ARMY COMMUNICATOR

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Voice of the Signal Regiment ❖ PB 11-02-3 Fall 2002 Vol. 27 No. 3

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Chief of Signal's Comments

"To defend against all enemies, foreign and domestic. ..."

As we observe the tragic first anniversary of the terrorist attacks Sept. 11, 2001, the Signal Regiment is leading the way in developing an information system that will help government agencies cooperate in defending against our country's enemies – both foreign and domestic.

Since Sept. 11, we as a nation have re-examined how best to communicate information about a very present and asymmetric threat (terrorism) within our borders. Before this date, communication among our federal, state and local organizations was obviously not as good as it could have been. Since the lack of information-sharing was an "enabler" to Sept. 11's events, to "disable" any future similar events, it's necessary to have a system capable of gathering and presenting information about the internal threat.

That's where we as a Regiment come in. Our mission as a Regiment has been to ensure Army units can communicate on the battlefield with each other, as well as with the other service components: Air Force, Navy and Marines. It's an ongoing challenge – with the constant change in technology and mission requirements – to ensure a smooth communications flow in this environment, but we make it happen.

However, our mission has been geared to a threat on foreign soil; we've not really been oriented toward protecting our homeland – until now. The president's executive order establishing the Office of Homeland Security galvanized efforts across ***all*** government levels. The national challenge is how to aggregate threat information from local, state and federal agencies in a manner that supports informed decisive operations. Because of our experience in joint and coalition communications, we're the experts when it comes to forming the solution that seamlessly brings together disparate systems, so our nation looks to us to take point.

MG John P. Cavanaugh
Chief of Signal

And we have. The Signal Center's Battle Lab at Fort Gordon, Ga., is leading development of a system that facilitates detecting, responding to, recovering from and ultimately protecting us from a terrorist attack using tools already "in inventory" but customized for the new domestic focus within the Army's fundamental mission of fighting and winning our nation's wars. The system's current name is the Force Protection Command-and-Control Information-Management System. Military as well as non-military organizations have shown a great deal of interest in it.

As our Battle Lab leads the way, our intent is to guide the information system's development to a logical end. We envision a system that joins organizations previously unable to efficiently do so in a collaborative, information-sharing environment. This will strengthen our national communications process and enable us to better deal with the terrorist threat.

What we're doing now is really what we've done as Signaleers since the Army has existed. We're working to increase cooperation and communication among federal and local agencies in the interest of defense against a domestic threat. I want all Signaleers to be confident the Regiment is working hard and smart to provide the required set of tools.

As you'll see in Circuit Check, Page 60, we have a new Chief of Signal. BG Janet Hicks will address her first comments to the Signal Regiment in the next edition (Winter 2002).

The national challenge is how to aggregate threat information from local, state and federal agencies in a manner that supports informed decisive operations. Because of our experience in joint and coalition communications, we're the experts when it comes to forming the solution that seamlessly brings together disparate systems, so our nation looks to us to take point.

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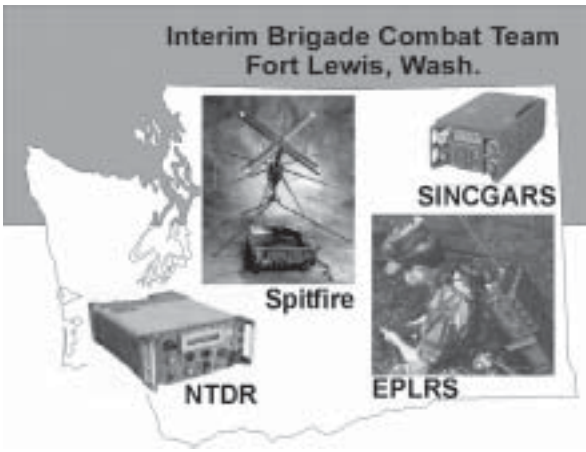

Radio's resurgence -- its "new" uses in the current and near-future Army

Non-traditional training for a wireless environment

by LTC Bart Hill

A recent issue of ***Army Communicator*** presented an article on using high-frequency radio in the Interim Brigade Combat Team. This article, combined with other information regarding the numbers and types of wireless devices present in the IBCT, sends a clear signal that Signal soldiers must prepare and train for a ***greatly*** expanded wireless environment.

To get a glimpse of this expanded wireless environment, look over the equipment list Fort Lewis, Wash., has published on the Web for the IBCT. You'll find a host of equipment that will require the battalion / brigade S-6 to be involved in their use and employment. Examples are Spitfire, the forward entry device / lightweight FED / handheld terminal unit, the near-term digital radio and its follow-on, super-high frequency triband advanced range-extension terminal, Movement Tracking System, Enhanced Position-Location Reporting System and enhanced Single-Channel Ground and Airborne Radio System.

These are but a few of the systems potentially requiring implicit knowledge of their operational use, frequencies, ranges, modes, etc. When you look at all these devices and at those on the drawing board, the Army expects the S-6 and staff to be virtual wireless wizards on the corps / division / brigade / battalion staff.

Signal soldiers must use all available means – traditional and nontraditional – to train and maintain wireless-communications skills. So I'm proposing that amateur radio should be incorporated as a partner for the Signal Regiment to use as a means of gaining, training and maintaining hands-on wireless skills.

Preparing for the expanded wireless environment

Given the Army transformation's increased use of a wireless environment, the Signal Regiment as a whole needs to find a way to train and maintain knowledge of wireless-specific skills as well as to familiarize Signal personnel with the entire range of wireless operations. If you combine the IBCT requirement for HF radio with the requirements for very-high-frequency frequency-modulation voice and data, plus the expanded use of EPLRS and wireless data networks, you quickly conclude that knowledge and experience in using wireless communications, antennas, propagation, interference and so forth will become extremely important for overall mission accomplishment.

As you can see from the Web, the IBCT equipment list is filled with specialized wireless voice or data communications devices; the S-6 and staff will have to be familiar with all of them when preparing supporting communications plans for the IBCT.

The price of not being prepared

Communications and computer skills are very perishable and must be maintained by continual training – both classroom and hands-on – starting almost immediately after graduation from the Signal school at Fort Gordon, Ga. The price of not having current skills in the field was driven home to me during my assignment with the Multinational Division-North in Bosnia, when one specific operational issue came up that emphasized to me our collective need to maintain individual communications skills for wireless voice and data.

A non-U.S. element of MND-North needed to use HF radio as its primary means to communicate with the U.S. engineer brigade it was temporarily attached to. No one in the engineer brigade knew how to establish such a link, nor did anyone in the division G-6. There were also equipment and antenna issues no one could quickly resolve. Needless

to say, the HF net was never implemented and other, less desirable, means were found to do the communications mission in question.

In the case of the MND-North mission, knowledge of near-vertical-incidence skywave propagation, general HF propagation, HF radio operations and HF antennas would have helped immensely, given the terrain and distances involved.

Gaining and maintaining wireless skills

Most Signaleers would agree that the Signal Center's training courses are the best in the world for communications training; the courses provide entry-level and advanced training in a variety of wireless areas. But Signal officers, noncommissioned officers and soldiers need to continue their education / training once they leave the schoolhouse, especially if they're not immediately assigned to a unit using the equipment they trained on. Further, education / training may not be obtainable during the duty day or as part of official training. So how do Signal soldiers maintain, even advance, their individual operating skills, knowledge and abilities?

After-hours formal coursework in a classroom is part of the answer, but not all of it. So how do we Signaleers gain hands-on-training and experience in wireless communications on our own? I believe the answer is today's amateur radio. The Signal Regiment and Signal Center should partner with amateur radio as a way to learn and maintain wireless operating skills.

After my tours as deputy G-6 for 1st Armored Division and as G-6 operations officer for V Corps, I came across a study guide for amateur radio. I subsequently took and passed my novice- and technician-level amateur-radio-license exams. While studying for these tests, I relearned a great deal I'd wished I'd known before those assignments. Some knowledge of FM-operations theory would have prevented at least one "discussion" with the division commander regarding his issues with the division's FM nets. Had knowledge and experience with FM operations been fresh in my mind, I would have known where to look for answers to problems we experienced.

To help avoid such issues for current and future Army communicators, we need to give our Signal officers, NCOs and soldiers as many options as we can to stay prepared and keep their skills honed. Army transformation will require extraordinarily agile and flexible communications. Our Regiment must be ready and must use any means, traditional and non-traditional, to achieve that goal.

Lifelong learning

There's no single answer to the question of how we train and maintain skills for Signal Regiment members with regard to the IBCT's equipment or wireless communications in general. The Signal Center's concept for the University of Information Technology bears this out. As noted on the Fort Gordon webpage discussing UIT, learning about communications can be done in many forums and should be a lifelong experience. Amateur radio is designed to be a lifelong learning experience and as such fits in closely with UIT proposals. Amateur radio could even be incorporated into UIT as one of the components, just as academia and industry are.

Amateur radio is a learning enabler that meshes with Fort Gordon's UIT initiative to provide a lifelong-learning environment so Signal soldiers can "refresh and enhance their skills, knowledge and abilities as they progress through their career." UIT only starts with the schoolhouse at Fort Gordon, however. Through virtual learning the school proposes to allow access to learning resources anytime, anywhere, to refresh and enhance soldiers' skills.

Amateur radio caters to these same goals. Using amateur radio as a learning platform, soldiers who desire to learn more about wireless-communications technologies and how they operate; experiment with wireless technology; and develop new uses, techniques or devices can do this on their own time and with their own resources. Amateur-radio operators do the research, develop the skills, build or buy the equipment, conduct their experiments and operate their own stations. As amateur-radio operators, Signal soldiers can do this, too, all the while learning and honing valuable wireless skills.

Amateur radio today

Many people will be skeptical about my proposal to advance amateur radio as a part of UIT, or even as a legitimate way to help maintain critical communications skills. The reputation of amateur radio is such that many are turned off by its mere mention. However, today's amateur radio is far removed from years past. In keeping with advancing technology, amateur radio has expanded and changed with the times.

Amateur radio today isn't just the old amplitude-modulation tube-driven radio connected to a huge tower antenna with the operator – usually pictured as ancient – sitting at his operating position tapping out Morse code. There are indeed amateur-radio operators who match this description. However, this is now the exception rather than the rule. Each time a new technology or communications mode shows up in the marketplace, amateur-radio operators find a way to use it, experiment with it, pass traffic over it and adapt it to whatever communications uses it may lend itself to. Transmitting and receiving data, voice and video via low frequency, HF, VHF, ultra-high frequency and SHF are all being explored by amateur-radio operators today – limited only by operators' imagination, ingenuity and individual or collective skills.

A great example of this experimentation is packet radio, which allows transmission and retransmission of packet data to stations connected via a standard wireless protocol. Amateur-radio operators have packet-radio stations up and operational on virtually every

available frequency band from HF through SHF. Some established packet-radio nets reach from south Florida into Canada and beyond.

To build their nets, operators use a computer, a terminal node controller, a radio and an antenna. Combine this with some amateur-radio-developed freeware, and even an entry-level amateur-radio operator can be on the air with a packet-data station.

This is expanding into the realm of Internet protocol and something akin to wireless Internet. As with most of amateur radio, development of wireless-data-type applications is only limited by the ingenuity of the amateur-radio operators, clubs and organizations experimenting with that technology.

How amateur radio parallels the IBCT

Amateur-radio technological experimentation doesn't stop there. Amateur radio is experimenting with something similar to EPLRS as well as Force XXI Battle Command Brigade and Below. EPLRS provides tactical commanders and staffs with automated, secure, near-real-time radio communications as well as data-distribution capability between computers. In addition, it provides position, location and navigation reporting of combat elements on the battlefield. FBCB2 uses the tactical Internet – of which EPLRS is a part – to provide situation-awareness data and command-and-control messages.

Amateur radio is working with something called the Automatic Position-Reporting System. This system allows near-real-time position reporting of mobile amateur-radio operators to base-station operators or to other mobile operators. APRS is used for real-time packet communications between users and for directly linking messages and email into the worldwide APRS Internet-linked system via the APRS Satellite Tracking and Reporting System, a derivative of APRS.

APRS information is automatically or manually placed onto digital maps of local areas or regions on a computer screen. Information and symbols can be placed on the map or graphic on the screen for all other APRS users to immediately see via APRS data transmissions. This sounds very similar to some aspects of EPLRS and FBCB2, doesn't it? While not as sophisticated, APRS is constantly being improved, experimented with and used by amateur-radio operators around the world every day. More importantly, though, Signaleers may work with APRS in their off time for fun to expand skills that directly translate to skills needed for real operations.

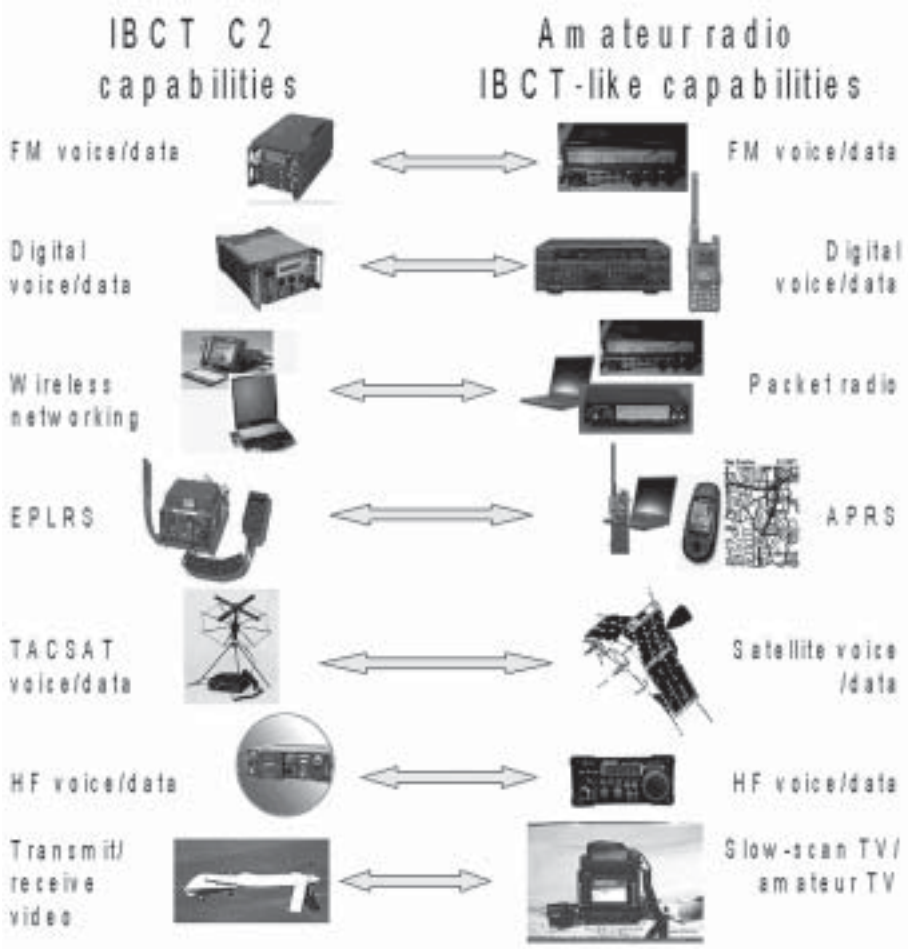

Figure 1. Communications equipment that amateur radio operates (or experiments with) parallels equipment the IBCT has.

Other IBCT wireless-communications technologies have parallels in the amateur-radio world. Both IBCT and amateur radio use HF radio and VHF/UHF FM operating skills. HF-radio operation, as an example, is not easy nor "plug and play" by any means. Successful operators must know HF propagation, antennas and antenna construction as well as HF-radio theory.

Some of the necessary operating skills are mentioned in Edward Farmer's recent article (Spring 2002 ***Army Communicator***). As Farmer points out, even with automatic link establishment, HF operators must know what frequencies are useable at which times of the day to conduct HF net planning. Amateur-radio operators who use HF frequencies for their operations – voice or data – have learned by studying or by experience what works and what doesn't. The same approach is used when amateur-radio operators construct or install antennas. The methods and means used to design and construct HF antennas directly translates to Signal soldiers' use of them in the field.

HF-radio operation is only one of many Army-related skills amateur radio offers – there are many more.

Becoming an amateur-radio operator

You may ask what the catch is to working in amateur radio. To be a U.S. amateur-radio operator, prospective amateurs must qualify – in other words, pass the necessary Federal Communications Commission-mandated tests.

To receive the first-level license and an FCC-issued callsign, candidates must pass a 35-question multiple-choice test at an accredited test session. These test sessions – given by local amateur-radio clubs – can easily be found via the Internet by doing a search for amateur radio in a given geographic area, such as Augusta, Ga. A quick search of amateur radio in and around Augusta found several amateur-radio clubs that conduct monthly test sessions for anyone wishing to take an exam.

To pass the exams, you need to study. While it may seem amateur radio isn't as sophisticated or difficult as Army communications – and so any amateur-radio test would be easy for Signaleers to pass – this isn't necessarily true. Even the best-qualified Signaleer doesn't know the applicable amateur-radio FCC rules and regulations. Most don't know how to mitigate radio-frequency exposure risk. Few know the frequencies amateur radio is authorized to operate on. In short, to pass any license tests, you have to know a range of information, including how to operate, where to operate, how to safely operate and how to legally operate.

On the other hand, before anyone turns away thinking amateur radio is too hard, an article in ***QST Magazine*** talks about a newly licensed six-year-old. To study and pass, she had a lot of help from her parents, who are both licensed operators. If a six-year-old can pass the technician exam, Signal soldiers will breeze through if they study the material.

After passing the entry-level exam, you're issued an FCC callsign valid for 10 years, renewable indefinitely. Receiving your initial callsign opens the door to amateur radio. As you progress in your exploration of wireless communications, you'll eventually want to upgrade to a higher-class license to receive the expanded privileges higher-class licensees possess.

Two higher-class amateur-radio licenses are available: amateur general class and amateur extra class. To operate on HF frequencies, you must obtain a minimum of an amateur-general-class license. This class of license allows the license holder to operate using all available modes on frequencies below 30 megahertz as well as above.

To get this license, you must have already passed the technician-class exam and a 35-question multiple-choice general-class exam. Much more HF theory and operational practice – as well as applicable FCC rules and regulations – are covered by the general-class-license exam. As I write this, to operate on HF amateur-radio frequencies in the United States, operators must also pass a Morse-code exam as part of the general-class-exam process. This sounds a lot more daunting than it really is. The Morse-code test is a simple 10-question fill-in-the-blank test based on what's heard in a taped five-words-per-minute Morse-code transmission played during a test session.

Even though the Morse-code test is included for the general license, it represents one very small aspect of amateur radio. It doesn't have the emphasis it has had in years past. Amateur radio has many operating modes; most can be explored with or without a general or higher license.

Amateur radio's services

Because of the self-developmental nature of amateur radio, it may seem unstructured or free form. This is definitely not true. Amateur radio is a serious undertaking. The FCC considers amateur radio a federally licensed communications service, just as broadcast radio and television are. Strict rules apply, and learning these rules is part of the license process.

There are many reasons these strict rules apply. One is that amateur-radio operators may use their FCC-granted privileges to become part of amateur-radio emergency services and participate as first-responders to disaster. Immediately after Sept. 11, 2001, amateur-radio operators set up emergency-communications nets for the Red Cross, Salvation Army and others to facilitate help to victims and their families at each affected location. Those operators keep the support nets operating 24 hours a day until they were officially stood down. Operations in New York City went on for more than a month.

Every time a storm causes significant damage to a populated area, ARES personnel are on the scene quickly to help out. Amateur radio provides real-world communications when needed.

Meshing the schoolhouse with amateur radio

ARES is one more way amateur radio lends itself to our profession and potential for enhancing our individual Signal skills, particularly for the future. To successfully operate in the IBCT, Signaleers will need every bit of skill they can acquire. We should encourage the use of all available means to maintain hard-won communications skills.

To promote amateur radio as a path to lifelong learning requires some emphasis during formal training at Fort Gordon. This emphasis can be accomplished in several ways:

- Encourage after-hours study of amateur radio by giving extra credit or some other incentive to those who pursue and pass the first-level FCC exam and obtain a callsign during their course work;
- Mention amateur radio during class as a means to continue learning communications skills, both at Fort Gordon and at follow-on duty assignments; and
- Encourage commanders to sponsor amateur radio in their units.

The goal is to expose soldiers to amateur radio as a viable continua-

tion of formal training.

Conclusion

Communications training, through any means, is important to continued operational capability. The Chief of Signal wrote in ***Army Communicator***'s Summer 2000 edition that one of the "Army's top priorities is to transform formations that were designed for the Cold War into responsive, rapidly deployable, lethal combat units … capable of full-spectrum operations ranging from peacekeeping and humanitarian missions to decisive operations in a major theater of war." Given the broad range of skills required of Army communicators this statement implies, it only makes sense that we as the Signal Regiment seek ways to develop our skills both on and off duty. Today's amateur radio provides a means to train and learn using current technology in a "hands-on" environment, allowing us to develop our skills not only for our careers but also for our lifetimes.

Since we know continued communications training and skills development is critical, you may ask why I, as 1st Armored Division's deputy G-6, didn't personally know as much as I could have or should have about HF and FM radio during my Balkans (MND-North) tour. The answer is that I attended the battalion / brigade Signal officers course 13 years before my Balkans tour without consistently using the skills learned in the interim. The key to keeping skills and knowledge fresh and ready for use is to work with them on a recurring basis.

Much of what I learned while studying for my first and subsequent amateur-radio exams was refresher training. That's precisely the point of this article. Amateur radio, by its very nature, allows participants to learn about, use and even build communications equipment as well as keep critical skills honed that were learned in traditional coursework and unit-level training. Given the rapid growth of the Army's wireless-communications environment, the opportunity to train and maintain our communications skills must expand beyond traditional means. To that end, the Signal Regiment should embrace amateur radio as a training tool for Signal Regiment members.

LTC Hill is serving in the Secure Voice Services Division, Network Services Directorate, Defense Information Systems Agency. He's active in amateur radio, holds an extra-class amateur-radio license and is a member of the Alexandria Radio Club, Alexandria, Va., and the Northern Virginia FM Association. LTC Hill's past assignments include S-3 for 440th Signal Battalion, G-6 operations officer for V Corps, deputy G-6 for 1st Armored Division and two assignments supporting MND-North communications in Bosnia. His awards include the Meritorious Service Medal and Bronze Order of Mercury. He has a bachelor's degree in business automated data-processing systems from Idaho State University and a master's degree in education from St. Mary's College, Leavenworth, Kan.

More reading

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IBCT equipment gallery; on-line at http://www.lewis.army.mil/transformation/EquipmentGallery/equipment_gallery.htm; May 2002.

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Acronym QuickScan

APRS – Amateur Packet Reporting System
ARES – amateur-radio emergency services
EPLRS – Enhanced Position-Location Reporting System
FBCB2 – Force XXI Battle Command Brigade and Below
FCC – Federal Communications Commission
FED – forward-entry device
FM – frequency modulation
HF – high frequency
IBCT – Initial Brigade Combat Team or Interim Brigade Combat Team
MND – Multinational Division
NCO – noncommissioned officer
NTDR – near-term digital radio
SHF – super-high frequency
UHF – ultra-high frequency
UIT – University of Information Technology
VHF – very high frequency

Frequency-modulation retransmission lessons-learned in Korea

by CPT Michael Sohn and 1LT Thomas Martin

"Strike 6, this is Warrior 6, over … (static) … Strike 6, this is Warrior 6, over … (static). …"

For a Signal officer in an infantry division, this is one of the worst things you could hear – the commanding general unable to communicate with his brigade commanders. Now imagine the difficulty commanders have controlling the battle when they can't talk over their frequency-modulation radios farther than 15 kilometers away without using FM retransmission.

This scenario may seem unlikely, but in Korea or other places with mountainous terrain, it's an obstacle that must be constantly overcome.

The 2d Infantry Division conducts exercises that require FM communications stretching 40 km by 60 km in an operations area with six major intersecting terrains. These missions require multiple FM retrans nets that link more than 17 command posts for the division's command and control. With the extensive use of FM retrans operations in Korea, Company C, 122d Signal Battalion has learned some important lessons concerning FM retrans operations that can maximize FM communications for warfighters.

In mountainous regions like Korea, the key terrain for Signal is on hilltops that provide good communication coverage for both FM and mobile-subscriber equipment. With limited hilltops available, 122d Signal Battalion is sometimes forced to co-locate FM retrans with MSE systems. However, when the FM retrans team is located close to a radio-access unit, the FM retrans team experiences increased interference and the division's FM nets suffer as a result. After investigation, and with the assistance of Communications-Electronics Command at Fort Monmouth, N.J., the reason for this condition was discovered.

During Ulchi Focus Lens 2002 (the annual peninsula-wide exercise) and this year's warfighter exercise, one of the division's FM retrans teams was co-located with a remote RAU team. The missions required FM communications all the way from Seoul to Camp Casey and beyond – a distance of 60 km. The FM retrans team experienced severe interference on the command net during these two exercises. The retrans team checked all equipment but didn't discover any equipment errors. During a similar exercise, the battalion placed the same network on the ground but without the RAU co-located on the hilltop with the FM retrans team. During this exercise, the division command net had almost zero interference and FM communication was flawless.

Our investigation showed that FM radios (RT-1523E) and the RAU radios (RT-1539) operate on the same frequency band, so the transmitting signals from the RAU can cancel out the transmitting signals from the FM (Single-Channel Ground and Airborne Radio System) radio. Furthermore, if the incoming SINCGARS signal is low, then the more powerful RAU's transmitting signal will overwrite the smaller received SINCGARS signal and the FM retrans team will not receive the intended signal (Figure 2).

When this occurs during frequency-hopping operation, the FM retrans team will hear static and the distant stations won't be able to communicate through the retrans team. This condition verified why the retrans teams experienced interference during two division-level exercises.

