environment, and 311th Theater Signal Command's soldiers were able to add depth to their knowledge of NM and IA.

ARIOC plans to support and actively participate in GF '03. NCRIOC has already developed conops that supports realistic scenarios in implementing IA, IO and command and control.

LTC Haight is chief of the Computer Emergency Response Team support group.

ACRONYM QUICKSCAN

ARIOC – Army Reserve Information Operations Command
Conops – concept of operations
CND – computer-network defense
GF – Grecian Firebolt
IA – information assurance
IO – information operations
IOC – information-operations center
NM – network management
NCRIOC – National Capitol Region Information Operations Center
USAR – U.S. Army Reserve

Satellite van first in Army Reserve

by SFC Joe Vano

FORT A.P. HILL, Va. – 311th Theater Signal Command made Army Reserve history by deploying, operating and maintaining its AN / TSC-93 satellite-communications van here to support Grecian Firebolt 2002.

The SATCOM van, one of two in the Army Reserve's inventory, deployed here to support the Petroleum, Oil and Lubricants Exercise and Company A, 280th Signal Battalion, Delaware National Guard. The satellite link was a critical piece in the POLEX portion of the GF '02 exercise, providing remote units access into the Defense Information Systems Network.

The van's newly refurbished "C" model has the latest commercial satellite modems, commercial up- and down-converters and an eight-foot Alta antenna. The system and its maintainers / operators boasted a 100-percent mission-reliability rating for the two-week exercise, exceeding the Defense Information Systems Agency's published standard for this system.

Figure 50. SFC Joe Vano coordinates with the "distant end."

The team of SFC Joe Vano, 311th Theater Signal Command, Fort Meade, Md.; SGT Scott Rosser and SGT Ronce Hunter, 313th Signal Company, III Corps, Fort Hood, Texas; and SSG Milton Alban, Connecticut Air National Guard, operated and maintained the system throughout the exercise. SFC Jeffery Givens, Maryland's satellite-operations noncommissioned officer in charge (also from 311th Theater Signal Command), prepared and deployed the system to Fort A.P. Hill.

The SATCOM system's successful deployment and operation / maintenance by an Army Reserve unit lends credibility to the ever-changing role of the National Guard and Army Reserve. It supplies a critical piece of the communications-capability package within the Reserve Component, enabling the RC to provide end-to-end, full-spectrum communications support. The SATCOM field, which has been limited to Army active-duty units in the past, will now see more RC soldiers in its ranks, ready to meet the challenges in the Army of the future.

SFC Vano was NCOIC of the SATCOM site at Fort A.P. Hill during Grecian Firebolt '02.

ACRONYM QUICKSCAN

GF – Grecian Firebolt
NCOIC – noncommissioned officer in charge
POLEX – Petroleum, Oil and Lubricants Exercise
RC – Reserve Component
SATCOM – satellite communications

GRECIAN FIREBOLT

This section looks behind the scenes at lesser-known stories and at training within the main training (Grecian Firebolt) frame

Army Reserve, Air National Guard pass joint signals

by Air Force CPT George Worrall

FORT DEVENS, Mass. – Near an old baseball field on a part of Fort Devens that wasn't converted to a technology park, two teams practiced sending signals.

Different from a pitcher and a catcher using hand signals, these teams used advanced satellite-communications equipment.

Elements of Connecticut's 103d Air Control Squadron, an Air National Guard unit based in Orange, Conn., and the Army Reserve's 280th Signal Battalion, of Westport, Conn., took over the field June 15-28 for Grecian Firebolt 2002, the world's largest communications exercise.

The exercise, designed to test the units' capability, also included Army, Army Reserve, Army National Guard and other Air National Guard units.

While deployed, 103d Air Control Squadron provided the satellite uplink needed for 280th Signal Battalion to provide its part of the picture.