Another issue associated with mountainous terrain is the need to change net identification while maneuvering around the operations

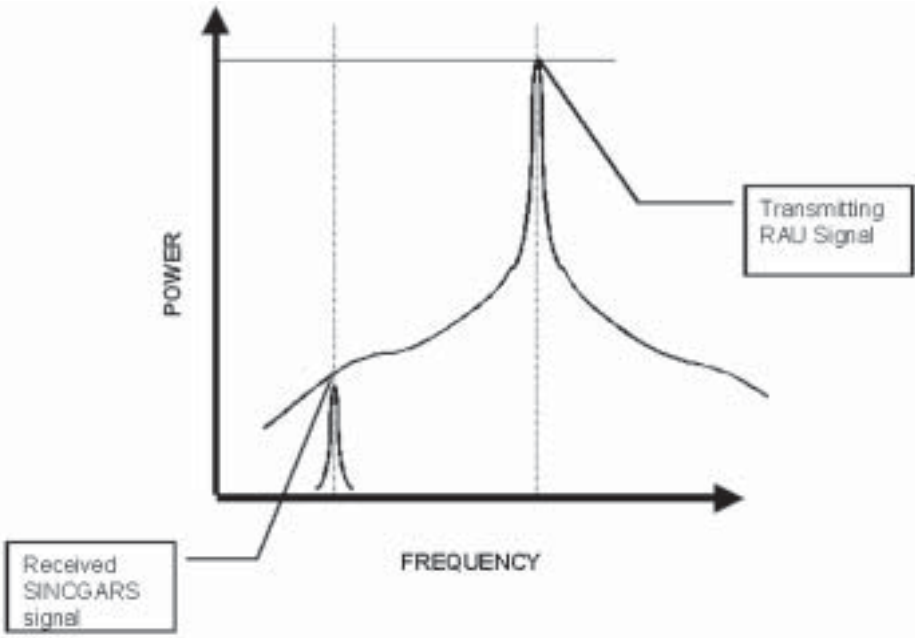

Figure 2. If the incoming SINCGARS signal is low, the more powerful RAU's transmitting signal will overwrite the smaller received SINCGARS signal.

area. Because a retrans team set up in the standard F1-F2 configuration receives one net ID (F1) and transmits another net ID (F2), warfighters must change net ID based on location so they can talk with everyone. This presents a significant problem to C2, particularly when units are conducting maneuvers and convoys, because FM communication isn't truly seamless and users must know when and where to change over to the other net ID. Using an F1-F1 retrans configuration and consequently eliminating the need to change net ID can resolve this problem.

An F1-F1 retrans configuration, in contrast to an F1-F2 configuration, essentially acts as a signal repeater rather than a signal retransmission. Using a new data function available on the RT-1523E model radio, a retrans team can designate one radio as a "receive only" radio and the other radio as a "transmit only" radio. This means that when someone talks on the net, the "receive only" radio picks up the signal and repeats it through the "transmit only" radio. Using an F1-F1 retrans configuration, 2d Infantry Division now has seamless communications and has essentially eliminated the need to change net ID while maneuvering through the operations area, allowing unit commanders to concentrate on the battle.

FM communications is the warfighter's most important communications asset. Without FM, warfighters can't effectively maneuver and they can't fight. Retrans operations are an essential part of the FM mission requirements for 2d Infantry Division, or any other unit in a mountainous region. Using an F1-F1 retrans configuration and avoiding co-locating FM retrans assets with MSE will maximize the overall FM communications support for the warfighters.

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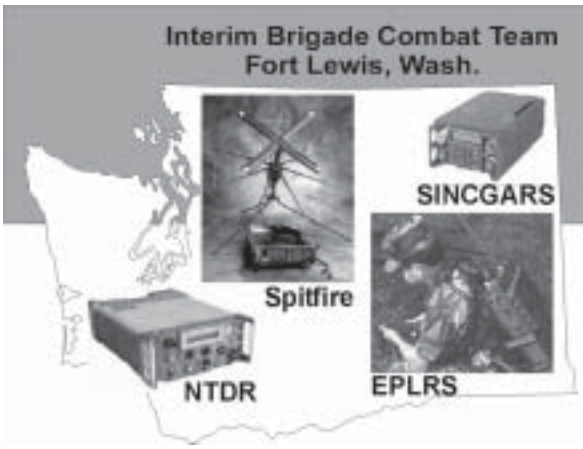
Company C provides FM retransmission for 2d Infantry Division's command nets with two mobile retrans teams and a fixed FM retransmission site located on Hill 754 (Casey 39). FM retransmission is used extensively for all exercises in Korea due to the rugged terrain.

Acronym QuickScan

C2 – command and control
FM – frequency modulation
ID – identification
Km – kilometer
MSE – mobile-subscriber equipment
RAU – radio-access unit
SINCGARS – Single-Channel Ground and Airborne Radio System



Radio's resurgence -- its "new" uses in the current and near-future Army

Planning for the use of high-frequency radios in the brigade combat teams and other transformation Army organizations

by David Fiedler

Over the past three years, the Army has begun to "transform" itself into a 21st-century combat force. Central to this transformation are the new brigade combat teams being organized and equipped at Fort Lewis, Wash., and other Army posts.

An examination of the BCT's operations and organizational concept will show that tactical long-distance / wide-area communications will be a major factor in the BCT's success or failure. To equip the new formations for their mission, the Army is both developing new systems and recapitalizing on older systems and concepts to meet new requirements. Modernized high-frequency radios (Transformation High-Frequency Radio System), shown in ***Army Communicator***'s Winter 2001 edition, will go a long way in meeting BCT tactical wide-area communications needs – particularly in rough terrain and urban environments – if a few basic concepts are understood.

Why HF radio for the BCT

HF radio (radio signals in the 1.6 to 30 megahertz frequency spectrum) has the following characteristics that make HF an ideal communications system to support the fast-moving, wide-area operations the BCT will participate in.

- HF signals travel longer distances over the ground than the higher frequency very-high-frequency (Single-Channel Ground and Airborne Radio System) or ultra-high-frequency (Enhanced Position-Location Reporting System or near-term digital radio) signals do because they're less affected by factors such as terrain or vegetation.
- HF signals can be reflected off the ionosphere (a layer of charged gases surrounding the earth at high altitudes) at high angles that will allow beyond-line-of-sight communications at distances out to 400 miles without gaps in communications coverage.
- HF signals can be reflected off the ionosphere at low angles to communicate over distances of many thousands of miles for reachback communications.
- HF signals do ***not*** require the use of either satellite-communications or retransmission assets.
- HF equipment provided to the brigade can be used either fixed station or on-the-move.
- HF systems can be engineered to operate independent of intervening terrain or manmade obstructions.

HF (2-30 mhz) radio-wave propagation

Radio propagation is the process by which electromagnetic energy (signal) moves from one point to another. Since radio waves propagate (move) the same way light waves do, we can think of radio waves in terms of light. As with light rays, radio energy (signal) can travel from a point source outward in all directions, just as a light spreads from a light bulb. For radio waves, this is called an omni-directional signal.

Figure 3 shows how radio energy decreases as distance from the source increases. Note that as the

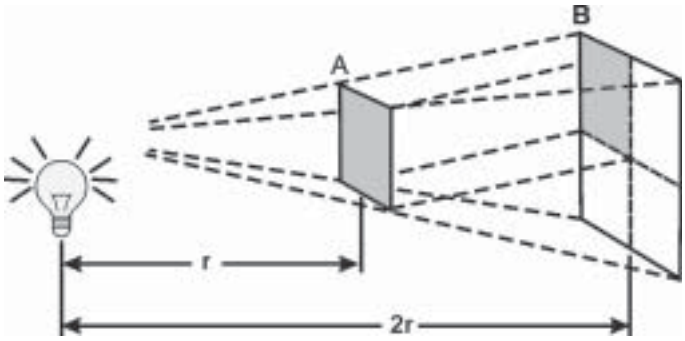


Figure 3. How radio energy spreads can be metaphorically compared to how light spreads. The farther away someone is from the source of light (or radio signal), the weaker the light (or signal) is.

distance (range) doubles, the signal strength is reduced to one quarter of what it was (proportional to 1/d squared).

Also as with light, radio signals can be focused to travel in a single direction similar to a flashlight beam. This is called a directional signal. The shaping of the radio signal is a function of the radio's antenna system. Just as with light, radio signals can also be blocked by obstructions and bent (diffracted) over solid obstructions. This is similar to seeing the small amount of light that can be detected from a source behind a wall.

All these effects can be used to provide gap-free tactical HF radio communications throughout the brigade's operations area and back to its sustaining base. It's important to recognize that the system operating radio frequency(s) and how the radio antenna shapes the signal pattern are the two most critical factors in assuring HF communications for the brigade.

Possible transmission paths within the brigade's operational area

Figure 4 shows possible radio paths between two stations located in the brigade AO. We'll assume for this article that most combat units in the brigade will be located no more than 400 miles from each other. Circuits of greater distances (reachback) will be covered under other sections.

Figure 4 shows three possible low-angle radio paths located along or near the earth's surface. These paths are called ground-wave paths because they're close to the earth's surface or are in contact with it. They consist of the direct-wave path, ground-reflected path and surface-wave path.

The direct wave consists of radio-frequency energy that travels through the atmosphere and near the earth directly from one antenna to another. This is called the line-of-sight mode of propagation.

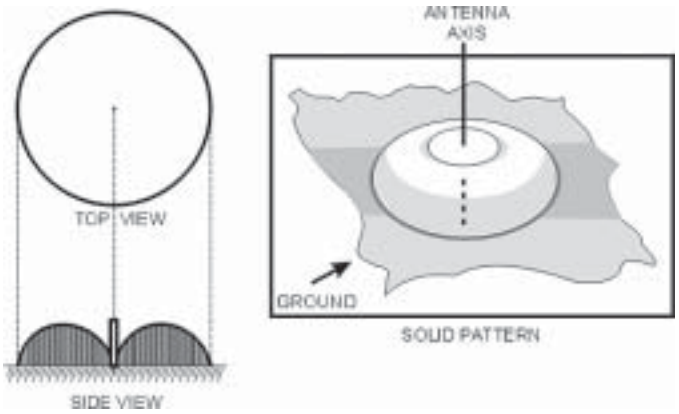


Figure 5. Radiation pattern of a quarter-wave vertical whip antenna.

Maximum LOS distance depends on the antenna's height above the ground and whether or not the path is obstructed by terrain that will block radio signals. On flat ground, direct-wave paths suitable for THFRS communications can be expected out to six to eight miles before the earth's curve blocks the signals. Direct-wave communications can go much farther if stations are located high on hilltops or have masts with no intervening obstructions. Control of high ground and antenna height is important when using direct-wave communications.

The ground-reflected path, like the direct path, travels through the atmosphere, but due to the lower takeoff angles from the transmitting antenna, signal energy is reflected off the earth while traveling from the transmitting antenna to the receiving antenna. Depending on the composition of the ground at the reflecting point, the reflected energy can be considerably reduced when it arrives at the receiving antenna. Signals reflected off seawater lose almost no energy, while signals reflected off a sandy desert become quite weak.

When summed together, the direct wave and the reflected wave are referred to as the space wave. As the two combine, they can result in either a stronger or weaker total signal, depending on the timing difference of the two signals as they arrive. The difference in signal phasing is caused by the longer distance traveled by reflected wave. Space-wave signals won't usually be the dominant communications mode in the BCT.

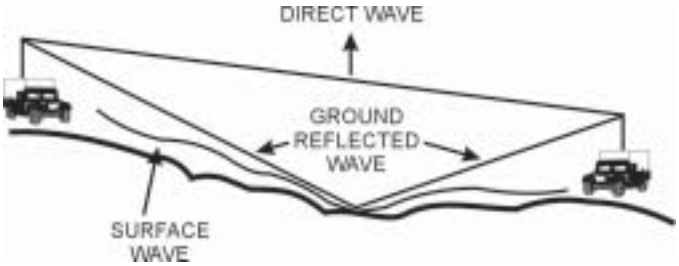


Figure 4. Ground-wave components.

The surface-wave path is the transmitted radio energy that travels along the boundary between the atmosphere and the earth's surface, and it's in actual contact with the earth's surface. The surface wave is greatly affected by the electrical conductivity of the earth in the propagation's path. With a good conductor such as seawater, surface-wave communications out to 100-plus miles are possible. With a poor surface such as sand or frozen ground, surface-wave communications are greatly reduced. Surface-wave signals are also greatly reduced by heavy vegetation and mountainous or urban terrain. Surface-wave signals can be made stronger over poor ground by using techniques that improve the conductivity of the earth near the antenna.

Most HF ground-wave communications within the BCT will use surface-wave signals. Space-wave communications will predominate only when communicating from high ground to other high-ground locations along the LOS. Vertical monopole (whip) manpack and vehicle antennas of various lengths are the antennas provided to produce the low takeoff-angle energy needed to generate ground-wave signals.

Figure 5 shows the antenna-

energy pattern of the vertical monopole (whip) antenna. Note that the signal is mostly along the earth's surface and on the lower angles. There's much less energy on the higher angles and none directly overhead (vertical angles). The pattern resembles a doughnut, so operationally you see it can be very difficult to communicate with aircraft that are directly overhead (reduced signal), while you can talk to aircraft many miles away that are receiving low-angle energy from a vertical antenna.

The ionosphere

The ionosphere is an electrically charged region of atmospheric gases that surround the earth. Ionization (electric charge) happens when solar radiation bombards atmospheric gas molecules and forces them to detach electrons, leaving the gas molecule with a positive electrical charge called an ion and leaving free electrons in the atmosphere. Since positive electrical charges repel each other, gas ions tend to "bunch" in distinct "layers" of ions at heights of between 30 and 300 miles – shown in Figure 6. These charged areas will reflect radio signals back to earth if they strike the ionosphere at particular angles using particular frequency bands.

Radio engineers have labeled these layers the D, E, F1 and F2 layers (Figure 6). Three factors determine whether a radio signal will be reflected back to earth and can be used by brigade HF communications systems. They are:

- The higher the radio frequency, the more likely the signal will penetrate the ionosphere rather than be reflected by it;
- The current ion density determined by the amount of sunlight (time of day, season, solar activity) at the time communications is desired; and
- The angle at which the radio wave contacts the ionosphere.

See Figure 7 for details.

Note that at any time of the day, year or solar-activity (sunspot) cycle, there's a band of radio frequencies always available that can be reflected off the ionosphere and will support HF communications. The automatic-link-establishment feature of the new Army HF radios (AN / PRC-150 family) will find these frequencies for the operator from a list of authorized frequencies in the radio database. Signals on these frequencies can be used for brigade tactical HF communications over distances of hundreds of miles unless very unusual and rare solar activity is occurring.

Also note that the angle at which the wavefront contacts the reflecting layer is determined by the radio's antenna system. The OE-505 and AT-1011 vertical whips produce low angles of radiation. Bending the whips into the horizontal position with the whip-tilt adaptor, or by using the RF-1912 or RF-1941 wire-dipole antennas 30 feet or less above ground, produces high-angle radiation.

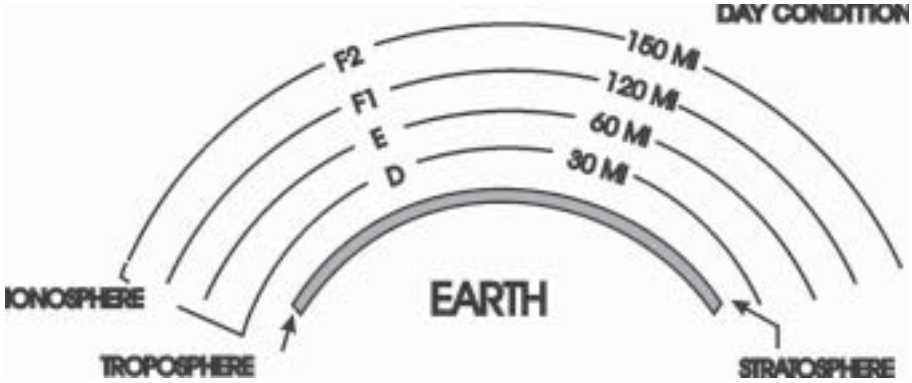


Figure 6. The earth's atmosphere (simplified).

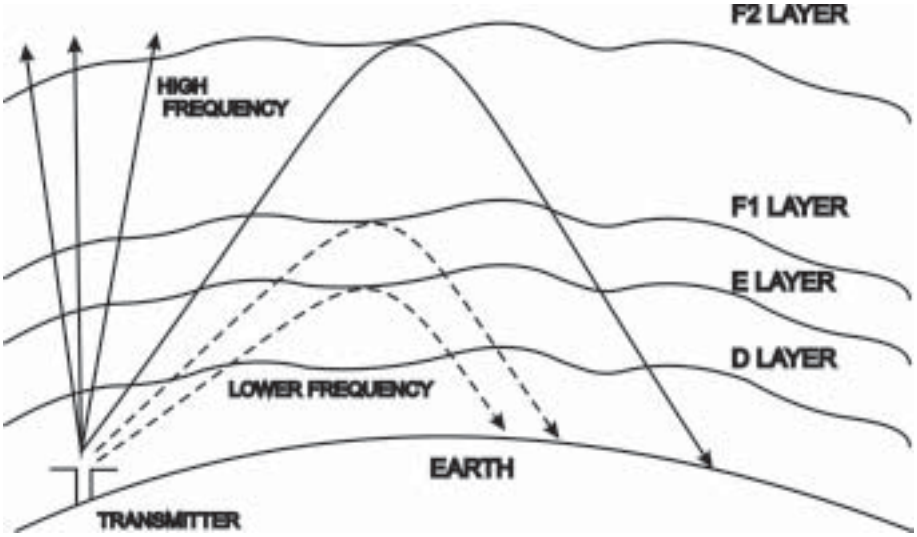


Figure 7. Skywave transmission paths. As illustrated on the diagram's left side, radio waves that pass through all layers are lost.

Maximum useable frequency, lowest useable frequency

Each layer of the ionosphere has a frequency that's the highest the layer will reflect. The exact frequency is determined by the amount of ions in the layer. As you may see in Figure 7, the lower layers reflect the lower frequencies, while the higher frequencies penetrate the lower layers and are reflected back by the higher layers. To cover the largest tactical AO possible, use the highest frequency that will reflect, since the higher the reflecting layer, the wider the area covered by the reflection.

Since the ionosphere is always changing, a general rule when in manual operation is to select a frequency 15 percent lower than the actual maximum useable frequency to avoid problems. This frequency is

called the frequency of optimum traffic. Signals on frequencies that exceed the MUF go through the ionosphere and are lost in outer space.

The MUF is also different for different angles of reflection. Signals on lower takeoff angles can use higher frequencies for communications because they'll be reflected. The ALE mode of modern HF radios will automatically prevent signals with a frequency above the MUF from being selected for operations. ALE will select the best radio frequency for communications on a continuous basis if it's used.

A limitation of HF radio is the high-radio-noise (static) level on HF frequencies. Radio noise comes from sources in outer space, lightning in the earth's atmosphere and manmade sources. Noise on a particular system depends mainly on location and season. For each situation, there's a frequency (lowest useable frequency) below which there is too high a noise level for communications. LUF is affected by transmitter power, antenna gain and directivity and absorption of signal by the lower layers of the ionosphere. LUF is defined for as the lowest frequency at which a 90-percent probability of communications exists.

The new radios' ALE, modems and vocoder features are designed to make the LUF as low as possible by enabling operation in a high-noise environment. This widens the range of operational frequencies available for communications. A typical plot of MUF/FOT/LUF is shown in Figure 8. Note the range of frequencies between the MUF and the LUF over the entire day. Under almost every circumstance, there are a range of HF radio frequencies that will be suitable for brigade communications.

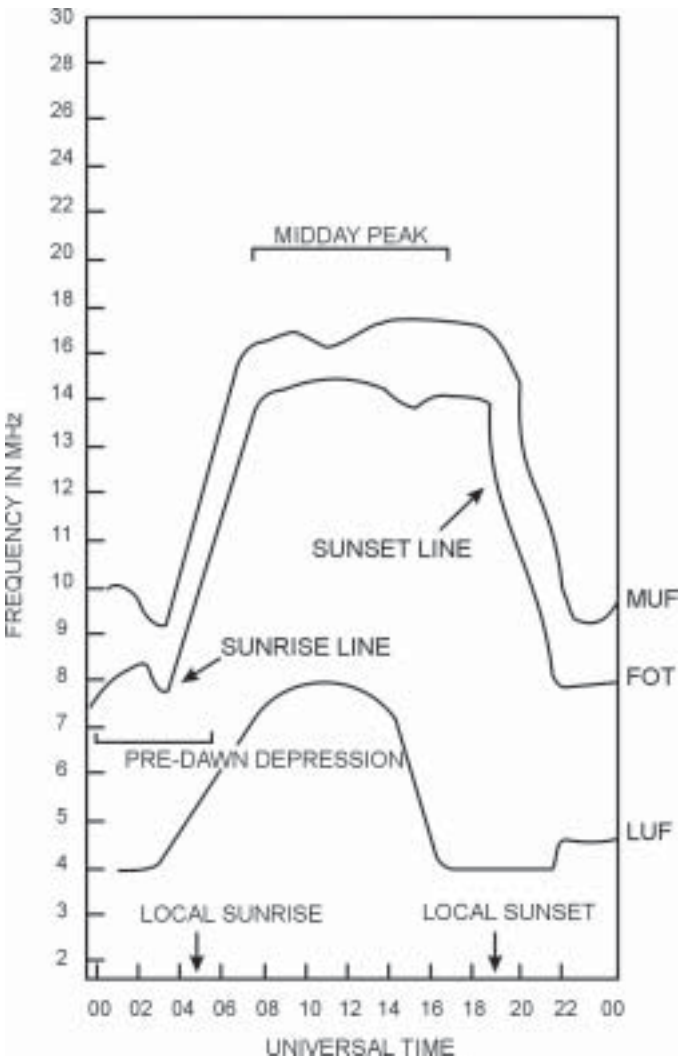


Figure 8. Important features of a typical propagation chart.

It's the responsibility of the operator and the system manager to obtain frequency assignments in this range for operations. To aid in frequency selection, skywave and ground-wave predictions and prediction software are available through frequency-management channels. It's the responsibility of the brigade S-6 frequency manager to predict HF RF requirements, obtain authorized frequencies between the predicted MUF and LUF and provide them to operators and system managers. When using ALE, the radio itself will test the propagation conditions and select the best operational frequency. ALE in the BCT will be set to accomplish this every half hour under normal operating conditions.

Antennas

The single most important factor in reliable tactical HF communications is the antenna. At HF frequencies, this is especially true. To select the best antenna for a particular brigade operation, the following concepts must be understood by the operator and system manager.

WAVELENGTH AND FREQUENCY. For best radio performance, there's a specific relationship between antenna length and operational frequency. All radio signals travel at the speed of light. The wavelength at a particular frequency is the distance traveled by light as it completes one cycle of its motion. To calculate this distance (in meters), the speed of light (in meters) must be divided by the operational frequency in cycles per second. After simplifying the math, wavelength (in meters) is equal to 300 divided by the frequency in mhz (millions of CPSs).

As an example, the wavelength of a three-mhz HF signal is 300 divided by 3 (300/3), or 100 meters. This means that in the time it takes to complete one cycle at three mhz, the signal has traveled 100 meters.

Knowing how to calculate wavelength is important because signal strength depends on the antenna's length and the amount of current flowing through it. For maximum current (signal) at a given frequency, the antenna needs to be one-half a wavelength or multiples of a half-wavelength long.

RESONANCE. The strength of a signal radiated from an electrical conductor that has an RF current flowing depends on the conductor's length and the current's amount. For

a given frequency, maximum current flows and maximum signal are produced when the conductor (antenna) is half a wavelength long, or multiples of that length. An antenna that radiates most of the energy flowing in it is said to be resonant.

At the frequencies most used by the brigade for fixed communications, the wire antennas (AT-1912, RF-1941) the Army provides are constructed using lengths that are close to resonance and are therefore very efficient.

On the other hand, mobile antenna lengths can range from less than 10 feet to as much as 32 feet. These antennas are physically too short to be resonant. To make the short antennas radiate as strong a signal as possible, antenna couplers such as the RF-382 or RF-5830 are provided. Couplers allow RF current to flow to the short antenna and dissipate energy that's not radiated as signal but is instead reflected back from the antenna towards the radio.

The ratio of radiated power to reflected power is called the voltage standing-wave ratio. It's important to keep this ratio low (less than 2:1) for highest efficiency. High VSWR won't physically damage the radio equipment, but it will reduce the radio signal's strength.

Antennas whose length is close to resonance don't require couplers to function since the antenna radiates all energy. When a coupler is needed to match an antenna, it should be located as close to the antenna as possible for best efficiency. When configured for mobile operation, the coupler may be located near the transmitter, reducing power at the antenna. This is acceptable for mobile operations or when at a brief halt. However, it's wise that whenever possible, use more efficient ground-mounted (resonant) wire antennas.

Antenna couplers may also be dismounted and located at the antenna feed point to reduce signal loss when practical. When not practical, due to operational constraints, antenna couplers will remain on the vehicle and the coupler output connected directly to the antenna via cables (provided), even though efficiency is reduced slightly.

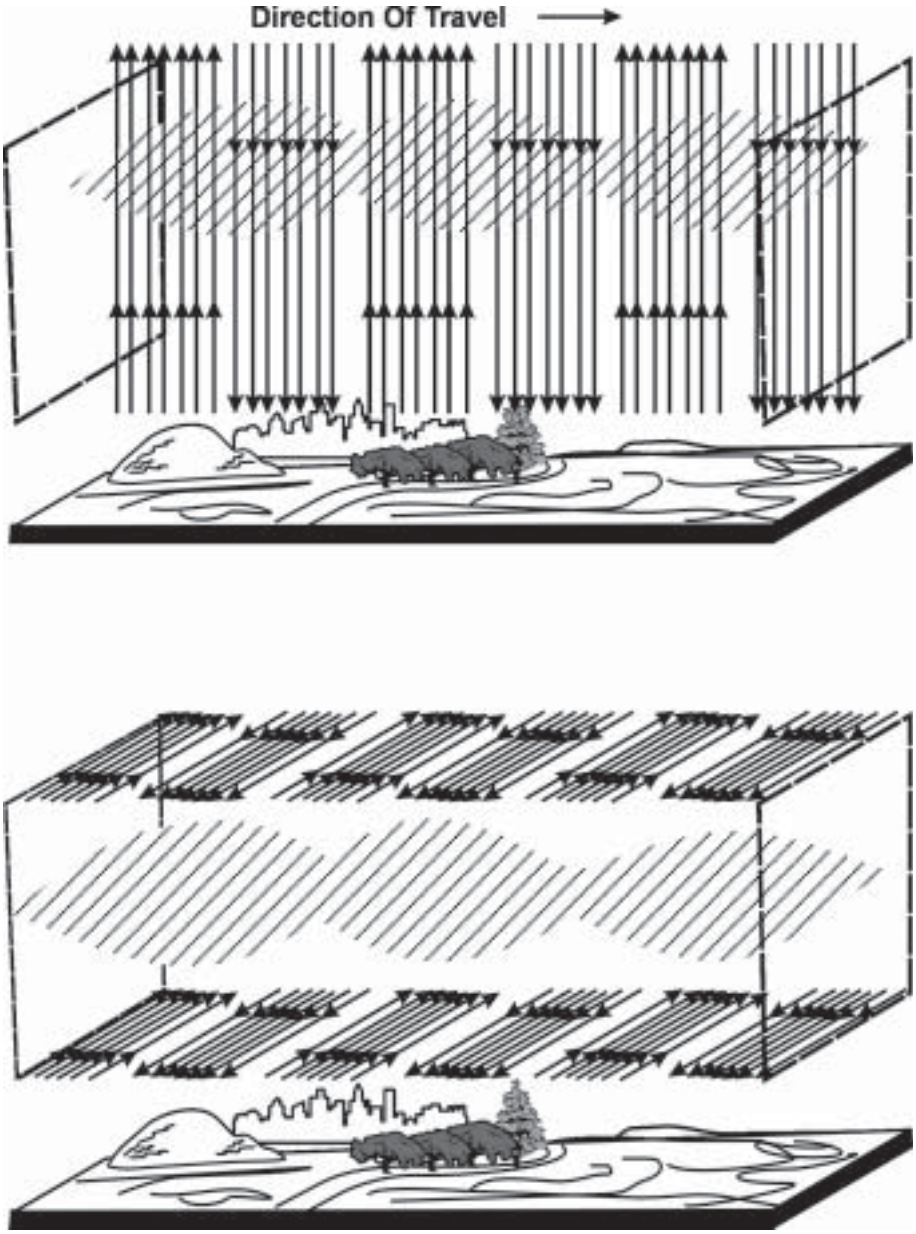


Figure 9. Vertical polarization, top. Horizontal polarization, bottom.

POLARIZATION. Polarization is the directional relationship of radio energy coming from an antenna to the earth's surface. As a rule, antenna fields are vertical if the antenna is physically vertical and horizontal if the antenna is physically horizontal. The intensity of a horizontal signal traveling in contact with the ground (ground-wave/surface-wave) drops rapidly because in effect the earth short-circuits the electric field. A vertically polarized signal doesn't lose strength nearly as quickly because it doesn't contact the earth as much.

In the brigade, ground-wave communications will be the primary mode of short distance (0-20 miles) communications. Manpack, ground-mounted and vehicular vertical antennas are provided for this purpose. Horizontal antennas and adaptors that "tilt" vertical antennas into a horizontal position are provided for long distance (0-400 miles) skywave communications. These antennas provide the high takeoff angles necessary for BLOS HF communications.

All antennas in a brigade radio net must have the same polarization. Mixing polarization of antennas in a net as a rule will result in significant loss of signal strength due to cross-polarization. S-6s will therefore assure that all stations in a net will have the same (horizontal or vertical) antenna polarization when possible. Surface-wave communications over seawater should always use vertical polarization because seawater's electrical properties will greatly reduce the signal strength of a horizontally polarized surface-wave signal.

Figure 9 shows the concept of vertical and horizontal polarization.

VERTICAL (WHIP) ANTENNAS. Ground-wave HF communications are most effective when using vertical polarization over good conductive ground. BCT manpack radios are provided the 10-foot long OE-505 antenna, and vehicular radios are provided the 32-foot long AT-1011 antenna.

Whip antennas are most efficient when they're between one-quarter and five-eighths a wavelength long at the lowest operating frequency. At HF frequencies normally used in the brigade, the whips are far too short for efficient operation. Tuning devices (such as the RF-382 antenna coupler) are provided to electrically match a physically short or long antenna to the radio and the transmission line. Operators should use the longest antenna physically possible under the operational conditions to achieve best communications performance.

For example, the 10-foot OE-505 manpack antenna can be replaced by a vertical wire tied to a support, such as a high tree branch, under many conditions to improve antenna efficiency. Any good heavy-wire conductor can be used, including field-telephone wire or the wire from the RF-1941 wire-dipole antenna kit provided with the radios. The end of the vertical wire must be insulated from the support. The feed end of the wire antenna is connected to the radio via the wire adaptor provided with the radio.

To further improve antenna efficiency and increase signal strength on the lower (surface wave) radiation angles, radios in manpack operation should be given a "tail" wire connected to the radio ground post. The "tail" will provide a low-resistance return path for antenna currents. Tail wires aren't provided but can be locally fabricated from computer-ribbon cable, communications wire or ground-strap braid. Tails should be as long as possible but shouldn't interfere with carrying the radio. The manpack-tail concept is shown in Figure 10.

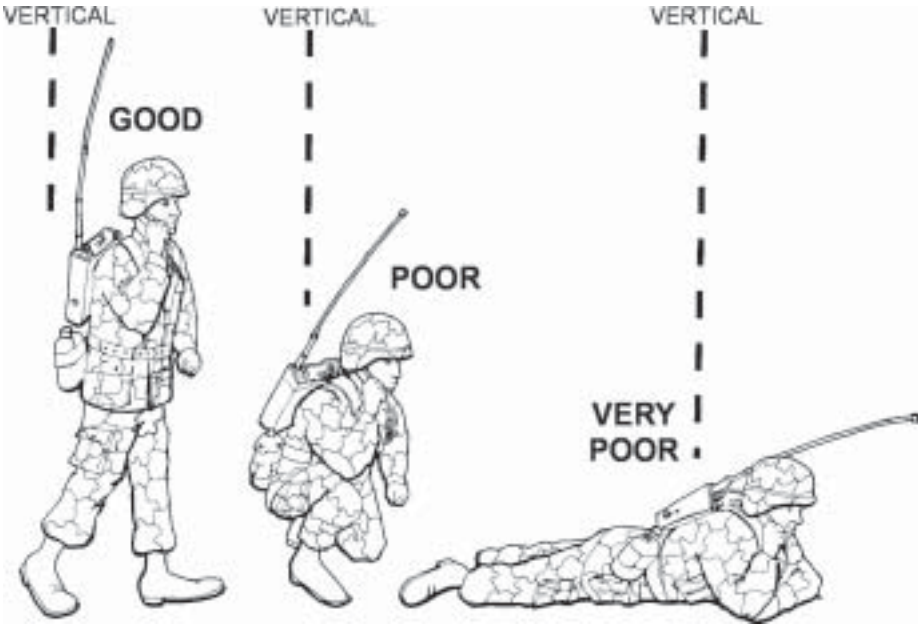


Figure 10. If operating ground wave, best results are obtained with the whip vertical. Also use a dangling ground-plane enhancement tail.

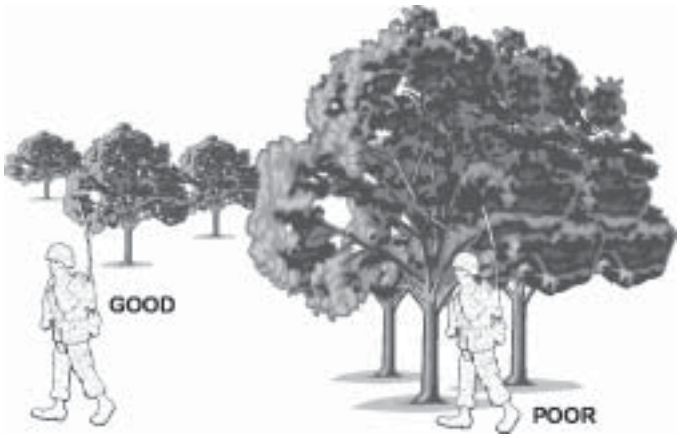


Figure 11. Where possible, find a clearing, no matter if you're using ground wave or NVIS.

Along with height, physical orientation is also very important when operating in the manpack configuration. The antenna must be kept as vertical as possible to produce the best surface-wave signal and also to avoid losses due to cross-polarization (Figure 10). It's also important when possible to operate from areas that don't have energy-robbing obstructions such as trees and buildings (Figure 11).

Whenever possible, manpacked radios should be removed from the operator's back and operated from the ground. This will reduce the capacitive coupling-to-ground effects of the operator's body that reduce signal strength. Also, when the manpack radio (AN/PRC-150) is operated from the ground, the ground-stake kit should be connected to the radio ground terminal and driven into the earth. This kit is provided with every radio and is designed to provide a low-resistance return path for ground currents. This dramatically improves

signal strength and communications efficiency.

Signal strength can be improved even more by connecting "radial" wires to the ground. Radials need to be constructed from insulated wire and connected on one end to the radio ground terminal. Ideally, radials should be one-quarter wavelength long and secured to the earth on their ends by means of nails, stakes, etc. Distribution of the radials should be symmetrical. In operational terms for the brigade, four wires (more if possible) of a practical length should be crossed in the center (X), and the center connected to radio ground. The wires should be spread by 90 degrees and secured (Figure 12).

Using ground radials improves vertical antenna performance (gain) by allowing more current to flow in the antenna circuit and by lowering the antenna pattern's takeoff angle. This produces an increase in ground-wave signal strength on low angles, where it's the most useful for tactical communications (Figure 13).

For vehicular operation, both fixed and OTM, the Army provides the 32-foot AT-1011 antenna. Under operational conditions, it won't always be possible to use all 32 feet of this antenna and keep it in the vertical position for best ground-wave performance. The antenna should always be kept as vertical as possible and as long as possible under the operational circumstances.

The radiation pattern for a vehicular-mounted vertical whip is essentially omni-directional; however, the mass of the prime mover under the antenna will distort the antenna pattern in the direction of the vehicle mass and provide signal gain in that direction. This can be exploited by pointing the vehicle's mass in the direction of the weakest station in a net or in the direction of the highest-priority station in a net to improve system operations (Figure 14).

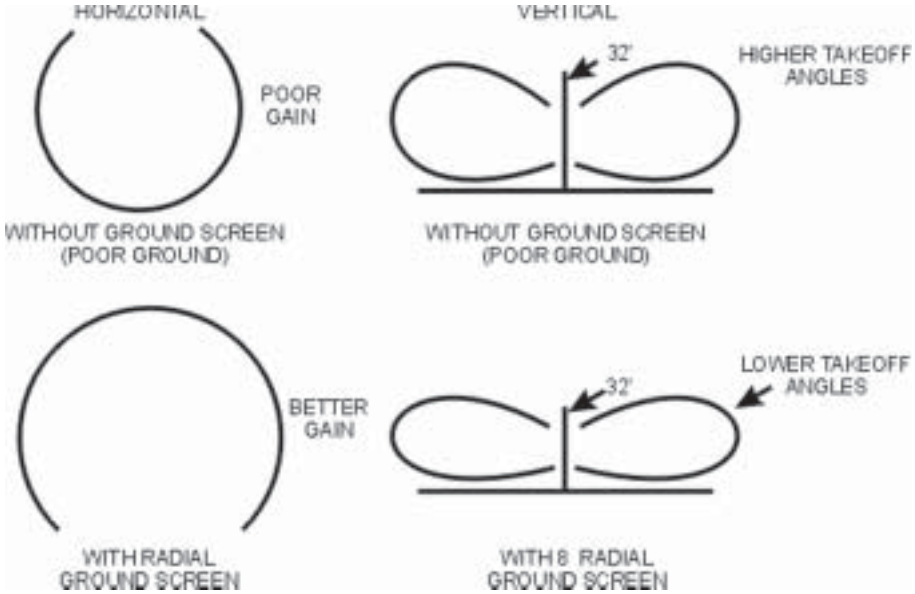


Figure 13. Whip performance.

Figure 14. Vehicle chassis as a counterpoise for surface-wave operation.

HALF-WAVE DOUBLET OR WIRE-DIPOLE ANTENNA. THFRS provides two types of wire horizontal dipole antennas for fixed-location operations at beyond-ground-wave distances. These antennas will overcome problems encountered when using vertical antennas in unsuitable situations (Figure 15). The antennas are the RF-1941 lightweight wire dipole and the AT-1912 dipole with 30-foot mast kit. The AT-1912 is provided only with the 400-watt base-station configuration.

A horizontal dipole consists of two one-quarter wavelengths of wire supported at the ends and connected to the radio in the center (Figure 16). If the antenna is kept physically one-quarter wavelength or less off the ground at the operating frequency, or is laid on the ground, or is even buried under the ground, the antenna pattern produced is that of an "inverted teardrop" (Figure 17). The bulk of the energy radiated is on angles between 30 and 90 degrees.

Since much of the radio signal is directed upward, where it can be reflected back to earth by the ionosphere, this mode of propagation is called the near-vertical-incidence

Figure 12. Manpack operation at halt. Note use of ground screen.

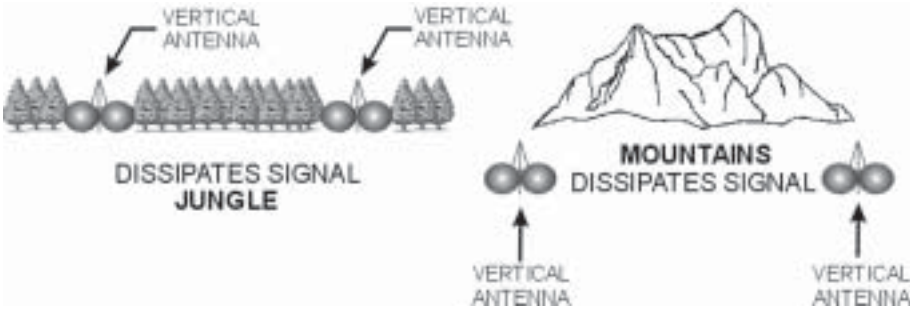


Figure 15. Problems associated with vertical antennas.

skywave mode. The relationship between antenna height above real electrical-conducting ground and signal gain is shown in Figure 18.

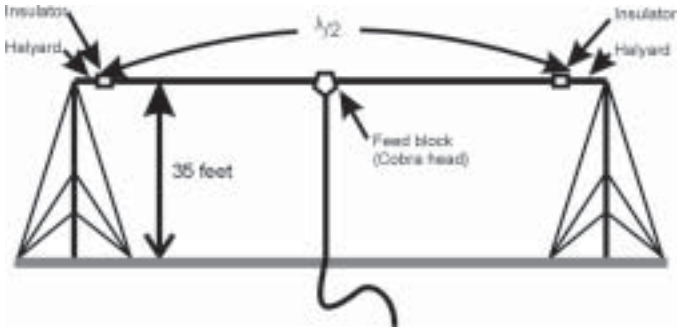


Figure 16. Horizontal dipole antenna.

Stations will try to elevate dipole antennas to 30 feet and leave them there, since the best average high-angle gain is attained in the NVIS frequency band at this height. The NVIS frequency band is, as a rule, two to four mhz at night and four-eight mhz in the day. Exception: in desert and arctic areas, the ground isn't very conductive. This means the antenna may perform better if it's physically lower or even on the ground, since real conducting ground could be many feet below the surface in these areas.

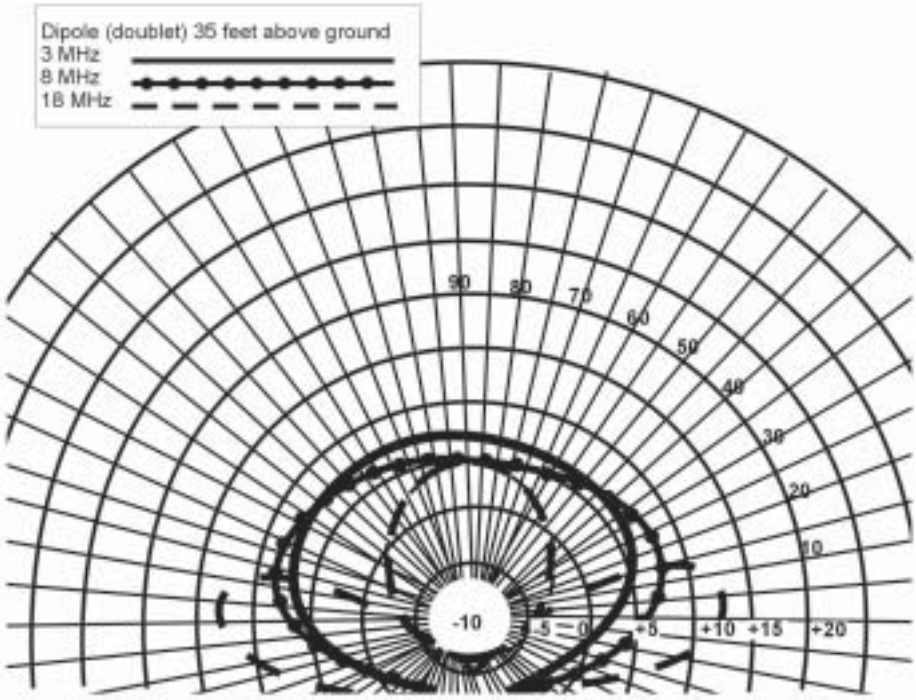


Figure 17. If a horizontal dipole antenna is one-quarter wavelength or less off the ground at the operating frequency, or is laid on the ground, or is even buried under the ground, the antenna pattern produced is that of an "inverted teardrop." The bulk of the energy radiated is on angles between 30 and 90 degrees.

Dipole heights must be adjusted to match actual operating conditions. The basic NVIS inverted-teardrop antenna pattern remains the same for all dipole heights one-quarter wavelength or less. Only the signal strength (gain) will change. Once a radio signal on a frequency that will be reflected is selected and the dipole is at a correct height, the signal will return to earth in an omni-directional pattern with a radius of hundreds of miles.

Note that dipoles can be made directional off their broad sides by putting them close to one-half a wave above ground. However, operators won't normally erect dipoles this high, so omni-directional communications will be used for most operations.

The NVIS signal after reflection has no holes and no "dead spots" or "skip zones," since all the energy is coming down from above. This makes NVIS an ideal mode for brigade-and-larger size operations over wide areas and at extended distances. Figure 19 shows the distance that can be expected by radiating signals on all angles.

Contrast Figure 17, which shows strong high-angle NVIS signal patterns generated by dipoles on all angles above 45 degrees, and Figure 19, which shows that energy on all angles above 45 degrees will, when reflected, give a strong radio signal at distances from zero to 300 miles. This is a good match for brigade communications needs such as reachback and tactical-operations-center-to-TOC communications. Using NVIS will also make communications in urban areas easy, since all energy comes from above and won't be as readily absorbed by urban structures. NVIS using ground-mounted wire-dipole antennas will be the most efficient means of HF communications when stations are located at BLOS (beyond ground-wave) distances from each other.

OTM NVIS OPERATIONS. As I previously described, each THFRS

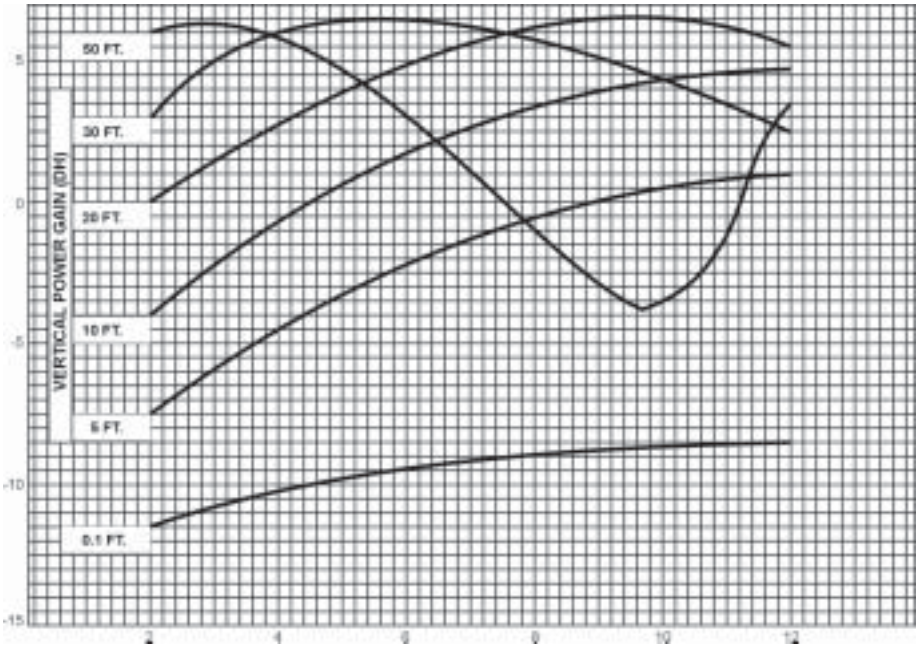


Figure 18. Cut 1/2-wavelength dipole at various heights over perfect and average ground. The bottom row of numbers is in mhz.

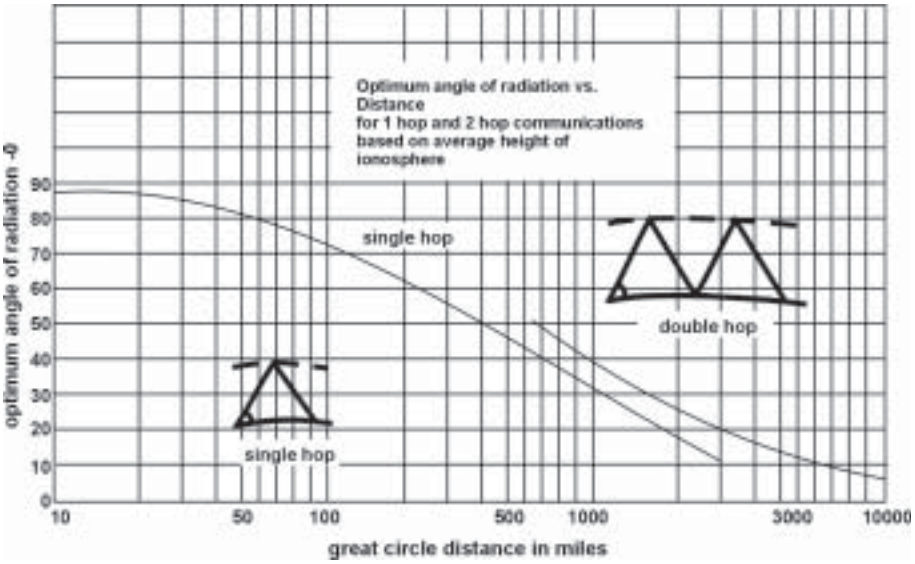


Figure 19. Radiation angle vs. range.

vehicular radio is equipped with an AT-1011 32-foot (whip) antenna. When in the vertical position, this antenna does a good job radiating vertically polarized surface-wave HF signals when OTM.

The AT-1011's length is often too long to be practical under operational conditions. In this case, shorten the AT-1011 by removing antenna sections until you find a practical length for the operational conditions. Shortening the antenna will make it less efficient for both transmitting and receiving, so operators shouldn't make the antenna less than 10 feet long under most conditions.

The RF-382 antenna coupler will tune a short antenna without a problem, and the omni-directional antenna pattern will remain for short antennas; however, signal strength will be greatly reduced when using very short vertical antennas. This same antenna when "tipped" horizontally, either forward or backward, will also produce an NVIS (dipole) antenna pattern. To facilitate whip antenna "tipping," antennas are located in a rear corner of either the vehicle or the shelter they're mounted on.

The antenna base is also provided with a seven-position "whip tilt adaptor" that will allow any length of AT-1011 antenna to be "tipped" into either the forward-facing or rear-facing horizontal position. When the brigade is at a brief halt, the antenna can be tipped backward to form a classic dipole – the AT-1011 whip being one half and the vehicle / shelter forming the dipole antenna's other half (Figure 20). When tipped backward, a classic "inverted teardrop" low-height dipole antenna pattern is produced.

If possible at longer halts, the antenna should be extended past 32 feet by replacing it with the wire from the RF-1941 antenna kit to make an even more efficient antenna. Ideal wire length will be one-quarter wavelength at the operational frequency.

When communicating OTM, the AT-1011 must be "tipped forward" over the vehicle for operational reasons. Again, the antenna should be as long as possible for best efficiency but practically can't be much longer than the length of the vehicle (usually less than 20 feet). Again, shortening the antenna makes it less efficient, but in this configuration the antenna and vehicle form what engineers call a transmission-line antenna. While this antenna doesn't have the ideal

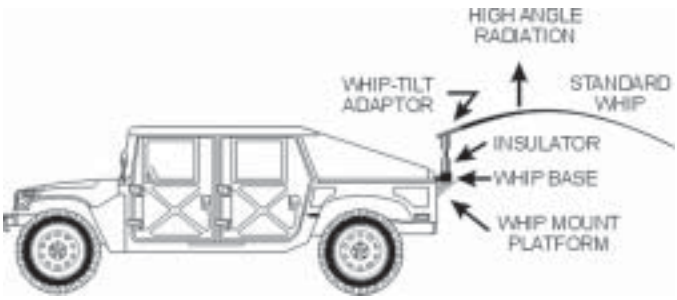


Figure 20. Use of a whip-tilt adaptor.

inverted teardrop NVIS shape that the wire dipole or rear-tipped whip has, it does produce enough energy on the near-vertical angles for NVIS communications. For missions such as motorized reconnaissance, movement-to-contact or convoy control, the bent-forward whip will be the antenna of choice for operations.