"We're tying in to 280th Signal here for data and voice, and transmitting it by satellite to Fort Meade [Md.]," said MSG Paul Wiedenmann, who was the noncommissioned officer in charge for the Fort Devens Link, 103d Air Control Squadron. "They (more of the 103d Air Control Squadron at Fort Meade) are in a hub configuration, with signals from Puerto Rico, here, Fort A.P. Hill, Fort Dix, Virgin Islands and more all coming in to them. So we can pick up a field phone anywhere out here and talk to anybody at any of those locations."

Figure 51. SSG Jayme Pace, aerospace ground equipment specialist with 103d Air Control Squadron, checks a generator powering satellite-communications equipment during GF '02 at Fort Devens, Mass.

The 11 Guard members from the base in Orange operate a self-contained site under camouflage netting to blend in with the surroundings. The site is complete with its own communications, maintenance equipment and power.

The exercise's purpose is realistic training to prepare for missions the units may encounter when deployed.

"This is training … doing the satellite communications and running the circuits gives us a chance to really learn the stuff for when we do go someplace," said SSG Jack Norris, a satellite wideband-communications specialist with 103d Air Control Squadron. "This [Grecian Firebolt] allows us to work with the Army and troubleshoot circuits in a real-world way that we never get at the base [in Orange]. This training is the same type of thing we did when we deployed for [Operation] Southern Watch and Deny Flight."

The air control squadron began planning months in advance, coordinating with the Army to identify the type of transmissions the site would need to support. Once the specific bandwidths and data types were identified, the satellite time was requested and the 12-hour shifts for 24-hour coverage were planned.

One airman noted the similarities to his civilian communications work. "The fields are very similar, since the goal of the jobs is to keep communication up," said Senior

Airman Brian Hadix, another satellite wideband-communications specialist with 103d Air Control Squadron. Hadix, who maintains cellphone sites for Nextel, was on his first training deployment. "The [military] training helped me get the Nextel job."

The air control squadron also participated last year in Grecian Firebolt 2001.

"This is our second mission doing it [Grecian Firebolt]," said Norris. "The things we learned from last year that didn't work made it work this year."

CPT Worrall is 103d Fighter Wing's public-affairs officer.

Behind-the-scenes civilian support

by Joal Watts

As a Communications-Electronics Command's information technology, local-area network logistics-assistance representative, I provide technical and logistics assistance to units of the active Army, Army Reserve and Army National Guard on data-networking devices. I supported Grecian Firebolt 2002 in troubleshooting and establishing units' data links through long-haul transmission (satellite) and switching networks. These data links included videoteleconferencing, secure Internet protocol routed network and non-secure Internet protocol routed network.

IT-LAN LARs work behind the scenes. As emergency-essential employees in the worldwide mobility program, IT-LAN LARs are assigned to various continental U.S. and overseas locations for one to five years. We may spend as much as 25 percent or more of our duty time on temporary-duty assignments. IT-LAN LARs must be physically and mentally prepared to deploy with supported units on training exercises and real-world military deployments.

IT-LAN LARs are called on to support military exercises and deployments because we know in depth the fundamentals for processing and forwarding data over intranets and LANs using different types of network devices. For instance, I bring to the profession years of experience in configuring and troubleshooting routers, catalyst switches and tactical network devices. This includes hardware, software, routed / routing protocols and LAN switching technologies. I'm also responsible for integrating commercial-off-the-shelf technology into the existing tactical data network, as well as providing assistance on network security issues.

IT-LAN LARs must have extensive knowledge of computer-operation systems and be able to load and upgrade operating systems, utility and applications software. We also must be proficient in Transmission-Control Protocol / Internet protocol and other networking protocols to isolate faults affecting operation of the LAN and associated devices.

The behind-the-scenes civilian support of the IT-LAN LAR (myself); the LHT LARs at Fort A.P. Hill, Va., and in Puerto Rico (Jerry Hill and Ray Rowe, respectively); and the switching LARs at Fort Dix, N.J., Fort Meade, Md., and in Puerto Rico (Andy Jacobs, Bob Conley and Fred Andrews, respectively) contributed to GF '02's overall success. Other LAR support to GF '02 included switch master technicians Mike Benson at Fort Meade; Kevin Wright, Fort Devens, Mass.; and Mike Roddy, Camp Guernsey, Wyo., and Camp Rapid, S.D. John Loosli served as the power / environmental LAR at Fort Meade; George Kosut as the LHT master tech at Fort Gordon, Ga.; and Pete Cox as the switch / troposcatter LAR at Camp Parks, Calif.