ANTENNA-LOCATION CONSIDERATIONS. The brigade is a tactical fighting organization and, when engaged in combat operations, won't always be able to locate its fixed and mobile radio assets at technically ideal positions for communications operations. Brigade HF communications planners should, however, attempt to comply with as many of the following criteria as possible to gain the best technical advantage for the tactical situation:

- Use ground radials and ground stakes under vertical antennas to improve antenna efficiency and lower takeoff angles for better ground-wave communications;
- Place vertical antennas on higher spots if possible to enhance ground-wave communications;
- Place all antennas above reasonably smooth earth if possible to reduce antenna pattern discontinuities and distortion due to ground reflections;
- Avoid placing vertical antennas behind metal fencing that will shield ground-wave signals;
- Avoid placing vertical antennas near vertical conducting structures such as masts, lightpoles, trees or metal buildings. Antennas need to be at distances of at least one wavelength or more to eliminate major pattern distortions and antenna-impedance changes caused by induced currents and reflections; and
- Separate antennas as far as practical to reduce interference effects between radio and antenna systems.

Remember that wire dipoles and tipped whips on vehicles can be placed in defilade since they radiate signals on high angles, while vertical whips will have their signals greatly reduced if they are in covered positions.

By following the concepts I discuss here, tactical communicators can provide reliable, gap-free, direct, wide-area communications BCTs need for operations in all types of environments and conditions. While HF radio will certainly not be the only type of tactical communications the BCT employs, it has been shown over and over again that HF will succeed under many conditions that will cause other means to fail. That's why it will be so valuable to the success or failure of the BCTs in combat.

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 DA 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

ALE – automatic link establishment
AO – area of operations
BCT – brigade combat team
BLOS – beyond line of sight
CPS – cycles per second
FOT – frequency of optimum traffic
HF – high frequency
LOS – line of sight
LUF – lowest useable frequency
Mhz – megahertz
MUF – maximum useable frequency
NVIS – near-vertical-incidence skywave
OTM – on the move
PM –project manager
RF – radio frequency
SINCGARS – Single-Channel Ground and Airborne Radio System
THFRS – Transformation High-Frequency Radio System
TOC – tactical-operations center
VSWR – voltage standing-wave ratio

TSM update

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

TSM-Tactical Radio

ENHANCED POSITION-LOCATION REPORTING SYSTEM

Preparation continues for user testing in November of the Enhanced Position-Location Reporting System's network manager, which will replace EPLRS' network-control station. Initial fielding will support Stryker Brigade Combat Team-3 in Fiscal Year 2003.

See ***Army Communicator***'s Spring 2002 edition for more information on major EPLRS improvements.

MULTIFUNCTIONAL INFORMATION-DISTRIBUTION SYSTEM

The Multifunctional Information-Distribution System radio has undergone extensive developmental and operational tests within the past year.

The Data Authentication Group and Reliability and Maintainability Scoring Conference met at Air-Defense-Artillery Test Directorate, Fort Bliss, Texas, to evaluate performance, logistics, reliability, maintainability and manpower and personnel-integration issues. The Army Evaluation Center is developing that group's findings and will provide a system-evaluation report to the program manager, according to CPT Mark Paulus, an ADADT test officer.

The PM, in turn, will provide input for a full-rate production decision in 1st Quarter FY 03. Pending the Milestone Decision Authority's decision, MIDS could make its debut as early as October in the new air-defense-artillery battery command post.

NEAR-TERM DIGITAL RADIO/BAE SYSTEMS' STEP 2C RADIO

Near-term digital radio and BAE Systems' Step 2C radio are developmental/experimental, mobile, packet data radios that provide a secure, self-organizing, self-healing network capability. NTDR uses the carrier-sense multiple-access protocol, while BAE Step 2C is a two-channel, software-programmable radio system using CSMA and time-division multiple-access protocols.

In addition to 4th Infantry Division and 1st Calvary Division, the first two SBCTs at Fort Lewis, Wash., are also receiving NTDR.

The BAE Step 2C customer test was scheduled for 4th Quarter FY02 at Fort Huachuca, Ariz. BAE Step 2C will be fielded to SBCT-3 through SBCT-6. The first unit scheduled to receive BAE 2C is SBCT-3 at Fort Wainwright, Alaska. BAE Step 2C fielding is planned for 1st Quarter FY03.

JOINT TACTICAL RADIO SYSTEM

In April the Joint Requirements Oversight Council revalidated and approved the operational requirement to build the Joint Tactical Radio System. Also, the JTRS' program's first block procurement underwent a successful Milestone B decision review by the defense acquisition executive in 3d Quarter FY02.

On June 24, the Boeing Company of Seal Beach, Calif., was awarded a $73,666,000 increment as part of an $856,539,000 cost-plus-award-fee contract – with an estimated total of $2,008,116,734 if all options are exercised – for development, demonstration and low-rate initial production of JTRS' Cluster 1. Work will be performed in Anaheim, Calif., and is to be complete by Jan. 31, 2008.

JROC will be presented an updated JTRS operational-requirements document in 4th Quarter FY02 to see if the council will approve more requirements supporting the maturing Objective Force concepts and future-combat-systems requirements. These requirements include the ability to communicate through subterranean and urban communications-masking environments; automatic selection of frequency (to make "adventitious use of spectrum"); handheld JTRS operation on two simultaneous channels; wideband-networking waveform accelerated to a threshold requirement for handheld; integration into emerging dismounted-soldier equipment and small unattended ground platforms; near-zero low probability of interception/low probability of detection/low probability of exploitation techniques; ability to configure any JTRS set for private point-to-point and conference-call capability; and embedded training capability.

TSM-SATCOM

MILSTAR

Milstar is a joint-service satellite-communications system that provides secure, jam-resistant worldwide communications to meet essential wartime requirements for high-priority military users. The multi-satellite constellation will link command authorities with a variety of resources – including ships, submarines, aircraft and ground stations. Milstar was designed to be the most advanced military-communications satellite system to date and represents the future of U.S. communications capability.

All Milstar satellites provide low-data-rate communications (voice, data, teletype and facsimile) at 75 bits per second to 2.4 kilobits per second. The last three Milstar II satellites will provide medium-data-rate communications (voice, data, teletype, facsimile) at 4.8 kbps to 1.544 megabits per second.

The first Milstar satellite, Milstar Flight 1, was launched Feb. 7, 1994, aboard a Titan IV expendable launch vehicle. Milstar Flight 2 was launched in 1995. Failures in the Centaur upper-stage software development, testing and quality-assurance process led to

an April 30, 1999, Titan IVB mission mishap that resulted in the loss of Milstar Flight 3.

Following Milstar 3, Milstar Flight 4 and Flight 5 were successfully launched with the MDR payload as well as LDR. Milstar 4 and 5 have much higher capacity than previous Milstar satellites. The MDR payload's higher data rate will enhance support to tactical users in the field.

Milstar Flight 4 is operational at 90 degrees west latitude. Flight 5 was launched in January and is now operational at 4 degrees east latitude.

Flight 6 is scheduled for launch in November. When Flight 6 testing is complete, Flight 4 will be moved to 177.5 degrees east latitude and Flight 6 will remain at 90 degrees west.

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ACRONYM QUICKSCAN

ADADT – Air-Defense-Artillery Test Directorate
CSMA – carrier-sense multiple access
EPLRS – Enhanced Position-Location Reporting System
FY – fiscal year
JROC – Joint Requirements Oversight Council
JTRS – Joint Tactical Radio System
Kbps – kilobits per second
LDR – low data rate
MDR – medium data rate
MIDS – Multifunctional Information-Distribution System
NTDR – near-term digital radio
PM – program manager
SBCT – Stryker Brigade Combat Team

Pulse

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

ARMY KNOWLEDGE MANAGEMENT ENTERS NEXT PHASE

by LTG Peter Cuviello

The Army is undergoing its most fundamental change in more than a century while still being fully dedicated to winning the global war on terrorism.

In August 2001, Secretary of the Army Thomas White and Army Chief of Staff GEN Eric Shinseki issued the first Army Knowledge Management memorandum. AKM is our comprehensive strategy to transform the Army into a network-centric, knowledge-based force. It consists of a robust set of goals and objectives that, once achieved, will improve the decision dominance of our tactical commanders and business stewards.

In the 10 months since the Army issued this first memorandum, the service has accomplished much in achieving the goals. For instance, the Army now has one enterprise portal (www.us.army.mil) providing universal access to Army knowledge. In May, the one-millionth Army Knowledge On-line user signed on.

The Army is also reducing the number of servers and is streamlining or eliminating many applications. These applications are being placed on the worldwide web but behind the secure AKO portal. With Network Enterprise and Technology Command's emergence, we're establishing a single authority to operate, manage and defend the Army's infostructure at the enterprise level. ***(Editor's note:*** *Army Signal Command is tentatively scheduled to become NETCOM Oct. 1.)*

The secretary and chief issued the second guidance memorandum for AKM in June. It's clear evidence we're taking our transformation efforts seriously and are moving forward in achieving our transformation goals.

The new memorandum, for which I am issuing implementing guidance, calls for more computer-server consolidation. It sets a new goal for reducing by half the number of Army web applications and ensures those remaining applications are linked to AKO. By reducing this so-called information-technology "footprint," the money we save can be reinvested in high-priority IT programs / systems or requirements.

Our initial focus is to have the directors of information management consolidate servers within posts, camps and stations at minimal cost. Besides the economies and efficiencies we can obtain from reducing that IT footprint, we also realize savings by using enterprise contracts. Further, we'll be decreasing system administration, operations and maintenance costs. Servers will be consolidated within several server farms on each installation, as local DOIMs determine.

The memorandum identifies several new focus areas within the AKM initiative that support the overall objec-

tives of AKM and Army transformation. These include information security, the Defense Department's Business Initiatives Council and the AKO Configuration Control Board.

Within the Business Initiative Council arena, for instance, the Army keeps any savings from its process changes. This will foster creative ideas and enable funding of some tightly constrained IT budget items.

These changes are impacting the Army's transformation effort on both the operational and institutional sides of the Army. The results are so apparent and beneficial to the Army that senior leadership has said, "We need to speed progress and show even more tangible results."

Our secretary and chief of staff strongly believe that leadership and trust are at AKM's heart. That's why we challenge leaders and soldiers at all levels to do their part in carrying out this new guidance so we can ensure the Army truly is a network-centric, knowledge-based force, second to none in the world.

LTG Peter Cuviello is the Army's chief information officer/G-6.

ACRONYM QUICKSCAN

AKM – Army Knowledge Management
AKO – Army Knowledge On-line
DOIM – director(ate) of information management
IT – information technology
NETCOM – Network Enterprise and Technology Command

Doctrine update

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

COMMAND, CONTROL, COMMUNICATIONS AND COMPUTERS IN THE CONTEMPORARY OPERATIONAL ENVIRONMENT

by K.N. Svendsen and Russell McCray

The events of Sept. 11, 2001 have shown that the operating environment and doctrine of the past must be adapted to better protect America's homeland and national interests. Two years into the new millennium, the Army finds itself operating in a new, multidimensional environment. This new environment is known as the Contemporary Operational Environment.

The Signal Regiment is assuming new responsibilities within the realm of command, control, communications, and computers operations that will require new skillsets and functions. To meet the need for up-to-date Signal Regiment keystone doctrine, the Signal Center is developing Field Manual 6-02, ***C4 Operations in the Contemporary Operational Environment.*** FM 6-02 will be posted as an initial draft in 4th Quarter 2002 and will ultimately replace the current Signal Regiment keystone manual, FM 24-1, last published in 1990.

FM 6-02 will provide keystone C4 operations doctrine for the Signal Regiment. Current and future adversaries may range from highly trained, competent forces equipped with advanced technologies to disparate and fragmented elements without formal doctrine and utterly reliant upon asymmetric methods.

FM 6-02 discusses the COE and highlights some of the responsibilities and operational areas that members of the Signal Regiment will face to provide a high level of support to the warfighter anywhere and anytime. C4 operations highlights the unifying efforts that combine the visions, judgments and impressions of multiple commanders and key warfighters into a single, coherent thought, allowing the views, ideas and judgments of many experts, specialists and authorities to be brought to bear on any given task.

FM 6-02 details C4-operations assistance in the proper positioning of critical information, enabling commanders and warfighters to respond quickly and decisively to requests for information by placing and maintaining the information where it's most needed. It provides a means of producing a picture of the operations area that's accurate and distinctive and meets warfighters' needs.

FM 6-02 highlights the role C4 operations will perform in ensuring the successful accomplishment of Army forces, joint operations and homeland-security missions. The FM provides the crisis- and consequence-management definitions needed when making operational decisions. Also, the FM addresses both current and future communications architectures used in C4 support.

Concurrent with the development of FM 6-02 is the development of the information-management concept of operations, which will be the basis for the Signal Regiment IM doctrinal FM. The IM FM will provide the doctrinal guidance, direction and management required for information and information management.

IM is a basic element of the information-superiority construct and is a key component of C4 operations. As defined in FM 3-0, "[IM] is the provision of relevant information to the right person at the right time in a usable form to facilitate decision-making. It uses procedures and information systems to collect, process, store, display and disseminate data and information."

IM is an integral part of all operations. It's a never-ending process and is inherent to every decision and action from planning through execution. IM systems and processes will directly influence the achievement of knowl-

edge dominance and decision superiority. The Signal Regiment's doctrinal FM will define the processes, systems, responsibilities and organizations involved within this broad and critical area.

The Doctrine Branch develops Signal Regiment doctrinal publications and is under the Concepts and Doctrine Division of the Directorate of Combat Developments at Fort Gordon, Ga. The Doctrine Branch invites everyone to visit the Signal Regiment Doctrine Digital Library (http://www.doctrine.gordon.army.mil) to view all draft Signal Regiment doctrinal publications. All comments and recommendations are welcome.

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 DCD.

Mr. McCray develops and writes doctrinal literature for the Concepts and Doctrine Division of the Signal Center's DCD. He is a 26-year retired Army veteran and a graduate of Southern Illinois University, Carbondale, Ill.

ACRONYM QUICKSCAN

C4 – command, control, communications and computers
COE – Contemporary Operational Environment
DCD – Directorate of Combat Developments
FM – field manual
IM – information management

Signal-planning fundamentals for field artillery

by MAJ John Hinkel

The artillery battalion's tactical-operations center hummed with activity. It was H-1 hour and the battalion S-3 had just finished the battle-update brief. The batteries were poised, ready to spew a fiery death on the enemy. Eagle 6's guidance from the brigade fire-support rehearsal had been succinct: "We've got to bloody the motorized rifle regiment in the passes. I want the artillery to grab him by the nose and kick him in the a--."

Just then the fire-direction center's radios sparked to life. It was Combat Observation and Lasing Team 4, primary observer of the passes. COLT 4's transmission was very weak and broken – barely audible. Through the static, COLT 4 was calling for AE9002 – permission to detonate the family of scatterable mines. It was time to grab the MRR by the nose.

The next moment the words "fire mission" reverberated through the battalion TOC. During the night, Gator Battery had moved forward with the counter-reconnaissance company, prepared to execute the battery's primary essential field-artillery tasks (which include emplacing FASCAM in the passes).

The battalion fire-direction officer calmly picked up the hand mike and broke squelch."Gator 8, this is Thunder 8, over." He repeated the call again. "Gator 8, Thunder 8, over." Silence.

After a long moment and sounding very distant, Gator 8 responded, "This is Gator 8. I hear you broken and distorted, over."

The battalion FDO shouted into his hand mike, "Fire AE9002, over."

"Thunder 8, this is Gator 8, I read you broken and distorted. Say again, over."

"Fire AE9002, over."

"Fire AE9002, out."

As the S-6 was listening to the radio transmission, he was nervous. The transmission didn't sound good, and the S-6 hoped the comms would get better. He was wondering if his plan would work – would it?

Then the S-6 remembered a Wolf Team after-action review, the one where Wolf 7 made him stand up to pay attention when he fell asleep. The details escaped him … something about Signal-planning fundamentals for the field artillery. What were they? His mind wandered back to the National Training Center AAR van as he began remembering. …

Solid Signal-planning skills and techniques incorporated into the battalion's military decision-making process will lead to effective command-and-control of the battalion. A key planner is the battalion S-6. But what process can he use? The following Signal-planning fundamentals are based on my observations at NTC during the last 18 months. When properly followed, these fundamentals provide a robust and flexible C2 network.

There are eight Signal-planning fundamentals. They are:

- Maximize radio capabilities;
- Know the planning ranges;
- Identify critical users;
- Identify critical nets;
- Identify critical users' locations;
- Develop a command-post movement plan;
- Develop a CP alternate movement plan; and
- Cover deadspace with retransmission.

Maximize radio capabilities

The S-6 can maximize his radio capabilities by ensuring the equipment is fully mission-capable, minimizing the effects of manmade noise, siting the battalion TOC on terrain that will facilitate good communications and properly spacing the battalion TOC's antennas. The first thing the S-6 should confirm is that the radios are correctly installed and are fully mission-capable.

Ensuring that a Single-Channel Ground and Airborne Radio System radio is fully mission-capable is as simple as performing a self-test and conducting long-range radio checks. Also, the battalion communications shop can use an AN/PRM-34 to test for transmitted power to ensure antennas and ancillary cables are fault-free.

Also, the radio must be installed correctly. A common fault is lack of a proper ground. If electronic equipment isn't properly grounded, it will radiate electricity as a radio wave that will interfere with nearby radios. To counter the effects of missing equipment grounding, the S-6 must inspect the radios to ensure they're properly grounded. These checks should be identified as pre-combat checks and/or pre-combat inspections and incorporated into unit standard-operating procedures.

The effects of manmade noise can vary from slight to great. Manmade noise can greatly reduce the effective transmit power of any radio. Generators, power lines and parallel signal and power cables produce manmade noise. The S-6 must carefully eliminate or minimize manmade noise's effect by conducting a daily inspection of critical C2 nodes – looking for generators in the antenna field, nearby interfering power lines and parallel signal and power cables.

The next step in maximizing our radio capabilities is to ensure the battalion TOC is sited on terrain to facilitate good communications. During the battalion TOC's site reconnaissance, the S-6 must ensure the site is far removed from overhead power lines, and that the potential battalion TOC site has

unobstructed radio-wave access, good soil conductivity for a good ground and plenty of room for the antenna farm. For these reasons, it's imperative the S-6 or battalion communications chief participate in all battalion TOC reconnaissance.

Placement of the battalion TOC's antennas is a critical leader task for the battalion S-6 and communications chief. OE-254 antennas are optimally spaced 10 meters apart. This is difficult to achieve. When optimal spacing isn't feasible, the antennas must be vertically spaced. Ideally this is one OE-254 placed directly above another. Since most battalions don't have this type of mast, the next best placement is to ensure the bottom elements of one adjacent OE-254 are clearly above the top elements of an adjacent lower OE-254 (Figure 21).

Know the planning ranges

The second Signal-planning fundamental is to know radio-planning ranges and what affects them. This is important so that the S-6 may recommend specific radio/antenna combinations and optimal data rates for digital nets to the commander and staff. Radio range depends on frequency, transmit power, antenna type, terrain, natural noise, manmade noise and data rates for digital nets. The effects of frequency, transmit power, antenna types and data rates are published in supporting technical manuals; their impact on range are based on scientific observation and calculations. Terrain impact on radio range is more subjective.

Power	Voice	Data
Lo	200-400m	
Med	400m-5km	
Hi	5-10km	3-5km @ 600-4,800 bps
		1-3km @16 kbps
PA	10-40km	3-10km @ 16 kbps
		5-22km @ 4,800 bps
		5-25km @ 600-2,400 bps
		Enhanced data mode
Hi		5-10km @ 1,200N-2,400N
		5-10km @ 4,800N
		5-10km @ 9,600N
PA		20-35km @ 1,200N-2,400N
		15-25km @ 4,800N/packet
		10-25km @ 9,600N

Why is there a large variance in ranges?

Antenna type
- Manpack (five-10 km)
- Vehicle whip (10-40 km)
- OE-254 (40-50 km)

Terrain
- Vegetation
- Soil conductivity
- Blocking terrain

Manmade noise
- Adjacent to power cables
- Antenna cables close to generators

Figure 22. Top table, SINCGARS planning ranges (general guidelines). List above: antenna type, terrain transmitted over and manmade noise cause variations in ranges given.

Figure 21. When Signaleers have adjacent OE-254 antenna masts at a battalion TOC, place bottom elements of one clearly above top elements of adjacent lower OE-254s.

Terrain effects of radio range include vegetation, soil conductivity and blocking terrain. SINCGARS radios operate in the very-high-frequency frequency-modulation portion of the spectrum and use ground-wave communications instead of skywave. (HF-amplitude modulation uses skywave communications, where atmospheric conditions are more important than terrain effects.) SINCGARS radio waves follow and interact with the earth's surface. Dense vegetation and poor soil conductivity decrease the strength of the electromagnetic ground wave (transmit power), which translates to shorter range. Therefore, knowing the type of

terrain and vegetation is important to predicting SINCGARS radio range.

A SINCGARS radio can transmit farther over seawater than over the desert. Why? Seawater is a much better electrical conductor than sand, which is silicon. How much better is difficult to calculate. Direct observation and experience are the best gauges, although the technical manuals do give some general guidelines (Figure 22).

The third, fourth and fifth planning fundamentals are all related to our customers. Namely, who are the critical users, what radio nets do they operate on and where are they located on the battlefield?

Identify critical users

Who are the critical users? Critical users are those users who, if they can't communicate, will directly lead to a mission's failure. Not all users are critical. Unfortunately the organic Signal platoon doesn't have the assets to extend the radio networks for every user. Therefore, the commander must establish priorities, and identifying critical users is the first step.

In a direct-support field-artillery battalion conducting combat operations, the fire-support coordinator, COLT/strikers, DS-battalion fire-direction center, DS-battalion S-3, battery fire-direction centers, task-force fire-support officers, reinforcing-battalion fire-direction center, reinforcing-battalion S-3 and the counter-fire radar may be critical users.

Of course, critical users will change as the unit prepares for combat, executes combat missions and consolidates/reorganizes after combat.

Identify critical nets

What radio nets are critical for critical users? Each critical user has critical nets they must operate to accomplish his mission. These critical nets may change over the course of a battle.

In a DS FA battalion, the critical nets are generally the brigade fire-support net, the battalion fire-direction voice and digital nets, the battalion command net and the battalion administration/logistics net.

At this point, the S-6 knows who the critical users are by phase, and he knows the critical nets they operate.

Identify critical users' locations

Next, the S-6 must determine where the critical users are located on the battlefield by phase. He can ascertain this in several ways: ask critical users where they'll fight from; read the higher-headquarters operations orders; and actively participate in the MDMP to gain a full understanding of the maneuver scheme.

Throughout this process, the S-6 must designate who's responsible for establishing and extending the critical nets. Signal responsibilities for establishing communications are "higher to lower," "left to right" and "supporting to supported." With an understanding of who the critical users are, what nets are critical and critical users' locations on the battlefield, the S-6 is now ready to begin planning for the battalion TOC.

Develop a CP movement plan

The sixth step involves optimally locating the battalion TOC in space and time. This can only occur when the battalion TOC's location and movement planning occurs in the MDMP. During the mission-analysis brief to the commander, the S-3 or S-6 should identify the critical time and location for the battalion TOC to be fully mission-capable.

For example, during a deliberate attack, the battalion TOC must be set before executing suppression and obscuration targets supporting the breach. If the optimal location for the battalion TOC is forward of the line of departure, then the jump-battalion TOC may control the battalion during movement across the departure line as the main battalion TOC moves forward to the optimal location.

A second option is the complete battalion TOC moves forward to its optimal location while a battery fire-direction center – hosting the S-3 or assistant S-3 – controls movement across the departure line.

Another option is the reinforcing battalion assumes control as the DS battalion moves forward to the optimal position.

There are many possibilities. However, communications for critical users must not be compromised. Time-distance calculations, route recons and the set-up level for the battalion TOC are also key considerations and should be coordinated and synchronized during the MDMP (Figure 23).

Develop a CP alternate movement plan

The seventh step in the process is to develop an alternate location and movement plan for the battalion TOC and to designate an alternate battalion TOC. Enemy actions will influence the battalion TOC and Signal planning. Prior planning for these contingencies provide the flexibility required for successful action.

In addition to the primary location for the battalion TOC and retrans teams, the S-6 must designate alternate and supplementary positions for each element. For example in a movement-to-contact, friendly forces plan on engaging and defeating the enemy in a specific set of engagement areas. However, if the enemy moves much quicker than the S-2 anticipated, this will force friendly forces to fight in a shorter set of engagement areas. Accordingly, for this type of operation the S-6 must develop primary and alternate locations for the battalion TOC and retrans to support the shorter set of engagement areas.

Also, the S-3 and S-6 must consider an alternate battalion TOC if the main battalion TOC is destroyed. This may be as simple as designating a battery CP as the alternate battalion TOC or using the reinforcing-battalion TOC as the alternate battalion TOC.

The key point to remember is to develop a flexible, rehearsed plan.