Mr. Watts is the IT-LAN LAR for CECOM.

ACRONYM QUICKSCAN

CECOM – Communications-Electronics Command
IT – information technology
LAN – local-area networks
LAR – logistics-assistance representative
LHT – long-haul transmission

Signals and snipers

by CPT Larry Josefowski

FORT MEADE, Md. – Someone coming up to the training site on the edge of post here would see soldiers busy setting up a site, pounding stakes and unloading 2-½ ton trucks and humvees. The company commander and his first sergeant are off to the side, apparently evaluating the training or discussing the exercise's next phase. Suddenly, the first sergeant falls to the ground, accompanied by shouts of "Sniper!"

Members of 392^{d} Signal Battalion, who until that moment had been struggling with tents, radios and camouflage in heat Category 5 conditions, suddenly had a different priority. As people grabbed weapons and assumed temporary fighting positions, one soldier low-crawled forward to aid the fallen soldier. SSG Timothy Butenuth, a member of the

unit's operations section, low-crawled to his fallen leader, SFC James Accordino, quickly assessing the situation and treating Accordino for the "wound" and prevention for shock. Meanwhile, the commander directed a small quick-reaction force to secure the situation.

After the team returned, CPT Larry Josefowski shouted "all clear" and gathered his soldiers into the relative shade of a 2-½ ton truck. He then led them through an after-action review of the morning's training, which had culminated in the "sniper attack."

The 392d Signal Battalion, which is headquartered in West Hazleton, Pa., was undergoing the final part of a training-assessment module. Shadowed by MSG Alan Kurtz of 311th Training Support Regiment at Fort Lee, Va., since the beginning of annual training, the unit was simulating a move to a tactical situation. The previous day had seen the battalion wrap up its formal participation in Grecian Firebolt 2002, where from a garrison location they managed tactical long-haul communication links from the relative comfort of an un-airconditioned basement.

While most exercise participants were performing recovery operations or returning to home station, 392d had raised its operational tempo. A flurry of logistics coordination, movement orders and operational issues were being organized even as GF '02 was winding down. Designed to meet the evaluation's requirements and cause minimal interruption to the exercise, the commander and staff had many hours of extra coordination to lay on sites, rations and water, and deal with all the other issues that go with a unit deploying to the field. Today, with 95-degree temperatures, high humidity and a battalion's worth of equipment to unload, it was difficult work.

Figure 52. SSG Timothy Butenuth gives first aid to SFC James Accordino, who was "wounded" in a sniper attack.

"Although Grecian Firebolt was an excellent test of our technical ability to manage a variety of communication assets, it's important that we don't forget our primary role as soldiers," said LTC James Hendricks, 392d Signal Battalion's commander. "In our role as a composite Signal battalion, we're an echelon-above-corps unit, but we must be prepared to operate in any situation or environment. From that perspective, this was a realistic test of the unit's ability to move to a new site."

Accordino, who had planned the exercise's individual training aspects, echoed the battalion commander's words. "Soldiers need to be able to do the basics," he said. "We designed the sniper attack, the heat casualty and the nuclear-biological-chemical attack for the soldier to practice these important soldier skills and to raise interest in the exercise."

As unit members refilled their canteens after the AAR, they returned to the task of setting up the site. "This has been a learning process for all of us. Safety is paramount, and the heat has forced us to modify our training plans, but we're still getting a lot of feedback from leaders, evaluators and soldiers to drive future training," said Josefowski. "Although not a traditional way to end annual training, this tough, realistic training tested both the staff's and the soldiers' mettle in getting the mission completed."

CPT Josefowski commands Headquarters and Headquarters Detachment, 392d Signal Battalion.

ACRONYM QUICKSCAN

AAR – after-action review
GF – Grecian Firebolt

GRECIAN FIREBOLT

This last section of *Army Communicator*'s 2002 Grecian Firebolt coverage features experience and youth (warrant officer and cadet).

Signal exercise demonstrates Army motto

by PFC Mekonya Cheefus

FORT DIX, N.J. – With an experienced National Guardsman overseeing annual training, the world's largest Signal exercise (Grecian Firebolt) truly exemplifies the Army's motto, "An Army of One."

CW5 Ronald LaSana was the acting chief logistician for the annual exercise Grecian Firebolt 2002 here. He's from 261st Signal Brigade, a Delaware National Guard unit from Dover, Del.

His military-occupation specialty is Signal-systems maintenance manager. LaSana also has a secondary MOS: network-management technician. During drill weekends, his duties are just plain organization, he said. He does everything that needs to be done to keep things running smoothly, such as logging in equipment, running the S-4 logistics shop, making sure equipment is working properly and making sure soldiers are paid on time.

The mission behind Grecian Firebolt is to send data from the United States to Germany by way of satellite, said LaSana.

Soldiers set up large switchboard terminals that send signals from Fort Dix to Fort Meade, Md., and then to 7th Signal Brigade located near Mannheim, Germany. The signals will relay density reports such as how many soldiers, vehicles and equipment are in certain areas.

"Basically, this is a global communications operation," said Army National Guardsman SGT Wilfred Green, a switchboard operator for 230th Signal Battalion from Orangeburg, N.Y. Green was is in charge of controlling the switchboard terminals. "Communication is the backbone of any operation," he said.

LaSana brings 38 years of experience to this mission. He spent three years in the active-duty Army, 5½ years in the Air Force Reserve, two years in the Army Reserve and 24 years in the National Guard.

Figure 53. CW5 Ronald LaSana from 261st Signal Brigade, a Delaware National Guard unit from Dover, Del., monitors operations during Grecian Firebolt '02.

"I switched to the National Guard to become a warrant officer. I got out of the Air Force because everything was so boring. Everything was so perfect," said LaSana with the energy of an enthusiastic young soldier. In the Army, said LaSana, you get the opportunity to see that things don't always run smoothly and learn how to fix problems.

Warrant officers are technical experts who manage and maintain

increasingly complex battlefield systems. They remain single-specialty officers whose career track is oriented toward progressing within their career field rather than focusing on increased levels of command and staff duty positions.

LaSana retires from the National Guard Nov. 28, his 60th birthday.

PFC Cheefus is assigned to 318th Public Affairs Operations Center, Chicago, Ill.

ACRONYM QUICKSCAN

MOS – military-occupation specialty

Clear Signal for Reserve Officers Training Corps cadet

by SPC Joseph St. Peter

FORT DIX, N.J. – Many of America's best and brightest young people are behind the fast-paced development of the computer world today, and many of these same minds are the Army's future leaders. One such example is Reserve Officer Training Corps Cadet Jamie Delco of Mamaroneck, N.Y.

Delco, who is studying software development as a graduate student of computer science at Fordham University in Bronx, N.Y., is also preparing himself to be one of the Army's best and brightest. Delco is a member of the New York National Guard's Company C, 230th Signal Battalion, of Orangeburg, N.Y. The unit's annual training here supported Exercise Grecian Firebolt.

Figure 54. Army ROTC Cadet Jamie Delco (right) explains a mission to SPC Osvaldo Juarez. The two are members of Company C, 230th Signal Battalion, New York National Guard. They are at Fort Dix, N.J., participating in the Army Reserve/Army National Guard exercise Grecian Firebolt. Companies B and C of 230th Signal Battalion are based in New York, while Headquarters and Headquarters Company, 230th Signal Battalion, is located in Humboldt, Tenn.