Time-distance calculations

- Use TerraBase to measure route
- Estimate movement speed – 15 kilometers an hour cross-country by day, 10 kilometers an hour cross-country by night
- Divide route distance by speed, then multiply the answer by 60. The result is travel time in minutes. Example: (11.55/15) x (60)= 46 minutes
- Add tear-down and set-up time to the travel time. This is the total time required to jump and become operational. Example: travel time 46 minutes + 20 minutes tear-down + 15 minutes set-up = 81 minutes

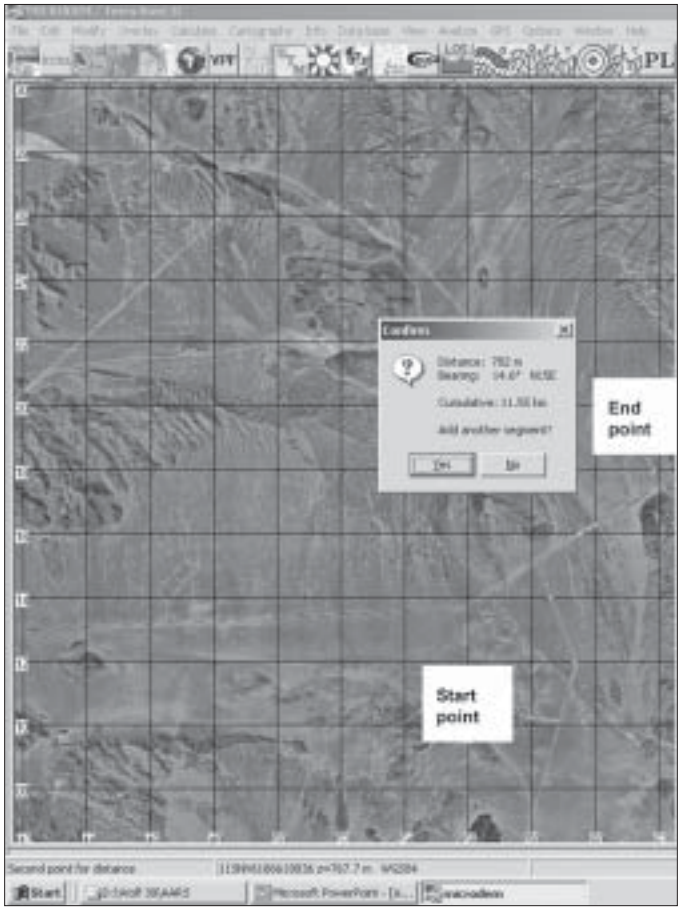

Figure 23. Time-distance calculation. The screenshot at right shows the TerraBase software measuring the route. Considerations for calculating time and distance are shown in the box above.

Cover deadspace with retrans

The last step in the planning process is in three parts: cover remaining deadspace by deploying the battalion's retrans team, establish multiple forms of communications to critical users and draw a sketch to depict the Signal plan.

As with the battalion TOC, the battalion retrans team must be placed in the optimal location at the optimal time as identified in the MDMP. Equally important is to establish redundant forms of communication for critical users. Redundant forms of communications include mobile-subscriber radio-telephone, tactical-satellite terminals, wire and HF-AM radios.

Finally, the S-6 must draw a sketch that clearly and concisely depicts the battalion TOC's location, retrans team's location and radio-net coverage in the battalion's operations area (Figure 24). This simple sketch will enable the commander to visualize the C2 network.

By using Signal-planning fundamentals, the battalion S-6 will have the tools and techniques necessary to design, develop and deploy a robust, flexible C2 network. This will lead to effective C2 of the battalion and successful mission execution.

… The thunderclap of a nearby cannon shook the battalion TOC and snapped the S-6 back to reality. Communications with Gator Battery were badly garbled; the battalion was in jeopardy of not accomplishing one of the brigade commander's essential fire-support tasks.

The S-6 was puzzled. The retrans team deployed forward two days ago with the COLTs and was fully functional. The previous night, the battalion conducted a quality FA technical rehearsal with all stations on the appropriate radio nets, including the retrans frequencies. The S-6 couldn't understand what had happened.

These thoughts in mind, he stepped outside the battalion TOC and there before him was the culprit – an OE-254 lying on the ground. This OE-254 operated on one of the battalion's critical nets. Sometime during the early morning it must have blown down.

The fix was easy and was made within minutes. Stepping back inside the battalion TOC, the S-6 clearly heard both COLT 4 and Gator Battery. The noose was tightening around the MRR; soon the enemy would meet a fiery death.

MAJ Hinkel was the combat Signal trainer at NTC, Fort Irwin, Calif., for 18 months (until June). He based his article on his observations of 20 NTC rotations.

Acronym QuickScan

AAR – after-action review
AM – amplitude modulation
Bps – bits per second
C2 – command and control
COLT – Combat Observation and Lasing Team
CP – command post
DS – direct support
FA – field artillery
FASCAM – family of scatterable mines
FDO – fire-direction officer
HF – high frequency
Kbps – kilobits per second
Km – kilometer
M – meter
MDMP – military decision-making process
MRR – motorized rifle regiment
N – enhanced
NTC – National Training Center
SINCGARS – Single-Channel Ground and Airborne Radio System
TOC – tactical-operations center

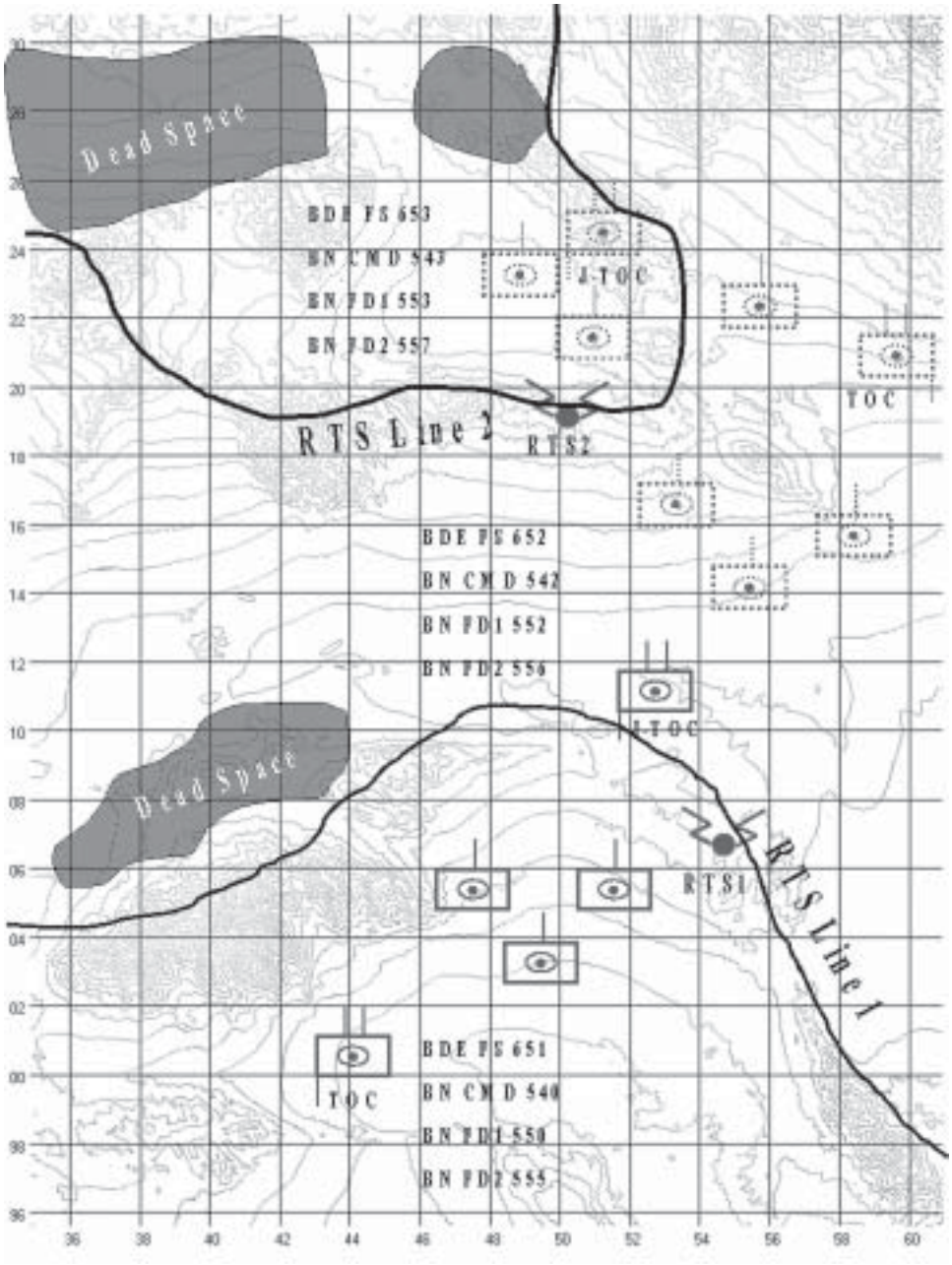

Figure 24. An illustration of the Signal sketch the S-6 draws that depicts the battalion TOC's location, retrans team's location and radio-net coverage in the battalion's operations area. This sketch enables the commander to visualize the C2 network.

GRECIAN FIREBOLT

Grecian Firebolt 2002 tests interoperability in homeland-defense communications scenario

FORT MEADE, Md. – The largest peacetime communications exercise in the world, Grecian Firebolt 2002, was held June 15-30. This year's exercise tested the communications piece of a homeland-defense scenario.

One of Army Signal Command's Reserve units, 311th Theater Signal Command (headquartered here) was in charge of this year's exercise. The exercise involved active and Reserve Army units, Army and Air National Guard units and the Federal Emergency Management Agency.

The exercise supported eight other major Reserve Component exercises spanning 32 U.S. sites and Puerto Rico. It tested interoperability among the Army, Air Force and FEMA's mobile emergency-response communications teams.

From a 311th Theater Signal Command public-affairs office release.

This year's Grecian Firebolt coverage focuses on 280th Signal Battalion and the Army Reserve's Petroleum, Oil and Lubricants Exercise, one of those "eight other major Reserve Component exercises."

ACRONYM QUICKSCAN

FEMA – Federal Emergency Management Agency

Company C Signaleers make the connection

by SPC Derick Vance

DEVENS RESERVE FORCES TRAINING AREA, Mass. – "Can you hear me now? Good."

Connecting the lines of communication is a formidable task for any group of people trying to convey information, whether they're commercial wireless companies or soldiers on assignment at this New England military post. Company C, 280th Signal Battalion – an Army National Guard unit from Westbrook, Conn. – did its part to connect those lines of communication during Grecian Firebolt, the largest global-communications exercise in the world.

The 280th Signal Battalion supported 12 units involved in the Petroleum, Oil and Lubricants Exercise held at military installations across the country. "Our mission is to ensure a secure phone network and supply communications support to the POLEX training," said SSG John O'Briant, one of many noncommissioned officers providing instruction to 280th soldiers.

The 280th's mission is installing, operating, maintaining and troubleshooting phone networks. It's tasked and trained to set up its equipment and to quickly be fully operational. "When we hit the ground, we can be up and running within 24 hours," said O'Briant.

SGT Nicholas Diluggo, NCO in charge of operations, described 280th's equipment used in Grecian Firebolt. "There are radio trucks connected to two 90-foot antenna towers that shoot a radio signal out to a number of sites, allowing phone connection to as many as 50 subscribers at each site," Diluggo said. "Soldiers in the woods will be able to communicate with other soldiers across the country."

The 280th also has Internet and

See Page 30 for related article on 280th Signal Battalion's A and B companies' work in POLEX and Grecian Firebolt.

email capability, he said.

Since the terrorist attacks of Sept. 11, 2001, the exchange of information has become a great priority among military and civilian organizations alike, so POLEX's significance is important to the Army's mission. "It gives us the opportunity to test our skills," O'Briant said.

"Being an operations NCO, I need to be informed about terrorist threats," Diluggo said.

The exercise also provided soldiers with two full weeks to train under simulated combat situations. "The soldier knows if a real-world mission comes up, he or she can do his or job," said Diluggo.

"There are about 90 (Signal) soldiers on the ground to carry out the mission," he added.

SPC Vance is assigned to 214th Mobile Public Affairs Detachment, Richmond, Va.

ACRONYM QUICKSCAN

NCO – noncommissioned officer
POLEX – Petroleum, Oil and Lubricants Exercise

Reserve troops step on-line with Army Knowledge On-line

by SGT Brett McMillan

DEVENS RESERVE FORCES TRAINING AREA, Mass. – Long a leader in weapon technology, the U.S. Army used information technology – with its own Internet communication system – to assemble and disseminate timely information at Petroleum, Oil and Lubricants Exercise 2002 June 14-28.

POLEX headquarters, overseen by the Army Reserve's 475th Quartermaster Group here, took advantage of Army Knowledge On-line to receive daily situation reports, logistics status reports and sensitive-item reports every morning, said LTC David Mireles Jr., chief of the liaison office and deputy commander of 647th Area Support Group, El Paso, Texas.

"It's a good way for the Army to be moving," Mireles said. "All our military and civilian full-time staff has established accounts. I've seen quite a few of the staff using it here."

More than a thousand quartermaster, transportation, Signal and medical soldiers from Reserve and National Guard units around the northeastern United States trained during POLEX.

"This is exactly what we want AKO to do – add value to the Army by integrating the portal into day-to-day operations," said COL Bob Coxe, the Army's chief technology officer. "AKO represents a basic set of tools that are optimized for information dissemination for the entire Army. But in reality, these tools are optimized for smaller organizations where the work gets done. It fascinates us to learn of the many uses folks in the field have found to use AKO to incorporate into their organizations.

"The ultimate compliment and the greatest indicator of AKO success would be when soldiers take AKO for granted as their place to get things done and simply assume it's their place to get their information," Coxe added.

For now, Mireles said soldiers are mostly using AKO for email, but he pointed out a lieutenant who recently took advantage of one of the system's other capabilities.

"While it's great for communicating with units," said 1LT Tracy Bernhardt, liaison officer for 300th Quartermaster Company, Peru, Ill., "the thing I like about it is that I was able to access and view all my records through my AKO account as I was preparing to submit a packet for the Active, Guard and Reserve Program."

Soldiers' records were formerly accessible through microfiche but are now available for them to view on the Internet if they have an AKO account. In August 2001, the Army mandated that all soldiers and Army civilians establish AKO accounts, which are available to new users at http://www.us.army.mil/.

AKO is also set up to allow document sharing, said CPT Patrick Swan, command-information officer, 214th Mobile Public Affairs Detachment, Richmond, Va.

"Our unit's mission is to tell soldiers' stories from this exercise," Swan said. "Even with overnight delivery, it still takes a day to physically move a CD-ROM with stories and photos to our higher headquarters for this operation at Fort Dix, N.J. But with AKO's Knowledge Collaboration Center, we just upload our large photo files to the central AKO database we've established. Soldiers from our higher headquarters, 318th Press Camp Headquarters, can then download the photos and stories and begin processing them immediately to send to soldiers' hometown newspapers or to local post newspapers.

"The bottom line for us is if we can move our stories faster through 318th and to a newspaper editor, we stand a much greater chance to have those stories run before they become old news," Swan said.

Although MAJ William Klaus, 327th Quartermaster Battalion liaison officer for POLEX, said while he doesn't use his AKO email account much, on a scale of one to 10, he rates AKO a nine. "As far as the military news and direct links, I think it really covers just about everything you could want," he said. "I don't know what I would do to improve it."

SGT McMillan is with the Army Reserve's 214th Mobile Public Affairs Detachment.

ACRONYM QUICKSCAN

AKO – Army Knowledge On-line
POLEX – Petroleum, Oil and Lubricants Exercise

280th Signal Battalion provides commo at exercise

by SSG Nate Orme

FORT A.P. HILL, Va. – 280th Signal Battalion's Alpha and Bravo companies provided much of the communication for the Petroleum, Oil and Lubricants Exercise this year. The 280th is from Seaford, Del.

"We have 80 troops here, including 10 augmentees from the Puerto Rican National Guard, 11 from 301st Signal Command and four satellite soldiers," said CPT Valentine Miller, Company A's commander. "We're providing tactical-subscriber phone services to 319th Quartermaster Battalion [Warrensville Heights, Ohio] and 423d Quartermaster Battalion (Water) [Warren, Ohio], and their subordinate commands here. We've put in cable links, line-of-site links and one fiberoptic link."

PFC Raul Lugo of 35th Signal Battalion in Juana Diaz, Puerto Rico, was here to support the 280th. He said events like the attacks of Sept. 11, 2001, were one of the reasons he enlisted as a multichannel system operator and maintainer.

"It enrages you and makes you try harder and put more effort into your job to make sure it doesn't happen again," he said.

All the communications soldiers worked together to implement communication with the units out in the field. The 280th's SSG Le-mmon Pitts and SPC Jackie Davis manned the AN/TTC-39D, a mobile switch housed on a truck.

"(The 39D) provides the main commo for everything on a site," Pitts said. "Once the switch is up, we have to preaffiliate the phone listings so they can affiliate the phones in the field that go through the switch."

Meanwhile cable dogs, as they're affectionately

See Page 29 for related article on 280th Signal Battalion's C Company' s work in POLEX and Grecian Firebolt.

Figure 25. PFC Raul Lugo of 35th Signal Battalion in Juana Diaz, Puerto Rico, sets up a communications cable to support 280th Signal Battalion in POLEX '02.

known, strung miles of cable. SGT Perfecto Cobian of 301st in Fredrick, Md., explained, "We can do everything from basic phone connection to heavy construction. We run cable between switch vans to patch panels and out to subscribers in the field."

SPC David Lane of 280th Signal Battalion said he likes his job as a cable-and-wire maintainer. "We do fiberoptics in-house and in the field," he said. "Plus, we can use this in the real world."

SSG Orme works with 214th Mobile Public Affairs Detachment, Richmond, Va.

Signal sergeant squelches problems

by SPC Derick Vance

DEVENS RESERVE FORCES TRAINING AREA, Mass. – Popping, static and squelching noises ring through the air. Radio equipment lays stacked flush against the wall, along with manuals strewn chaotically across the table. Network diagrams are tacked to the wall like crooked picture frames in an unkempt house. Outside this confined space are a gaggle of soldiers who await answers, like students receiving information for a test.

Welcome to the office of SSG Chuck Harris, the 36-year-old noncommissioned officer in charge of operations for Company C, 280th Signal Battalion, during the Grecian Firebolt exercise here. Harris has served in 280th Signal Battalion for 18 years. Being the NCOIC of operations is a duty Harris said he takes seriously.

Along with Grecian Firebolt, the 280th – a National Guard unit from Westbrook, Conn. – is also supporting 12 units involved in the Petroleum, Oil and Lubricant Exercise held at military installations across the country in June.

During POLEX Harris' days are 12-hour shifts; however, he could be called at any time during the day or night to troubleshoot a problem.

"I don't pull a regular shift, I'm on duty 24 hours a day," Harris said.

Harris' duties consist of planning Signal operations and prepping the unit before annual training. Harris, who supervises 12 Signal soldiers, works with the Single-Channel Ground and Airborne Radio System. He also uses a number of telephones to carry out the mission.

It's important that he keep himself abreast of everything that's happening during the exercise and also that he communicates with everyone as well. "Communication is key to any successful exercise," Harris said.

All the units involved in the training exercise must have a communications hub, and Harris' operations center is like nerve central for those units. It's understandable, then, that he said the most difficult challenge of his job is coordinating all the information he receives daily.

"You have so much input coming in. Trying to figure out who the output is going to is tough," Harris said.

Harris brings technical expertise from his civilian job as an information-technology specialist. "I try to incorporate what I learn on my civilian job to my military job," he said.

Many soldiers said they appreciate the way Harris works with multiple tasks and still finds time to help them. He's flexible and hears and understands the troops' concerns, they said.

PFC Kelsey Vance, a radio operator from Killingly, Conn., said, "Harris listens well and knows what he's doing."

SPC Kim Kenny from Groton, Conn., added, "He's kind and nice. He never yells at you."

Since the terrorist attacks of Sept. 11, 2001, many Army men and women have rededicated themselves to getting their military job done, Harris said, and he is no different. "It's very important that we get all soldiers up to speed," he said.

SPC Vance writes for 214th Mobile Public Affairs Detachment, Richmond, Va.

Figure 26. SSG Chuck Harris answers calls in the operations station of Company C, 280th Signal Battalion.

Cisco academy offers high-tech skills to Army Reservists

by SPC Jonathan Charles

FORT MEADE, Md. – A modern army can't fight if it can't communicate. In the 21st century, communications means data, and the Army is no different from any other high-tech corporation. It needs people trained in communications technology. For the U.S. Army, that technology is Cisco.

As the Army offsets more and more of its non-combat forces to the Army Reserve, advanced training offered on active duty needs to be transferred as well. Since most Army Reservists serve only one weekend a month and two weeks a year, they need to be handled a little bit differently than active-duty soldiers.

But 311th Theatre Signal Command here – whose wartime mission is to provide theatre-wide command-and-control of all communications assets – has discovered a unique way to satisfy this high-tech requirement.

"We've established the first and only sanctioned Cisco academy within the U.S. Army Reserve Command worldwide," said 1LT Shawn Herron, 311th's public-affairs officer. "This course will provide ongoing state-of-the-art technical training to soldiers commensurate with their civilian work schedule."

What this means for Reservists is they can get this technical training during evenings and drill weekends. Soon they'll be able to dial-in via their home computers to download training material and access equipment.

"The command benefits by providing highly skilled soldiers to support its war and peacetime mission," said Herron. "We're a communications command. We have telecom, satellites, and underneath all of it are the Cisco routers. If they don't work, we don't communicate."

The academy's benefits to individual soldiers and corporations are also high.

"America benefits by having skilled information-technology professionals in its workforce, and the individual soldier wins by acquiring state-of-the-art training that parallels the required skillsets for corporate America," said Herron.

The Cisco course, which would normally take six weeks to complete full-time, takes six months part-time. The current class, which started in July, should be providing trained personnel by December.

"This course is designed primarily to train soldiers to use the equipment, but soldiers are also encouraged to acquire Cisco's industry certification," said Herron. "It's also required training for senior noncommissioned officers, warrant officers and commissioned officers."

USARC and the Signal Center, Fort Gordon, Ga., are evaluating the Cisco course for possible expansion throughout USARC.

The course is open to anyone in the military and to Department of Defense civilians. Herron said the 311th also hopes it will eventually be able to offer open seats in the course to military family members.

SPC Charles writes for 318th Press Camp headquarters, Chicago, Ill.

ACRONYM QUICKSCAN

USARC – U.S. Army Reserve Command

Signal Corps ... Signal Regiment .... Signal Corps Regimental Association -- what's the difference?

by Amy Tuschen

Many people contact the Signal Corps Regimental Association office, the Regimental Division or elsewhere at the Signal Center looking for information on the differences among Signal Corps, Signal Regiment, SCRA and the different awards programs they offer. This article is intended to help clear up the confusion.

Essentially, the Signal Corps is the Army branch that was born in 1860. The Regiment came about in 1986, when the Army adopted the Regimental system. Office Chief of Signal's Regimental Division supports the Regiment with its education and marketing programs. And SCRA began in 1976 as the Signal Museum Association; today it's a private, non-profit organization based on paid membership.

The background and other differences are discussed in the rest of this article, beginning with the Signal Corps.

This article will probably be the most thorough yet most concise overview of "things Signal" (Signal Corps, Signal Regiment, Regimental Division and Signal Corps Regimental Association) ... their roles and the differences among them ... you'll ever see in one place.

Signal Corps

Albert Myer, an Army doctor, first conceived the idea of a separate, trained professional military signal service. He proposed that the Army use his visual communications system, called "wigwag," while serving as a medical officer in Texas in 1856. When the Army adopted his system June 21, 1860, the Signal Corps was born, with Myer as the first Signal officer.

Figure 27. BG Albert Myer, the Army's first Chief Signal Officer, in 1880 (shortly before his death).

Myer first used his visual signaling system on active service in New Mexico during the 1860-1861 Navajo expedition. Using flags for daytime signaling and a torch at night, wigwag was tested in Civil War combat in June 1861 to direct the fire of a harbor battery at Fort Calhoun, Va. (also known as Fort Wool), against Confederate positions opposite Fort Monroe, Va.

Until March 3, 1863, when Congress authorized a regular Signal Corps for the duration of the war, Myer was forced to rely on detailed personnel. Some 2,900 officers and enlisted men served, although not at any one time, in the Civil War Signal Corps.

Myer's Civil War innovations included an unsuccessful balloon experiment at the first Battle of Bull Run and, in response to GEN George McClellan's desire for a Signal Corps field-telegraph train, an electric telegraph in the form of the Beardslee magnetoelectric telegraph machine. Even in the Civil War, the wigwag system, dependent upon line-of-sight, was waning in the face of the electric telegraph.

The electric telegraph, in addition to visual signaling, became a Signal Corps responsibility in 1867. Within 12 years, the corps had constructed – and was maintaining and operating – some 4,000 miles of telegraph lines along the country's western frontier.

In 1870, the Signal Corps established a congressionally mandated national weather service. With the assistance of LT Adolphus Greely, Myer – by the time of his death in 1880 – commanded a weather service of international acclaim. The weather bureau became part of the Department of Agriculture in 1891, while the corps retained responsibility for military meteorology.

Figure 28. Adolphus Greely in 1887, just after the president promoted him to brigadier general and named him to succeed BG William Hazen as Chief Signal Officer. Greely developed the national weather service under Myer's direction.

The Signal Corps' role in the Spanish American War of 1898 and the subsequent Philippine Insurrection was on a grander scale than it had been in the Civil War. In addition to visual signaling, including heliograph, the corps supplied telephone and telegraph wire lines and cable communications, fostered

the use of telephones in combat, employed combat photography and renewed the use of balloons. Shortly after the war, the Signal Corps constructed the Washington-Alaska Military Cable and Telegraph System, introducing the first wireless telegraph in the Western Hemisphere.

On Aug. 1, 1907, an Aeronautical Division was established within the office of the Chief Signal Officer. In 1908, the Wright brothers made test flights of the Army's first airplane built to Signal Corps' specifications. Army aviation remained within the Signal Corps until 1918, when it became the Army Air Service.

The Signal Corps lost no time in meeting the challenges of World War I. Chief Signal Officer MG George Squier worked closely with private industry to perfect radio tubes while creating a major signal laboratory at Camp Alfred Vail, N.J. (later Fort Monmouth). Early radiotelephones developed by the Signal Corps were introduced into the European theater in 1918. While the new American voice radios were superior to the radiotelegraph sets, telephone and telegraph remained the major technology of World War I.

Figure 29. Chief Signal Officer MG George Squier in 1917. He pioneered a close relationship with private industry to advance communications.

A pioneer in radar, COL William Blair, director of the Signal Corps laboratories at Fort Monmouth, patented the first Army radar demonstrated in May 1937. Even before the United States entered World War II, mass production of two radar sets, the SCR-268 and the SCR-270, had begun. Along with the Signal Corps' tactical

Figure 30. Orville Wright makes one of the first test flights over Fort Myer, Va., of an airplane built to the Signal Corps' specifications. Aeronautics was part of the Signal Corps until 1918.

frequency-modulation radio, also developed in the 1930s, radar was the most important communications development of World War II.

The Signal Corps' Project Diana in 1946 successfully bounced radar signals off the moon, paving the way for space communications. On Dec. 18, 1958, with Air Force assistance, the Signal Corps launched its first communications satellite, Project SCORE, demonstrating the feasibility of worldwide communications in delayed and real-time mode by means of relatively simple active satellite relays.

Meanwhile, the Korean conflict cut short an all-too-brief peace. Korea's terrain and road nets, along with the distance and speed with which communications were forced to travel, limited the use of wire. The Signal Corps' very-high-frequency radio became the "backbone" of tactical communications throughout the conflict.

The Vietnam War's requirement for high-quality telephone and message circuits led to the Signal Corps' deployment of tropospheric-scatter radio links that could provide many circuits between locations more than 200 miles apart. Other developments included the SYNCOM satellite-communications service and a commercial fixed-station system known as the Integrated Wideband Communications System, the Southeast Asia link in the Defense Communications System.

Today, communications systems and facilities are still evolving as the Signal Corps continues the commitment to its Regimental insignia's motto, "Pro Patria Vigilans" (watchful for the country). A major program in 1988 was the initial production and deployment phase of the mobile-subscriber equipment system. MSE, along with other innovations, in LTG Bruce Harris' words, "exemplify the dynamics of ... [the Signal Corps'] ever-increasing mission and responsibilities in supporting our Army. The professional challenge these initiatives represent is not new to our Signal Corps. Our history is dominated by rapid change. ..."

As in the past, the Signal Corps (Regiment) "will continue to ... [meet] these challenges with distinction."

Figure 31. The Signal branch insignia, which is part of the Signal Corps insignia. Included among places you'll see it is on Signal officers' uniform lapels. When it's in color, the red flag with white center is on the right side; when subdued (such as in a uniform patch), the darker flag is on the right side.

Signal Regiment

Out of the Signal Corps – which was at the time 126 years old – was created the Signal Regiment. The corps still exists as the larger entity, the Army branch. Laid over the corps is the veneer of the Regimental system, which established a Regimental adjutant, insignia, coat of

arms, motto and Regimental home base. The Regimental system also provided for honoring people who serve the Regiment in exemplary fashion through the honorary colonel / sergeant major / warrant officer and distinguished member of the Regiment awards programs.

The Signal Regiment was activated June 1, 1986, as a component of the U.S. Army Regimental System. The USARS concept was approved in 1981 by the Army's chief of staff "to provide the soldier with a continuous identification with a single regiment and to support that concept with a personnel system that would increase a soldier's probability of serving recurring assignments with his regiment."

The need for such a system derived, at least in part, from the Army's traditional manning system. While the American Army over time has been successful in fostering individual enterprise and self-confidence, it has had less success, according to Russell Weigley in ***History of the United States Army***, "[i]n instilling group cohesion that will hold squads, platoons and companies together under pressure. ..." Learning from the past, in the early 1980s the U.S. Army conceded there was a definite problem and developed the USARS concept, labeled in December 1982 as "the new manning system." Under NMS, soldiers were to be assigned to regiments and remain there throughout their careers.

The USARS concept, as set forth in Army Regulation 600-82, includes the total Army. It stipulates that all soldiers, with certain exceptions, are to belong to a regiment / corps. The USARS concept provides:

- The opportunity for long-term identification with a regiment / corps;
- The potential for recurring assignments within a regiment / corps; and
- Chances to further emphasize the history, customs and traditions of the regiment / corps.

In addition, USARS offers soldiers regimental affiliation, thereby permitting the continuous

Figure 32. The Signal Regiment's Distinctive Unit Insignia, commonly called the Regimental crest.

Figure 33. The Regimental coat of arms. The Regiment's motto, "Pro Patria Vigilans" (Watchful for the Country), can be found on both the Regimental crest and coat of arms.

association or identification with a combat-arms regiment, combat support / combat service support or special branch throughout their careers. Under the system, CS / CSS / special branches operate on a "whole-branch concept as a corps, but within the corps or special branch, carrying on the activities and traditions of a regiment."

USARS outlines a "regimental plan," which includes:

- Location of a Regimental home;
- The Reserve Components;
- Regimental accouterments;
- Regimental colors;
- A "regimental marketing plan" to educate soldiers about the regimental system and to keep them abreast of regimental activities, events and the historical importance of the regiment as well as its honorary positions;
- A "plan for providing CS / CSS / special branch / engineer soldiers the potential to serve recurring assignments based upon geographical locations, regional basing, branch units or associations with combat-arms units"; and
- A training-base plan providing regimental colors to training units.

According to the affiliation policy, each CS / CSS / special branch / engineer officer and enlisted soldier becomes automatically affiliated with his / her respective Regiment / special branch "upon graduation from a branch / MOS-producing school."

A few months after NMS had been "born," the Army tasked each CS / CSS branch chief in March 1983 to design a regimental system best meeting each branch's needs and requirements. Signal's initial concept – and USARS as a whole – stalled when the Army directed that no action be taken on any CS / CSS branch initiative. It wasn't until two years later – in June 1985 – that Training and Doctrine Command directed the Signal Center to develop a regimental implementation plan for the Signal Corps, rejecting the Signal Center's 1983 concept of nine Signal regiments created along nine functional lines. The Army's CSA had lit a fire under USARS again, instructing that 13 CS / CSS regiments be implemented during fiscal year 1986. The Signal Center submitted its plan of one regiment aligning with the whole-branch concept to TRADOC Aug. 19, 1985.

Aspects of the Signal Center's proposal included:

- Designating Fort Gordon, Ga., as the regimental home base;
- Making no designation for a geographic home base;
- Developing regimental colors and a crest;
- Naming an honorary colonel of the Regiment and an honorary

sergeant major of the Regiment; and

• Selecting a distinguished member of the Regiment.

In January 1986, the CSA approved the Signal Corps' regimental plan. Events then moved quickly. The regimental colors and distinctive insignia were approved March 5, 1986. Then, as authorized under General Order 21, the Signal Regiment and regimental program were activated June 1.

The Signal Corps was one of the first CS branches to activate its regiment. The event, coupled with a change-of-command ceremony, officially was celebrated at the Signal Center June 3, 1986. At that ceremony, MG Thurman Rodgers, commander of U.S. Army Signal Center and Fort Gordon, became the first Chief of Signal under the Army's new regimental system before relinquishing command of the Signal Center to MG Bruce Harris, who then assumed the office of Chief of Signal.

CSM Cecil Miles, who participated in the Regimental activation ceremony, became the command sergeant major of the Signal Corps and, as such, was the first noncommissioned officer to perform regimental sergeant major duties.

Figure 34. CSM Cecil Miles, the first Regimental command sergeant major.

In addition, a regimental march written by SSG Johnny Seay, a member of Fort Gordon's 434th Army Band, was played publicly for the first time.

As part of the regimental plan, the Signal Center's two training brigades officially were reflagged or redesignated Sept. 23, 1986. The 1st Signal School Brigade and 2d Signal School Brigade became 15th Signal Brigade and 29th Signal Brigade, respectively. The 29th Signal Brigade was later inactivated under School Model 89.

Under the regimental system, the director of OCOS (formerly the proponent office) became the regimental adjutant. The regimental adjutant, as authorized under AR 600-82, is responsible for monitoring and maintaining "the health of the Signal Regiment." The adjutant directs and/or participates in activities promoting the regimental system and fostering the Signal soldier's affiliation with the regiment (for example, liaison with units, regimental-association programs, guest speaker, rites-of-passage activities, continental United States and outside CONUS visits to major Signal Regiment elements).

In essence, the regimental adjutant serves as the spokesperson for the Chief of Signal concerning the Signal Regiment. As MG Leo Childs, former commander of the Signal Center, said, the adjutant is "... responsible for all administrative procedures for the Signal Corps regimental system throughout the world. That means wherever the Army is, there's a Signal soldier. The job of the regimental adjutant is to support that soldier."

Other components of the regimental plan are:

• Certificates of affiliation for all Signal soldiers;

• Regimental briefing classes for precommand and advanced NCO course students;

• The Chief of Signal Regimental Awards Program (Regimental impact award, Chief of Signal plaque, Regimental fellowship award and certificate of achievement);

• The lineage-and-honor book including each Signal organization's distinctive unit insignia and lineage-and-honor certificate;

• The Signal officer's basic course rites-of-passage ceremony, an event in which graduating second lieutenants are granted acceptance into the Signal Regiment; and

• The lieutenant's register for newly inducted Signal officers.

The Regimental NCO, who works in OCOS' Regimental Division, administers most of these programs. Each program is intended to foster esprit de corps, unit cohesion and affiliation, stability, commitment and a sense of appreciation of Signal Regiment history – all vital elements in the USARS concept and its overall goal of increasing combat effectiveness.

Regimental Division

OCOS' Regimental Division was created to carry out the "marketing" part of the Regimental plan. The division educates soldiers and officers about the Signal regimental system.

Regimental Division also manages the Chief of Signal's awards and recognition programs; publishes the Regiment's quarterly professional journal (***Army Communicator***); and develops and maintains the Regimental history resources and archives via the command historian and Signal Museum. Regimental Division's chief is also the Chief of Signal's liaison to the SCRA.

Other responsibilities for the division are:

• Providing Reserve Officer Training Corps units, U.S. Military Academy and Command and General Staff College Regimental support – including ROTC summer camps;

• Designing and overseeing development of new Regimental products;

• Representing the Regimental adjutant at meetings, conferences and working groups;

• Preparing communications for the Chief of Signal;

• Administering the "Go Signal" marketing initiative to cadets and youth; and

• Serving as the Chief of Signal's liaison for the Regimental Hall.

As I mentioned, the Regimental NCO is part of Regimental Division. The NCO's responsibilities include:

• Managing Chief of Signal awards program and honorary and distinguished member programs;

• Maintaining historical files of each color-bearing Signal unit;

• Maintaining Regimental leaders and sergeants major photo galleries;

• Delivering monthly Regimental briefings to basic and advanced NCO courses;

• Assisting soldiers in receiving their Regimental affiliation certificates;

• Maintaining a database of Signal unit commanders / honorary members / distinguished members / Chief of Signal and fellowship award recipients; and

• Fabricating memorabilia for presentation by the Chief of Signal to visiting dignitaries.

Confusion remains over obtaining ***Army Communicator***, as the magazine was once part of the membership benefits when SCRA organized. After a time, ***AC*** became part of the Regiment's official Army publications; it has nothing to do with SCRA membership now and must be requested separately. Subscriptions are free. (See the magazine's website at http://www.gordon.army.mil/AC/ for information on how to subscribe.)

The quarterly magazine:

• Promotes the professional development of Army communicators and automators by publishing technical and doctrinal information relating to the Signal Regiment;

• Presents new ideas, concepts and trends in communications, electronics, automation and visual information;

• Shares lessons-learned and "good ideas"; and

• Is available on the worldwide web as well as in print.

The Regimental Division's historical and archival arms are the command historian and Signal Museum. The command historian publishes the annual Signal Center historical report; manages historical archives of reference materials and donated collections; and answers historical inquires and requests for information on the Signal Corps, Army and military.

The Signal Museum's mission is to function as a permanent historical and educational institution at Fort Gordon, providing training and education to soldiers and their family members and to the general public on all aspects of Signal Corps history; the development of Fort Gordon and vicinity; and the U.S. Army. The museum is also responsible for recommendations concerning the preservation, protection, development and enhancement of historical buildings, monuments, works and sites throughout the Fort Gordon military reservation.

The Signal Museum is located in Conrad Hall, adjacent to Signal Towers. Conrad Hall is also the home of the national SCRA office, as well as serving as the Regimental Hall.

The Regimental Hall is a meeting place for conferences, awards ceremonies or other special events, and it serves as the information hub for the yearly Signal symposium. Included in the hall are the Regimental lounge and Mallette Room.

Chief of Signal Regimental Awards Program

Part of Regimental Division is the Chief of Signal Regimental Awards Program; Signaleers go to SCRA for awards recognition when they actually should investigate the lesser-known (and free) Regimental awards program. This section of the article outlines the Chief of Signal's program, which is the "official" awards program; the next section presents SCRA and its awards program.

The Regimental awards program is designed to foster esprit de corps and contribute to the Signal Regiment's cohesiveness. This is done, in part, by recognizing the exceptional performance of individuals who merit special commendation from the Chief of Signal. The Chief of Signal may approve awards based on his / her personal observations or on a commander's or supervisor's recommendation.

The Regimental NCO, as I mentioned, administers this program. There's no cost associated with any of these awards.

How to request a Chief of Signal Regimental Award

Commanders or supervisors who wish to recommend someone for the certificate of achievement, Chief of Signal plaque or fellowship award must prepare a recommendation for the award (Department of the Army Form 638) with a proposed citation. Each award citation is subject to the following limitations:

• Certificate of achievement citation must be no more than nine double-spaced lines;

• Chief of Signal plaque citation may be no more than 15 words, including individual's name; and

• Fellowship plaque citation can be no more than 15 words, including individual's name.

Your recommendation must include a double-spaced narrative (not to exceed one page) describing the individual's achievements. The forwarding memorandum must certify that military personnel aren't pending adverse action under AR 600-31.

The 638, narrative and forwarding memorandum must be forwarded through command channels to OCOS' Regimental Division, ATTN: ATZH-POM, Fort Gordon, Ga. 30905-5300.

Recommendations should be submitted not less than four weeks before presentation to ensure adequate processing and mailing time.

Regimental awards should be presented to the individuals in an appropriate awards ceremony.

There are six types of awards / recognition:

• Regimental impact awards are unique mementos presented by the Chief of Signal as "on-the-spot" recognition for outstanding performance or achievement;

• The certificate of achievement (Fort Gordon Form 6723-1) is used to recognize outstanding achievements relative to the Signal Regiment's mission. The certificate recognizes achievements of a lesser degree than required for the Chief of Signal plaque or Signal Regiment fellowship award;

• The Chief of Signal plaque is awarded to deserving individuals

based on recommendations from commanders/supervisors citing outstanding achievement or recognition for special projects relevant to the Signal Regiment's mission. The Chief of Signal plaque isn't to be used as an end-term-of-service, permanent-change-of-station, retirement or any other official Army award;

• The fellowship award is designed to recognize people not affiliated with the Regiment. The requirements are the same as the Chief of Signal plaque, but the award isn't normally presented to Signal personnel;

• The honorary member of the Regiment program recognizes soldiers and other individuals who have contributed to or served the Regiment in some way, but they aren't members of the Regiment. People who have been recognized as Signal Regiment honorary members include foreign allied exchange/liaison officers and NCOs who have been assigned for duty at the Signal Center, non-Signal Regiment soldiers and service members of our sister armed forces; and

• Distinguished members of the Regiment, who are prestigious or notable military or civilian people recognized for their accomplishments. They must be current or former members of the Signal Corps/Regiment. Nominees (anyone can nominate, but the Chief of Signal selects) may be active-duty, Army Reserve, Army National Guard or Signal Regiment Department of the Army civilians (active or retired status). Designation as a distinguished member of the Regiment is largely ceremonial and serves to perpetuate the history and traditions of the Regiment, thereby enhancing unit morale and esprit.

The honorary colonel, honorary warrant officer and honorary sergeant major of the Regiment are distinguished, retired Signal Regiment special appointees who simultaneously become distinguished members of the Regiment when appointed to their honorary positions. These appointees serve a three-year tour and participate in command and award ceremonies, speaking engagements at dinings-in and other functions that help bridge the gap between the past and the present. When their honorary appointment term ends, they remain lifetime distinguished members.

SCRA

The Signal Corps, Signal Regiment and Regimental Division are all part of the "official Army." SCRA, on the other hand, is a private, nonprofit organization affiliated with the Regiment. SCRA provides an opportunity for Signal officers, warrant officers, enlisted members and civilians – whether affiliated with the Active Component, Army Reserve or National Guard – to help preserve for posterity the proud heritage of the Signal Regiment and of Signal units throughout the world. Through direct financial support, the association enhances the Regiment's educational and recreational value and thus ensures the lessons of history and the Regiment's proud traditions aren't forgotten by future generations.

The Network, SCRA's quarterly newsletter, helps educate members and preserve the Regiment's history, as well as inform members about Regimental events. Articles on SCRA chapter activities, unit activities, Signal history, SCRA awardees, chapter-contact information and corporate-member information are included. ***The Network*** is mailed directly to current SCRA members.

One of the most visible "arms" of SCRA, however, is its award program for its members and volunteers. There are five awards (Brevet Colonel, Silver Order of Mercury, Bronze Order of Mercury, Silver Wahatchee and Bronze Wahatchee):

• The Brevet Colonel Award recognizes non-government civilians who have supported and contributed to the Signal Corps' enhancement. Membership in SCRA isn't required for the recipient of this award;

• The SOM is the higher of the two-level Order of Mercury award. SOM recognizes individuals who have demonstrated conspicuous long-term contributions to the Signal Regiment and SCRA. Membership is required for this award;

• The BOM is presented to individuals who stand above their peers in their contributions to the Signal Regiment and SCRA. A minimum one-year membership requirement prior to award submission is expected;

• The SW award is presented to volunteers who demonstrate long-term support to the Signal Regiment's soldiers. Membership in SCRA isn't required; and

• The BW award is for volunteers who show outstanding support to the Regiment's soldiers. Membership in SCRA isn't required.

I hope this helps distinguish among corps, regiment, Regimental Division, SCRA, the Chief of Signal Regimental Awards Program and SCRA's awards. To quickly recap, affiliation into the Signal Regiment comes with completion of the officer, warrant officer, NCO or enlisted Signal branch or MOS-producing course. Functional-area officers from other branches may also choose to affiliate with the Signal Regiment. Honorary and distinguished members are awarded as a part of the Regimental awards program. SCRA membership is open to anyone who has an interest in supporting the association's mission. There is a membership fee to become a member of this private organization, and membership is required for Order of Mercury awards.

Ms. Tuschen has been SCRA's national manager for four years. She was an Army captain, serving eight years. Also an associate consultant with Booz Allen Hamilton, she holds bachelor's and master's degrees in computer information systems from St Norbert College and Boston University, respectively.

Portions of this article were excerpted from ***The Concise History of the Signal Corps*** *and from the Regimental Division webpage, www.gordon.army.mil/ocos/rdiv/.*

Acronym QuickScan

AR – Army regulation
BOM – Bronze Order of Mercury
BW – Bronze Wahatchee
CONUS – continental United States
CS – combat support
CSA – Chief of Staff of the Army
CSS – combat service support
MSE – mobile-subscriber equipment
NCO – noncommissioned officer
NMS – new manning system
OCOS – Office Chief of Signal
ROTC – Reserve Officers Training Corps
SCRA – Signal Corps Regimental Association
SOM – Silver Order of Mercury
SW – Silver Wahatchee
USARS – U.S. Army Regimental System

Signals

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

Enlisted Notes

MILITARY-OCCUPATION SPECIALTY CODES WILL CHANGE

In February 2001 the Army's chief of staff approved the Army Development System XXI recommendation to change military-occupation-specialty codes and/or area-of-concentration codes to ensure the MOS's or AOC's first two digits identify the branch/career-management field and match regardless of military pay category (whether officer, warrant officer or enlisted).

After the CSA approved ADS XXI's recommendation, he assigned the Army's G-1 (formerly known as the Office of the Deputy Chief of Staff for Personnel) as lead organization for this initiative.

Since current Signal enlisted structure consists of three distinct CMFs (CMFs 25, 31 and 74) based on separate disciplines (visual information, communications and automation), G-1 proposed realigning the Signal branch's MOSs by recoding all CMF 31 and CMF 74 MOSs so they begin with "25" to coincide with the designation for Signal branch officers, warrant officers and CMF 25 MOSs.

The Signal Center's perspective is that it's in the Army's best interest for the three CMFs to retain their current coding, since G-1's proposal for realigning Signal MOSs eliminates career-field identity. Our alternate proposal was to renumber the three CMFs consecutively (25, 26, 27), a proposal we're still pursuing. We feel this would make our CMFs more readily identifiable as "Signal" while maintaining CMF identity.

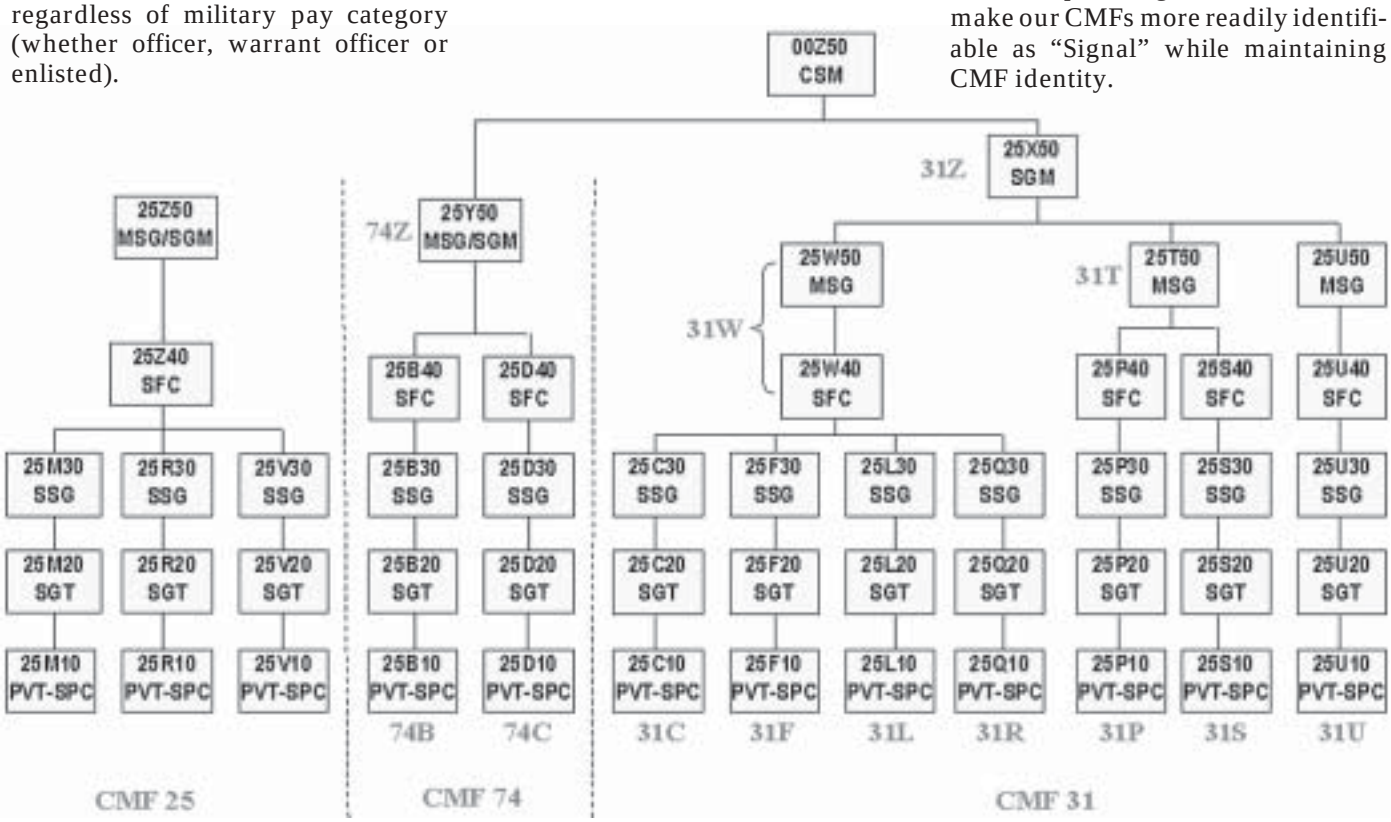

Figure 35. The new CMF, communication and information systems.

However, G-1 rejected our proposal, responding that it would support separate CMFs only if the separate CMFs align functions across all military-personnel classifications. (For example, CMF 74 could become CMF 53 to align with the officers' Functional Area 53. Warrant officer MOS 251A would also have to be recoded to align with FA 53.) Therefore the Signal CMFs will combine into CMF 25 (communication and information systems). Figure 35 depicts the career progression for the restructured CMF, with the old MOSs included for comparison.

We prepared a Military Occupational Classification and Structure action and are staffing it to make this change. Once the MOCS is approved, the MOS recoding should be seen in Fiscal Year 2005 documentation of modified tables of organization and equipment, as well as tables of distribution and allowances.

CMF 74 UPDATE

OCOS completed a viability / feasibility study of CMF 74, information-systems operations, in October 2001. The study revealed this CMF would face many changes in the near future as a result of modernization in the information-technology area. Examples of new initiatives affecting CMF 74 are information assurance, Defense Message System, Tactical Message System and digitization of the force.

Following is a summary by MOS of the study.