Delco, 27, is a member of a unique Army officer-commissioning program called the Simultaneous Membership Program that allows ROTC cadets to also be members of the Army Reserve or National Guard. This program enables cadets to gain more experience and responsibility as they prepare to receive their commissions as U.S. Army officers. Upon graduation from the ROTC program next year, Delco will receive his commission and will begin his military career as a second lieutenant.

Delco, an avid runner and triathlete, began his military connection last year when he attended the ROTC Leadership Training Camp at Fort Knox, Ky. This five-week course covered basic military skills such as drill and ceremony, basic rifle marksmanship and land navigation. Following leadership camp, Delco went to Fort Benning, Ga., for U.S. Army Airborne School.

"It was absolutely amazing. It was such a great experience to be in a serious training environment," said Delco. "It pushed me to the limits of what I thought I could do."

Delco's ROTC commitment during the school year involves physical training, classroom training and a weekly laboratory. Also involved in his training are several mandatory field-training exercises on weekends throughout the school year. His National Guard commitment is one weekend per month and one two-week training period per year. This schedule, in addition to his regular course work at Fordham, keeps Delco on his toes.

"You definitely have to spend time studying, especially during your third year. It's probably the

most demanding as far as book smarts goes," explained Delco.

His role away from school and ROTC and in the field with the National Guard allows him the advantage of shadowing a second lieutenant while being slowly integrated into the unit-leadership structure.

"I'm here to learn, I'm here as an observer. It allows me to see how the unit really works," said Delco. "Some days I get to act as a second lieutenant and be with the platoon. Some days I get to follow the company commander around and go to battalion briefings. You really get a shot at seeing the bigger picture."

Not only does Delco gain valuable benefits from his SMP experience, so does Charlie Company.

According to CPT Frank Letizia, Company C's commander, Delco is an asset, even at this early stage of his career.

"Even though he's at such a junior level, he's put in the line of fire. We let him plan and do briefings. We try to coordinate him in with tactical-operations center operation – anything that will help his career when he becomes a lieutenant," said Letizia. "Delco is one of our shining stars, and we look forward to him joining the unit."

Even in his role as an observer, the value of participating in Grecian Firebolt at Fort Dix isn't lost on Delco. The exercise is a real-world mission 230th Signal Battalion could face if deployed.

"It's exciting to be a part of this exercise. It's a great opportunity to put everything together, to see how our company fits into the larger Signal mission," said Delco. "We'll get to bring actual Internet service out to the field to quartermaster and transportation units we're supporting."

The type of technical expertise gained from this exercise is exactly the reason Delco chose to enhance his civilian and military career in the SMP.

"This experience will make me more marketable to future employers. A lot of the technologies we study in the civilian world are employed here on the military side," said Delco.

Not only does Delco receive valuable experience as an SMP cadet, he gets paid as well. He receives pay for attending drills, tuition assistance and a monthly spending stipend as well. When asked how he's getting through graduate school financially, Delco replied with a smile, "ROTC sent me to graduate school."

Benefits like these, as well as the opportunity to attend and take part in exercises like Grecian Firebolt while still an ROTC cadet, are great assets to Delco as he prepares to assume a leadership role in the Army. The SMP and Grecian Firebolt specifically, are in Delco's eyes, "…one of the best things I can do for my future career."

SPC St. Peter writes for 318th Public Affairs Operation Center, Chicago, Ill.

Acronym QuickScan

ROTC – Reserve Officers Training Corps
SMP – Simultaneous Membership Program

In memoriam:
Dr. Paul Scheips, 1914-2002

by Rebecca Robbins Raines

The Signal Regiment lost one of its most distinguished citizens with the death of Dr. Paul Scheips Sept. 29, just a few weeks before his 88th birthday. Scheips is perhaps best known for his landmark study of the life and career of Albert James Myer, father of the U.S. Army Signal Corps. With this work, which he completed as his doctoral dissertation, and his many other studies on various aspects of Signal history, Scheips laid the foundation for current scholarship on the Signal Corps. We all owe him a tremendous debt of gratitude.