MOS 74B – This continues to be the most popular MOS within the Signal Regiment. Authorizations are expected to increase as a result of fielding DMS, TMS, IA and digitization. Another change factor will be a force-design-update action being developed that will place 74B soldiers in maneuver units. The precise number of authorizations in maneuver units hasn't yet been determined.

OCOS submitted a MOCS action to create an additional-skill identifier that would identify DMS / TMS positions within MOS 74B. Approval of this ASI (tentatively called ASI D1) is expected by October and will be announced via Notification of Future Change. To be eligible for this ASI, soldiers would have to be on assignment to a DMS / TMS position and have completed the four-week DMS course and three-week TMS course (not available yet).

Communications-security management functions will be transferred to MOS 74B as soldiers in this specialty assume all IA functions for the Army. This will take place as part of the MOCS action underway to delete MOS 74C.

MOS 74C – While MOS 74C appears to be healthy in its current state, its authorizations would be drastically reduced as a result of DMS / TMS initiatives. These two systems are designed to provide new messaging solutions to all levels and types of units throughout the Army, thus replacing all current record-traffic positions. This is a change from previous OCOS updates via "Signals," where we said 74C soldiers would remain in Special Forces, North Atlantic Treaty Organization and military-intelligence units, manning record-traffic systems.

About three-quarters of MOS 74C positions are documented as telecommunications-center operators. This shows 74C soldiers are possibly being misused, since many TCCs throughout the world have either closed down or sharply reduced their authorizations to prepare for the scheduled closing date (September 2003) of the Automatic Digital Network.

After AUTODIN closes, COMSEC would be the only function left for 74C soldiers. However, regulatory guidance governing the grade requirement of soldiers assigned to COMSEC-custodian positions, and the Army's decision to make COMSEC management part of IA, forces us to transfer this function to MOS 74B.

OCOS is developing a MOCS action for Personnel Command's Deputy Chief of Staff for Operations approval, which will delete MOS 74C. As authorizations are reduced, soldiers will be eligible for reclassification under the auspices of the Fast Track Program. This will help maintain balance within the MOS while giving displaced soldiers an opportunity to advance in other career fields.

Projected effective date of the MOS's deletion would be FY07.

MOS 74G – MOS 74G was approved for deletion in October 1999. Effective date of deletion is Sept. 30, 2002, with all remaining soldiers reclassifying to 74B. Soldiers requiring transition training received orders to report to Fort Gordon, Ga., to attend the 74B advanced individual training. Once soldiers complete the training, they will be required to incur a three-year service obligation (service-remaining requirement for the MOS).

For more information on this update or any other issue regarding CMF 74, contact MSG Wilfredo Norat, CMF 74 senior career-management noncommissioned officer, at DSN 780-8187, commercial (706) 791-8187, or e-mail noratw@gordon.army.mil.

SPECTRUM-MANAGEMENT MOS BEING CREATED

Radio-frequency emitters on current and future battlefields are proliferating. The IT and communications systems being fielded are becoming more complex. This places significant challenges on spectrum managers at every level of the operational spectrum. Therefore an initiative is underway to develop a new MOS dedicated to spectrum management.

Enlisted soldiers holding ASI D9 (battlefield spectrum management) manage the Army's spectrum. As our Army transitions to the Objective Force, the current training and management structure for ASI D9 is inadequate to manage RF spectrum-access requirements for current and future warfighters.

For instance, a persistent problem with ASI D9-qualified soldiers is that managing ASIs in the Army has often been difficult. Although the Army identifies some soldiers for assignment by ASI, the actual position to which a soldier is assigned is up to the local command's discretion – sometimes even the soldier's. A good example is that a 31W40 D9 is often assigned as a platoon sergeant or in other positions within the Signal community that aren't designated D9 positions. This is necessary to allow soldiers holding ASI D9 to serve in traditional leadership positions to remain competitive for promotion.

The bottom line of this is that many D9 positions go unfilled or are filled by a non-school-trained NCO. In many cases, newly trained D9s never work in the field and so have lost their skills when called on to fill a critical spectrum-management position.

It's concerns like these that drive creation of the new spectrum-manager MOS, which will be strictly a technical career field. It will start at staff sergeant and progress to the sergeant-major level. Signaleers also need to understand that there will be no traditional leadership positions (platoon sergeant, first sergeant, command sergeant major) available in this MOS. The new MOS will have its own promotion structure that will eliminate the need for soldiers to hold those positions so they can get promoted, since they'll be competing only among their peers in the same specialty.

Other services either have spectrum-manager career fields or are addressing their spectrum-manager career needs to meet their current and future warfighting spectrum requirements. The Air Force has a specific career field in which airmen are initially trained as spectrum managers, and they work in that field their entire careers. The Navy sees the need for a separate career field and is acting on the requirement. Also, the Defense Science Board has recognized the deficiency and recently recommended that all services establish a separate career field to produce a cadre of professional spectrum managers.

Clearly, these external factors affecting spectrum-management soldiers are significant enough to cause the Signal Center to begin establishing a new career field. Due to the procedures required for approval and documentation, this MOS won't actually appear until the FY 05/06 timeframe. This career field will have a clear progression structure to ensure promotion opportunities and will result in a highly trained and motivated NCO specialized in spectrum management to meet today and tomorrow's battlefield spectrum requirements.

For more information, contact SFC Bruce Nixon, career manager for MOSs 31F/L/W, DSN 780-8193, commercial (706) 791-8193, or e-mail nixonb@gordon.army.mil.

MOS 31C DUE FOR RESTRUCTURING

Our feasibility/viability study also determined that even though MOS 31C (radio operator-maintainer) is currently healthy and viable, several factors indicate that it's suited for some structure changes.

MOS 31C is vital to the operation of several organizations, including special operations and Reserve Component units. Nearly 75 percent of the total force authorizations for MOS 31C are within the National Guard. Many of these authorizations are based on the AN/GRC-106 radio set.

These authorizations will remain at least until the Joint Tactical Radio System is fielded. JTRS will require management functions similar to those of the Enhanced Position-Location Reporting System, which is a function of MOS 31C. Current analysis supports retaining a dedicated MOS for single-channel radio operation (defined as retransmission, single-channel tactical satellite, high-frequency radios and special-operations communications assemblages).

An Occupational Data, Analysis, Requirements and Structure Program survey, conducted by the Army Research Institute, indicates that a large number of 31Cs are performing many critical tasks common to MOS 31U (Signal-support-systems specialists). These tasks include installation of large-area networks, single-channel radio retrans operation and single-channel TACSAT operation.

Proliferation of automated Signal systems in non-Signal units is rapidly increasing the already extensive list of systems that MOS 31U is required to support. The Signal Center determined that transferring retrans and single-channel TACSAT operator functions to MOS 31C will relieve some of MOS 31U's burden by placing all single-channel radio-operator functions in MOS 31C. This will allow 31U to concentrate on support rather than operator functions. This will also align MOS 31C even more closely with MOS 31U. Therefore, 31C will be restructured so that it caps with MOS 31U rather than MOS 31W at the rank of sergeant first class.

As a result of this realignment, MOSs 31W and 31U will require some authorization and standard-of-grade adjustments at the senior-NCO levels to ensure viable and balanced career-progression opportunities for all soldiers involved. The realignment will also require some changes to the basic and advanced NCO courses for both 31C and 31U.

For more information on this action, contact SFC Todd Grisso, career manager for MOS 31C/R, DSN 780-8192, commercial (706) 791-8192, or e-mail grissot@gordon.army.mil.

ASSIGNMENT-ORIENTED TRAINING

by SFC John Barrett

This update provides the latest information on the assignment-oriented-training program and personnel management under the University of Information Technology and lifelong-learning concept. My previous article, "What assignment-oriented training means to the Signal Regiment" – published in ***Army Communicator***'s Winter 2001 edition – can be found at http://www.gordon.army.mil/AC/wintr01/aot.htm.

The scope of AOT, which begins the Army's lifelong-learning process, has grown significantly beyond the borders of Fort Gordon, Ga. The concept – briefed to GEN John Abrams, Training and Doctrine Command's commander; LTG John LeMoyne, the Army's G-1; and GEN Eric Shinseki, the Army's chief of staff – received their enthusiastic support. LTG Dennis Cavin, TRADOC's deputy commander for initial-entry training and commander of the newly formed Accessions Command, said this new training philosophy "…provides a more highly competent soldier to the operational Army in a shorter period of time." These leaders support the concept and look forward to the program's development.

Currently, in addition to the four Signal military-occupation specialties being considered for implementation (MOSs 31R, 31S, 31P and 31F), there are 27 MOSs from five other TRADOC

schools planning to implement training under this concept. The eventual TRADOC / Army goal is to have 50 percent of all MOS training under this concept.

Our initial personnel-management plan was to manage soldiers using transitional additional-skill identifiers Y2 and Y3. However, the Army's G-1 and G-3, along with Personnel Command, didn't agree with our concept. The Army's current management and modeling systems don't work well with transitional ASIs, they said; the Army needs a management system that can handle as many as six "tracks" of training and will work with current systems.

We met with TRADOC, PERSCOM and the Army staff several times in March and April to work out this problem. The solution had to fit not only Signal soldiers but ***all*** branches using this training method. The Army decided to use permanent ASIs to manage personnel under AOT and lifelong learning. A permanent ASI is one that is coded against both the soldier and the position in authorization documents (modified table of organization, table of distribution and allowances). Using permanent ASIs provides compatibility with the Army's current modeling and management systems. This allows visibility of AOT-trained soldiers and identification of training requirements for the MOS common-core courses as well as the individual "tracks" of technical training.

Documenting an ASI takes 42 months to complete. This timeframe was unacceptable to the Signal Center, so the Army G-3 agreed to expedite action to support the program. The current estimate for documenting the action is one year. During the documentation timeframe, PERSCOM agreed to manage AOT MOSs using the approved ASIs assigned to the personnel only. That way we don't lose track of AOT-trained personnel, and the transition to permanent ASIs will be transparent to the soldier.

ASI management is critical to this program's success and to the Army's readiness. If an echelons-corps-and-below-trained soldier is assigned to an echelons-above-corps unit, it does nothing to enhance a unit's readiness; the unit must assume the burden of training the soldier on all technical and tactical aspects of equipment the soldier is unfamiliar with. When the documentation process is complete, commanders will request the correct soldier for their unit by using MOS code and the ASI on the requisition.

SFC Barrett is senior career manager for MOSs 31P, 31S and 31T.

*(**Editor's note:** The training piece of AOT can be found in "Training update," Page 47, making its debut in this **Army Communicator** edition. AOT is not a stand-alone effort by either OCOS or Directorate of Training, so both entities will weigh in from time to time with updates.)*

AOT definitions

AOT – In the advanced-individual-training environment, AOT is a training methodology used to train only MOS-critical tasks and skills necessary for the first unit of assignment. A soldier receives training in the MOS common core, which is common to all soldiers and assignments within the MOS. After soldiers complete common core, they receive training in the technical "track" course, which provides the skills training their first unit of assignment requires.

After AIT, AOT means a soldier trains for subsequent assignments, when required, through lifelong learning. Soldiers will be able to access the skills training they require to contribute to their next unit of assignment's successful mission accomplishment.

Lifelong learning – Lifelong learning is a conceptual approach to education and training that's comprised of four tenets: AOT, the University of Information Technology's resource center, simulations and virtual campuses. These components combine into a powerful educational system that engages all members of the Signal and information-technology force – including civilian employees – in learning wherever they're located. It's a total approach that includes instruction and materials delivered in synchronous and asynchronous modes, just-in-time, on-demand and adapted to students involved in formal school programs and courses as well as to practical day-to-day duties and activities.

UIT – UIT at the Signal Center is the organizational structure for delivering lifelong learning and training to our soldiers, leaders and units. It will be a combination of hardware, software, facilities, connectivity and people providing lifelong-learning materials, information and support that includes 24/7 reachback for the IT community – including Active and Reserve Components, other military services, joint commands and agencies, as well as alumni.

We expect UIT to `foster lifelong professional and personal relationships and to become the "home" university for Signal and IT soldiers, leaders and their families, including alumni. UIT will have the same responsibility for all students, regardless of their location, and it eliminates any differences between students located at Fort Gordon and other locations; all its students will be the same.

UIT's components include colleges derived by transitioning the Signal Center schools to this status and establishing relationships with commercial training sites, units, armories and individual homes. The components also include relationships with academic and research organizations that are supporting UIT's education-and-training needs.

Officer Notes

SIGNAL REGIMENT GRADUATE EDUCATION PROGRAM

In a recent e-mail to commanders and senior Signal Regiment leaders, Chief of Signal MG John Cavanaugh said, "It's no surprise that graduate education is more important than ever as a means to keep pace with changing technology and to develop adaptive and agile IT leaders for a knowledge-based Army. …"

To meet IT leaders' needs, the Signal Center is partnering with the University of Maryland University College to provide members of the Signal Regiment an opportunity to pursue an IT-related master's degree. (See "Signals," ***Army Communicator***'s Spring 2001 edition.) The program offers this lifelong-learning opportunity to soldiers, family members and civilians worldwide. Over time, the Regiment will expand its program to incorporate other "universities of excellence." Our goal is a web-based program with multiple universities and a range of technology-related degrees that are taught in multiple formats.

SRGEP has two phases. First, students can take courses through UMUC's on-line graduate-education program. The on-line graduate-education program ensures our officers, warrant officers, enlisted soldiers and civilians can maintain currency in "new technologies" during utilization tours from any location in the world.

For students and permanent party at Fort Gordon, UMUC offers an IT graduate seminar program. This is a combination of resident and on-line instruction in an executive-seminar format.

SRGEP is an exciting opportunity to continue the lifelong-learning process essential to your success in the Army!

The IT-related master's of science degree programs UMUC offers through SRGEP are computer-systems management (applied-computer-systems track, database-systems-and-security track, information-resources-management track or software-development-management track); technology management (technology-systems-management track); IT; telecommunications management; and software engineering.

The ITGS program is particularly attractive to soldiers attending long training courses at Fort Gordon and to those assigned as permanent party, Army civilians and family members. ITGS is a 14-week seminar that meets on Saturdays. Students who take this program earn nine graduate credits (25 percent of the total credits needed for a degree), which can be applied towards the master's programs in IT, computer-systems management or telecommunications management. UMUC professors, who travel to Fort Gordon for the Saturday sessions, teach the seminars.

After departing Fort Gordon, a soldier or civilian simply continues with the degree program by taking UMUC's on-line classes.

Normally a program like this offered to civilian corporations would cost a student about $6,600. However, a soldier using tuition assistance pays slightly more than $1,200 out-of-pocket for the program.

We've conducted two ITGSs with great success. Our third started in August. We anticipate conducting three or four ITGSs in 2003.

How do you apply? For on-line classes, go to the UMUC website at www.umuc.edu/mil and select the Army Signal Center IT Graduate Program. You'll find information there on admissions and registration. For ITGS, you can get information at the UMUC website or Fort Gordon's website (www.gordon.army.mil/ocos/edu).

For specific information on ITGS, contact MAJ Alan Makowsky, alan.makowsky@us.army.mil, DSN 780-2267, commercial (706) 791-2267.

Acronym QuickScan

ADS – Army Development System
AIT – advanced individual training
AOC – area of concentration
AOT – assignment-oriented training
ASI – additional-skill identifier
AUTODIN – Automatic Digital Network
CMF – career-management field
COMSEC – communications security
CSA – chief of staff of the Army
DMS – Defense Message System
FA – functional area
FY – fiscal year
IA – information assurance
IT – information technology
ITGS – Information Technology Graduate Seminar (Program)
MOCS – Military Occupation Classification and Structure
MOS – military-occupation specialty
NCO – noncommissioned officer
OCOS – Office Chief of Signal
PERSCOM – Personnel Command
RF – radio frequency
SRGEP – Signal Regiment Graduate Education Program
TACSAT – tactical satellite
TCC – telecommunications center
TMS – Tactical Message System
TRADOC – Training and Doctrine Command
UIT – University of Information Technology
UMUC – University of Maryland University College

Training update

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

***Editor's note**: "Training update" makes its debut this **Army Communicator** with updates on several tenets of lifelong learning. Also see the personnel-management piece of assignment-oriented training in "Signals," Page 41. AOT isn't a stand-alone effort by either Office Chief of Signal (the personnel proponent) or Directorate of Training, so both entities will provide updates in various **AC** issues. For background information, see the Winter 2001 **AC** edition, which contained several articles on lifelong learning, the University of Information Technology, AOT, the resource center, virtual campuses and simulations – all discussed following.*

LIFELONG-LEARNING ORGANIZATION

by Barbara Walton

About a year ago the concept of lifelong learning was just a good idea, but the Signal School has come a long way since then in implementing the various tenets of lifelong learning. This article will provide an update on what has been accomplished to support those tenets.

The Directorate of Training was reorganized in March, and a UIT Division was established. The UIT Division's mission is to serve as the directorate point-of-contact for implementing the lifelong-learning concept for the Signal Center. In close coordination with the directorate's other divisions, 15th Regimental Signal Brigade, Leader College of Information Technology, Office Chief of Signal, Training and Doctrine Command and Department of the Army, the UIT Division manages the lifelong-learning tenets (AOT, simulations, the UIT resource center and the virtual-campus concept) as well as lifelong-learning materials, partnerships with outside activities and development of policies and procedures to support the concept.

At the 2002 Senior Leader Training Support Conference, leaders examined our current training-support strategy and worked on a new strategy providing individual, leader and unit training competencies. Chief of Signal MG John Cavanaugh teamed with Fort Jackson's commander as co-chairs of one panel identified to work on the new training strategies – the panel on enlisted military-occupation specialty qualifications and lifelong learning. The panel's objective was to develop an implementation plan detailing how to leverage innovative and technological processes and applications to achieve MOSQ in institutional training, as well as sustain MOSQ throughout a soldier's career.

The Enlisted MOSQ and Lifelong-Learning Implementation Plan is the product we produced to meet that objective. The Chief of Signal briefed the plan's main points at the conference's conclusion, then we produced the final document and submitted it to TRADOC in March. In the plan are detailed explanations of the concept and strategy for each lifelong-learning tenet and a comprehensive laydown of estimated investments over a six-year budget cycle.

We also drafted a lifelong-learning business plan in June. The business plan combines the ideas and concepts of lifelong learning (described in the MOSQ implementation plan) with the hard resource and investment data, and it integrates the timelines for implementing our milestones. (Before the business plan existed, there were many documents and briefings discussing the various parts of lifelong learning, but there was not ***one*** document a person could go to for everything in one place.) The business plan also provides a common set of definitions and a roadmap that "crosswalks" all the activities and work the Signal Center is doing.

We're firmly committed to this transformation of education and training, and we believe the Army culture is evolving to accept it. Several TRADOC schools have proposed candidates for AOT, so Personnel Command is helping those institutions by developing policies and procedures to manage personnel under AOT. Active and Reserve units have heard about UIT's tenets, and they're eager to become involved. We're partnering with Fort Hood, Texas, through their Battle Command Training Center and with 93d Signal Brigade to establish the groundwork for pilot virtual-campus sites. We've captured the interest of instructors and faculty who are using the UIT resource center to post their course content, and we can tell by the increasing number of hits on the UIT resource center's website that more and more soldiers are beginning to accept lifelong learning.

We've worked hard to mature the tenets of lifelong learning over the past year, and while we've accomplished a great deal, there's a great deal more that needs to be done. We're looking forward to maturing the individual tenets of lifelong learning in the coming months.

More MOS courses will be redesigned for AOT. Lifelong-learning materials – including simulations and other interactive multimedia technologies – will be developed to support these newly designed courses. The resource center will become increasingly valuable to Signal soldiers and leaders as more content is added to the digital library and as capabilities are expanded to enhance reachback. We'll use lessons-learned from piloting the virtual campus to establish more campuses at other units and activities, with the ultimate goal being to provide all Signal soldiers and leaders the ability to access and share content wherever and whenever it's needed.

Ms Walton is a supervisory instructional-systems specialist and chief of DOT's UIT Division at the Signal Center, Fort Gordon, Ga. She has been deeply involved in the UIT project from its beginning, as well as with the IT and digital-training master plan.

RESOURCE CENTER

by MAJ Jake Pennington

In my earlier article [Winter 2001 ***Army Communicator***], the resource center was still conceptual. In just six months, the resource center has grown into a functional center for lifelong learning in the Signal Regiment.

We've built a UIT website (https://UIT.gordon.army.mil/), fielded web-based collaborative tools to the schoolhouses and many of the directorates, and with the help of the School of Information Technology's futures-development team, built a number of on-line courses for use and testing in the schoolhouse. (Since coming on-line in January, about 100 courses have been activated on the site, and we're averaging 8,160 user hits daily.)

Your Army Knowledge On-line user identification and password allow you access to the site.

We add content daily to the website. We have courses on-line for MOSs 74B and 74C, warrant officers and Functional Area 53 officers, as well as basic Signal officer courses and the Signal Captains Career Course. Courses are all being taught "resident" at this time, but we're working on our first off-site class now for MOS 74B. (More on this following.)

The website provides search capability to the UIT digital library, as well as links to the Reimer Digital Library and other military sites. Forums, courseware and other options are also available. We're working toward standing-up 24/7 support (an on-line help desk) with a frequently-asked-questions page, a knowledge base with subject-matter-expert profiling and voice-over-web support. We're building the FAQ page and knowledge base ourselves, but we're modeling the knowledge base after corporate successes (such as the Microsoft Most Valuable Professional program).

Our knowledge base is built from our on-line forum database and allows each user to rate the response. This gives our SME profiling a unique perspective of how the community feels about the SME's quality. SMEs are also rated on how often they post. The ratings are different for each topic area, so an SME might have an excellent rating in a particular area but have a mediocre rating in another.

We're close to purchasing an eStara solution for our voice-over-web capability. EStara offers a reasonably priced web-to-personal computer or web-to-phone solution (push-to-talk) that will ensure our soldiers never get a busy signal. We're also planning to add video support.

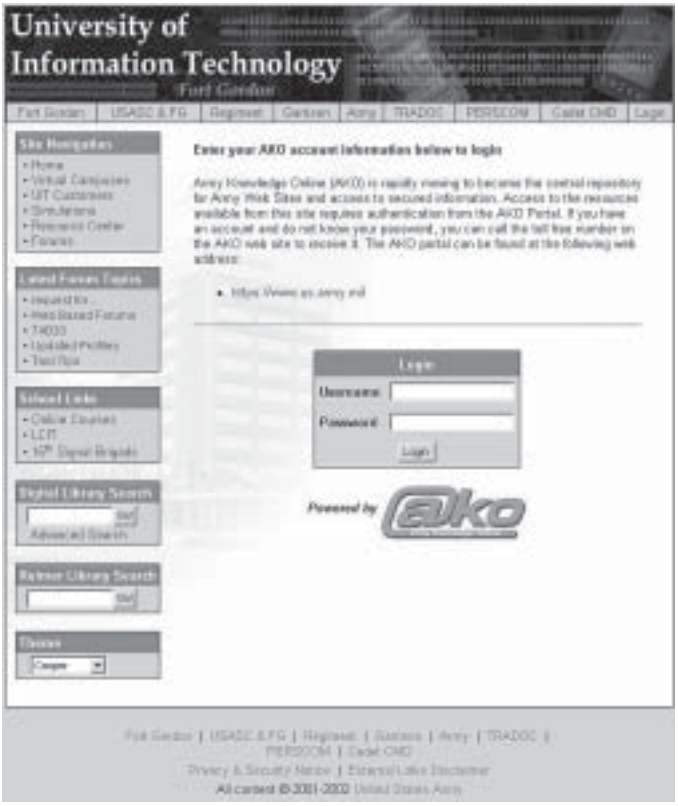

Figure 36. Log-in screen (homepage) at https://uit.gordon.army.mil/.

We don't have our learning-management system in place yet, but we're working with Blackboard and representatives from the Army Distance Learning Program to stand up Saba here as our LMS. Saba is the Army's objective LMS, and we plan to be one of the first sites to field it. As an interim solution, we're working with Blackboard to develop the reports we need to build a comprehensive training record on our soldiers and tie the data seamlessly to existing TRADOC systems.

As we end the fiscal year and approach the calendar year's end, we have plans to expand both our server capability and software licensing to move the resource center forward. Our objective is to hire a help-desk staff, upgrade our Blackboard license to enterprise level and purchase enough hardware to configure our servers in a cluster arrangement to provide a more stable and secure platform for the resource center.

We're also working with SIT and other agencies on Fort Gordon to improve our Blackboard classes so each course lecture module has a streaming videoclip of the lecture embedded into the briefing and timed to the slides. We're accomplishing this through use of a digital videocamcorder, s-video cable and a free Microsoft PowerPoint add-in called Producer. We feel that once we've videotaped each lecture and built some simple Flash media videos of the hands-on training, the Reserve Component will feel comfortable certifying their instructors to teach our courses remotely. There appears to be a large demand for the MOS 74B10 course, so we're starting with this course first and are coordinating an October class with a local Reserve unit as our first test. If successful, we'll be able to create multiple instances of the course on our server and quickly bring up remote courses throughout the Reserve community.

MAJ Pennington is chief of the resource center. He's a Functional Area 24 (computer-system engineer) officer and was previously an FA 53 (information-system manager). His assignments have included systems-automation officer and information-management officer at headquarters, 5th Signal Command, as well as FA 24 proponent manager in OCOS, Fort Gordon.

SFC John Barrett of OCOS' Enlisted Division contributed to this article.

SIMULATIONS

by MAJ Heather Meeds

Just as UIT will use the computer on your desktop to meet the education and training requirements for Signal and IT leaders, soldiers and units worldwide, the simulations being developed to support UIT will use PC-based simulations as the optimal means of providing realistic, virtual hands-on training, which will allow users to learn by doing.

The first PC-based simulation to support UIT and lifelong learning is the AN / TRC-173B, an air or vehicular transportable radio repeater that provides line-of-sight capability in corps-area communications. The simulations enable MOS 31R soldiers to learn TRC-173 and its critical tasks, then validate their new skills. Leader skills may also be obtained from working with this simulation.