Figure 55. Dr. Paul Scheips, Dec. 3, 1998, at his Distinguished Member of the Signal Regiment induction ceremony.

Scheips was a superb historian, but he was much more than that. He was a gentleman and a scholar in the truest sense of those words. He was a man of great compassion and deep conviction, with an unyielding dedication to truth and accuracy. Yet as a colleague and mentor, he was unfailingly generous with his time and the fruits of his labors. He was never too busy to discuss works in progress with other historians and always had many suggestions for further research. He graciously lent volumes from his vast library and frequently shared items of interest that had come to his attention. He never stopped learning and remained intellectually vigorous to the end of his life.

Scheips was a native of Peru, Ind., and received his undergraduate education at Evansville College (now the University of Evansville). He earned his master's degree from the University of Chicago in 1949 and his doctorate from The American University in 1966. Early in his career, he taught at the University of Michigan and Denison University. Though he eventually left the classroom to become a civil servant, he never stopped teaching. In 1952 he joined the Signal Corps Historical Division, where he spent the next 10 years. There he authored a number of studies and participated in the celebration of the Signal Corps' centennial in 1960.

With the closure of the Signal Corps' history office in 1962, Scheips joined the staff of the Office of the Chief of Military History in Washington, D.C. (now known as the U.S. Army Center of Military History). As a member of its Histories Division, he produced a wide array of studies and contributed to many of the center's publications, including ***American Military History*** (1973) and ***Department of the Army Annual Historical Summary, 1981***. His name can be found in the acknowledgments of many authors to whose works he lent his expertise.

Although Scheips retired in 1986, he remained actively engaged in scholarly pursuits. He continued his long-standing relationship with Fort Gordon, Ga., where he was a frequent and popular lecturer. At the time of his death, he was working on the third volume in the U.S. Army Military History Center's series on the Army and its use during civil disturbances. This volume, ***The Role of Federal Forces in Domestic Disorders, 1950-1990***, is scheduled for publication during the coming year.

While Scheips is most closely associated with Myer, he was also responsible for rescuing the papers of another prominent Chief Signal Officer, MG Adolphus Greely. He discovered the documents in the attic of Greely's daughter's house in New Hampshire, where they were in imminent danger of being irreparably damaged and lost. Scheips was instrumental in arranging the donation of the Greely collection to the Library of Congress, where it now resides in the Manuscripts Division.

Scheips was an active participant in a wide variety of professional organizations, including the American Historical Association, the Society for Military History, the National Council on Public History, the Society for History in the Federal Government and the Western Historical Association. In addition to his abiding interest in the Signal Corps, he researched and wrote extensively on a number of subjects, among them the history of the Panama Canal, civil-military relations and the American West.

In recognition of his pivotal role in preserving and documenting the Signal Corps' history, Scheips received the Silver Order of Mercury from the Signal Corps Regimental Association, a private organization that supports the Signal Regiment. In 1998 he was designated a Distinguished Member of the Signal Regiment.

Scheips and his wife, Alice Cole Scheips, enjoyed traveling, especially with fellow members of the Cosmos Club. He was a proud member of this organization, which has been a gathering place for Washington's intellectuals for more than a century. He contributed many fine articles to its bulletin, specializing in profiles of former members, such as Greely. It was a special treat to join the Scheips for a meal in the club's beautiful dining room to enjoy an unforgettable combination of delicious food, congenial company and stimulating conversation.

Those who were fortunate enough to have known Paul Scheips will always remember him with the greatest fondness and admiration. With his passing, we've lost a dear friend and the Signal Corps a true champion. His absence will be deeply felt, but he has left us much to remember him by.

Ms. Raines is chief of the Force Structure and Unit History Branch, U.S. Army Center of Military History, Washington, D.C. Scheips served as her mentor at the center and provided invaluable assistance and encouragement for her volume, ***Getting the Message Through: A Branch History of the U.S. Army Signal Corps*** *(1996). Most recently she was collaborating with Scheips on a full-length biography of Myer.*

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