The TRC-173 simulation was ready for training Aug. 31. The $2.5-million simulation immerses the user in a fully three-dimensional graphical environment. (See Figure 37 for a screenshot from the simulation's familiarization portion.) The icing on the cake is that the simulation has 100-percent reusable content, so updating this simulation and creating new ones will be much cheaper.

Speaking of new simulations, we've also started working on a simulation for MOS 31U. This simulation will be used as initial and sustainment training for the MOS. The simulation will train Force XXI Battle Command Brigade and Below (Version 3.5.3) as well as how to operate the tactical Internet to support fielding of Army Battle Command System digital systems. The 31U soldier will be able to operate each piece of equipment that makes up the tactical Internet, place the individual pieces of equipment into an integrated communication system and troubleshoot the system.

Other systems and equipment will be part of the simulation to form an integrated systems trainer:

- Single-Channel Ground and Airborne Radio System's advanced system-improvement program;
- Enhanced Position-Location Reporting System;
- Automated net-control device; and
- Precision lightweight Global Positioning System receiver.

Another new simulation we plan is the brigade-subscriber-node simulation, mostly targeted to MOSs 31F, 31P and 31R. This simulation will allow a leader or soldier to place the system into operation, establish internodal links as part of an integrated communications network, troubleshoot hardware and link faults, initiate shutdown procedures and prepare the system for redeployment.

Managers will be able to plan and monitor a network using the integrated network-management tools available within BSN, reconfigure an active network and troubleshoot network faults. More specific skills the simulation will train managers on include voice equipment; Internet-protocol address management; Hewlett Packard's Open View software for monitoring network status; access-control list management; Intrusion Detection System management and monitoring; H323 videoteleconferencing protocol; and battlefield VTC management.

The "hottest" simulation projects now are the MOS 31S simulations, however. Since 31S is severely understrength Army-wide, Fort Gordon has moved the simulations priorities to the 31S simulations to help increase the throughput of 31S soldiers. The 31S simulations will also increase the interservice training capacity for the Air Force, Navy and Marine Corps.

The first 31S simulation to be developed will be the AN / GSC-52A (satellite-communications terminal). The AN / GSC-52A, a strategic piece of equipment, is a high-capacity super-high-frequency SATCOM system. The strategic sites are permanent (for all practical purposes), so the simulation will only be for operator / maintainer. The simulation will provide familiarization with the equipment, operation, site layout and terminal. The user will acquire skills on equipment configuration, patching, programming, system operations and troubleshooting. In following the lessons, the user will practice and improve his or her knowledge and skill.

Since AOT has been implemented for MOS 31S, it's necessary to further train the soldier for his or her next assignment, since he or she only received formal training on either tactical or strategic in their advanced-individual-training course. The 31S

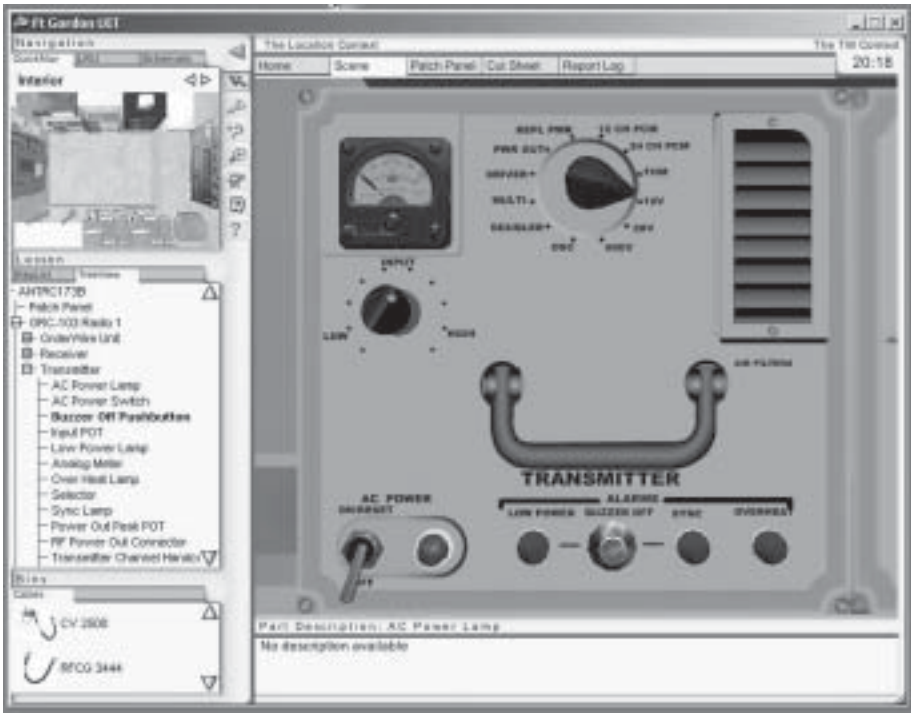

Figure 37. Familiarization from AN/TRC-173B radio set simulation.

simulation to be developed will be at a level where the soldier can get enough training from the simulation and unit-based training to effectively perform his job. This will eliminate the need to return to the schoolhouse to complete the other part of formalized tactical or strategic training.

The Signal Center is also seeking funds to develop a simulation on another critical 31S piece of equipment: the AN/TSC-85C nodal terminal, which can receive, transmit and process low-, medium- and high-capacity multiplexed voice, data and teletypewriter signals.

A few final notes on simulations in general. Having simulators at the schoolhouse will allow students to spend less time waiting for their turn on the equipment to acquire skills and practice them. This time-saving allows the course to be shortened ***and*** produces a more focused and better-trained soldier.

Also, using simulators will assist the schoolhouse in teaching joint courses. If the schoolhouse doesn't have the latest equipment version most of the Army is using, simulators will help eliminate that problem; students will be able to train on the simulator even if the schoolhouse doesn't have the actual equipment. The simulators won't just be used for AIT – they'll support follow-on training and can be used for refresher training, sergeants' time training or remedial training. These simulations will also be available and will be used for in Noncommissioned Officer Education System training (for both the basic and advanced NCO courses), and for officer and warrant-officer training.

All simulations are built for field use and are based on training manuals and on critical tasks for certain MOSs. The individual soldier will have access to them – from the foxhole to the classroom.

MAJ Meeds is chief of DOT's Systems Integration Division at the Signal Center. She's been an Army officer for 16 years, 11 of those with the South Carolina Army National Guard. Previous assignments include S-1, S-3 and S-4 with 151st Signal Battalion; commander of Company A, 151st Signal Battalion; systems engineer, 151st Signal Battalion; network officer, 228th Signal Brigade; and emergency-response plans and operations officer with the National Guard Bureau.

SFC John Barrett of OCOS' Enlisted Division contributed to this article.

ASSIGNMENT-ORIENTED TRAINING

by Beverly Friend

This update focuses on four of the seven initial-entry-training MOSs for which 15th Signal Brigade is proponent. As reported in the Winter 2001 edition of ***Army Communicator***, during the autumn of 2001, four MOSs (31R, 31S, 31F, 31P) were recommended as feasible candidates for the AOT pilot program.

The first course to be piloted (in October 2001) was the Multichannel-Transmission-Systems Operator-Maintainer Course (31R). The 31R supervises, installs, operates and performs unit-level maintenance on multichannel line-of-sight and tropospheric-scatter communications systems, communications security devices and associated equipment.

Before AOT was initiated, trainees spent 13 weeks and two days learning all mobile-subscriber and digital-group-multiplexing LOS equipment in use across the Army, regardless of the trainee's next assignment. When AOT was implemented, 31R training was reduced to nine weeks and three days (saving three weeks and four days of training) for echelons above corps, or eight weeks and three days (saving four weeks and four days of training) for echelons-corps-and-below training (Figure 38).

Our learners are now trained only on the critical tasks required by their gaining unit. This strategy will allow our learners to be more focused as they are trained, educated and developed through a systematic lifelong-learning process.

The Satellite-Communications-Systems Operator-Maintainer Course (31S) was the next course to be piloted (February). This task was a little more complicated than transitioning with 31R because of the length and complexity of the 31S course, the requirement to get an endorsement from the Interservice Training Review Organization, and the fact that we had to train legacy and AOT concurrently without more resources. The ITRO endorsement was required because the 31S course trains Army, Navy, Marine Corps, Air Force and international military students to operate and maintain the Defense Satellite Communication System. The 31S course also trains satellite systems and network coordinators to manage and control DSCS satellite networks.

Before AOT was implemented, the 31S course had grown from 39 weeks and one day in Fiscal Year 2002 to 41 weeks and one day (the approved course length for FY03). Under AOT, the course's length was reduced by 13 weeks and one day for the strategic track and by 16 weeks and one day for the tactical track; the 31S course under the AOT concept is 25 weeks and two days for the strategic track, or 22 weeks and two days for the tactical side (Figure 39).

The Signal Center instituted full-time AOT training in February for 31R and 31S. (Even though the pilot for 31S started in February, "full execution" did as well.) As of May, we've graduated 371 soldiers from 31R and no 31S (due to course length). By the end of this FY, 1,180 31R soldiers and 102 31S soldiers will have graduated AOT training. Course-length reductions have saved the Army 1,794 training weeks to date and will save 6,458 weeks during this FY alone.

We plan to implement the Network-Switching-Systems Operator-Maintainer Course (31F) as AOT (both the pilot and "full execution") in September. The 31F course teaches supervising, installing and operating up to on-site/in-systems maintenance on large and small electronic switching systems, system-control centers, node-management facilities, associated multiplexing and combat-net-radio interface equipment (Figure 40).

Finally, the 31P course – which trains the supervision, operation and maintenance of microwave communications systems, associated antennas, multiplexing and communications-security equipment – transitioned to AOT with a pilot course in August, although we originally projected the

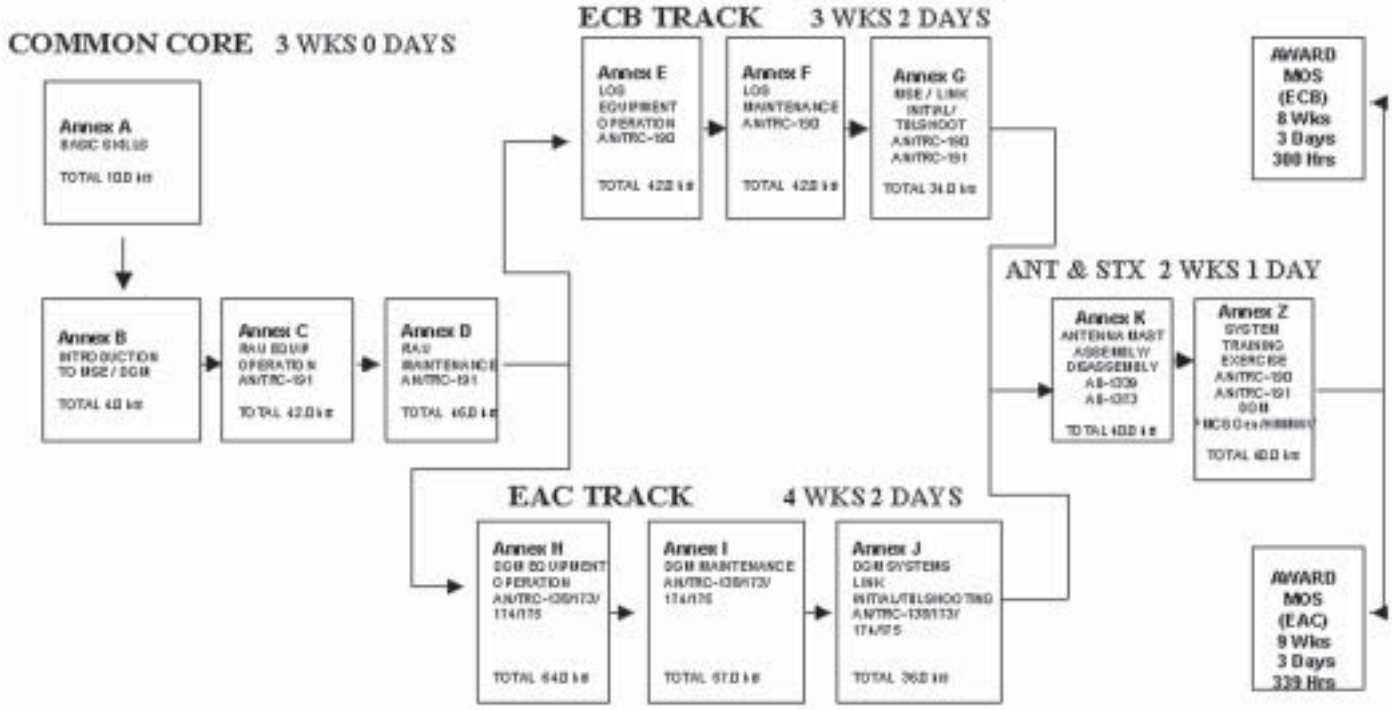

Figure 38. MOS 31R AOT flow. AOT course lengths are eight weeks, three days, for ECB and nine weeks, three days, for EAC.

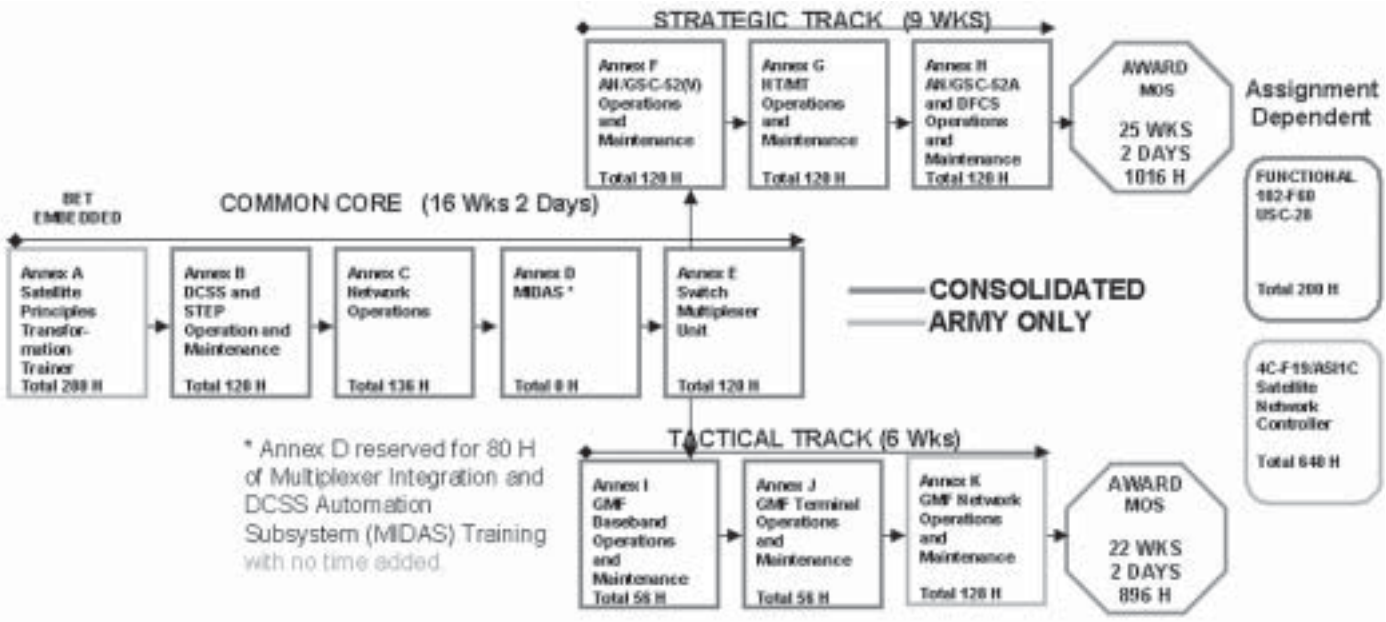

Figure 39. MOS 31S AOT flow. AOT course lengths are 25 weeks, two days, for the strategic track and 22 weeks, two days, for the tactical track.

pilot to begin in June (Winter 2001 ***Army Communicator***). TRADOC approved our concept plan, which is now a requirement for an MOS to implement training under the AOT methodology. The plan includes training requirements, the projected costs or savings over the lifecycle of the program, a lifelong-learning plan to cover the entire education spectrum for the MOS and documentation of the required additional-skill identifiers.

Our AOT pilot programs this year and late last year have been successful. We've learned many lessons from them, and we believe we're ready to move forward on a grander scale in terms of instructional development. It has been an almost seamless transition for the learners, but the instructors and supporting staff have developed tremendously on a professional level because of their involvement with this paradigm.

Also of note is that the AOT program benefits not only the active Army, but there's also significant benefit to

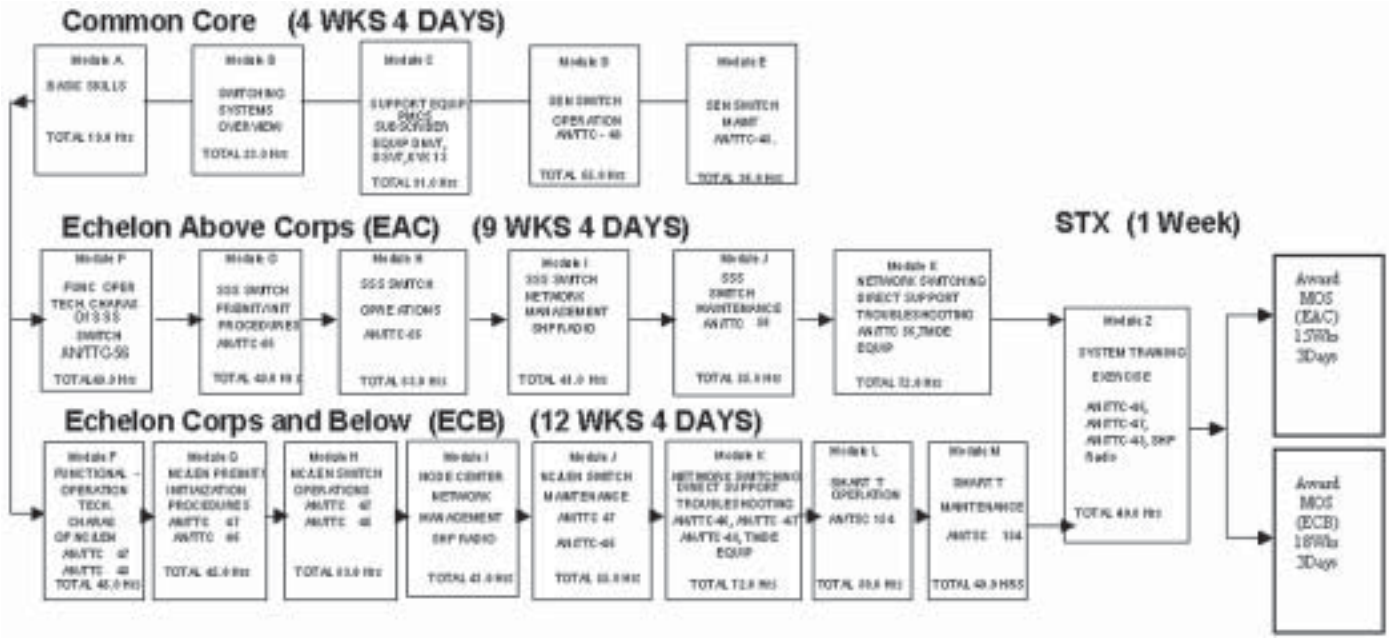

Figure 40. MOS 31F AOT flow. AOT course lengths are 15 weeks, three days, for EAC and 18 weeks, three days, for ECB.

both the Army Reserve and National Guard. The program tailors the soldier's MOS training to the equipment they'll work with at their unit of assignment. They spend less time away from their homes, jobs and unit. Most RC soldiers will never require follow-on training, as most never change units, but it's still available to those who need it. As UIT and the virtual campuses mature, RC soldiers may not even have to leave their jobs and families to attend training after they've completed IET.

As we continue our transition, we must remain mindful of what AOT soldiers will need after leaving Fort Gordon. Just as is presently done in the field, there will continue to be a requirement for AOT graduates to have mentoring and supervised on-the-job training from their supervisors. We'll need in-depth planning and coordination to retain and sustain each AOT soldier's technical skills and job proficiency. It's critical that we use IT now to ensure all soldiers have workable opportunities to grow both professionally and personally throughout the rest of their careers.

Dr. Friend is academic dean for IET at 15th Signal Brigade, Fort Gordon. She was formerly department director at the Signal Center's School of Telecommunications Technology. Friend holds master's degrees in education and instructional-systems technology. She has a doctorate in instructional-systems technology from Indiana University and is pursuing another doctorate in training and performance improvement. Her civil-service education includes training at the Distance Learning Institute in Stillwater, Okla.

SFC John Barrett of OCOS' Enlisted Division contributed to this article.

Acronym QuickScan

AIT – advanced individual training
AOT – assignment-oriented training
BSN – brigade subscriber node
DOT – Directorate of Training
DSCS – Defense Satellite Communication System
FA – functional area
FAQ – frequently asked questions
FY – fiscal year
IET – initial-entry training
IT – information technology
ITRO – Interservice Training Review Organization
LMS – learning-management system
LOS – line-of-sight
MOS – military-occupation specialty
MOSQ – military-occupation specialty qualification
NCO – noncommissioned officer
OCOS – Office Chief of Signal
PC – personal computer
RC – Reserve Component
SATCOM – satellite communications
SIT – School of Information Technology
SME – subject-matter expert
TRADOC – Training and Doctrine Command
UIT – University of Information Technology
VTC – videoteleconference(ing)

Recapitalization of tactical computer-automation systems

by LTC Jerome Payne

"The Department of Defense continues to face a limited investment budget constrained by a relatively stable top-line budget, and squeezed by increased operations and support cost for aging weapons systems." – Jacques Gansler, "Recapitalization: a key element of Army transformation," ***Army AL&T Magazine****, January-February 2001.*

The current pace of commercial-off-the-shelf computer-component migration is adversely affecting the projected useful life of the Army's new ruggedized tactical computer systems – accelerating planned rebuy / refresh funding points for product / program managers and making it difficult to accurately develop cost-effective recapitalization strategies for their fielded systems.

The purpose of my article is twofold. First, it's to analyze and discuss the Army's implementation of Secretary of Defense William Perry's 1994 directive to integrate and leverage COTS components in the design and production of systems the Defense Department develops and procures. In this part of my discussion, I intend to highlight the advantages and disadvantages of COTS components as they're integrated into today's tactical computers and automation hardware systems.

The second purpose is to identify a number of recommendations (some obvious, some not so obvious) as to what can and should be done to recapitalize and get the most out of our materiel investment. Whether referring to the activity as modernizing, recapitalizing, rebuilding, rebuying or refurbishing, the real question on the table from the Army leadership is, "What can be and is being done to extend the useful life of our $1 billion-plus investment in tactical automated systems supporting digitization and ultimately the Army's transformation program?"

Since the end of Operation Desert Storm, the Army and other DoD agencies have procured more than 10,000 computers, most of which are ruggedized and designed for use in several types of harsh environment. This number only reflects tactical computers built and delivered by way of the Army's Common Hardware Systems program; it doesn't reflect computers that may have been procured through a myriad of other contract vehicles. So the total number of tactical computers in operation today may well be in numbers of an even greater magnitude.

The important point here is to demonstrate the immense proliferation of tactical automation systems the Army and its "sister" services use since that proliferation began in the late 1980s and early 1990s, as well as to outline the need for a plan addressing recapitalization of this significant investment.

Background

As I mentioned, in 1994 Perry implemented an initiative that essentially moved the services toward a COTS approach to materiel development. DoD promoted this initiative, an aspect of the Acquisition Reform Act, to contain military costs by eliminating the design of customized application-specific systems.

The initiative forced the services to reduce their traditional reliance on military specifications for materiel acquisition and to seek out COTS solutions whenever and wherever applicable. Commercial standards and specifications became the norm; in the years that followed the 1994 initiative, the services had to request special waivers on mil-spec to procure items. The impetus for this initiative was clear. It was in DoD's best interest to leverage research, development and acquisition investments in the commercial sector, and in so doing, free up declining defense dollars for other pressing requirements such as combat system modernization, training and procurement.

Since the Cold War's end, U.S. defense spending has dropped 40 percent of what it was at its peak, and DoD's procurement budget is down by 65 percent, according to Phillip Hamilton's article, "Military Electronics and Obsolescence," ***COTS Journal***, March 2001. Military influence in the electronics and semiconductor market has reduced proportionately. In the 1970s, the military purchased and controlled more than 30 percent of the electronics sector. By the mid-1980s, the military's share had fallen to about 7 percent. Today DoD purchases less than 1 percent of the industry's total semiconductor output, according to Hamilton.

When the military lost its market share, it lost its influence. The bottom line is that today COTS development is driven by consumer need and commercial trends, and DoD is primarily a spectator, forced to leverage commercial-technology developments rather than direct them.

What does that mean to the Army? On one hand, military system developers love the low-cost, cutting-edge technology COTS materiel integration provides; however, COTS' major downside is the short obsolescence cycle and lack of corporate incentive to ensure the next-generation component seamlessly integrates into the old system. Technical experience in this area is that seldom, if ever, does the

next-generation component fit into the previous system, share the same footprint or work easily with earlier external system interfaces. Components that do usually require significant program funding to rehost system software, develop new drivers, update firmware or customize circuitry to accommodate next-generation voltage architectures – for example, the five-volt transition to 3.3 volts or 1.8 volts.

In view of these challenges, how will the Army maintain a system for 10 to 15 years when the integrated commercial electronics will be obsolete in 18-24 months and, for the most part, no longer available?

Digitization and Army transformation

To understand the overall complexity of the COTS issue as it relates to fielding schedules and the Army's unit-set-fielding initiative, it's important to understand where we were as an Army and where we're going with transformation. With the Cold War's end, the Army was forced to take a good look at itself and its relevancy regarding the type of operations it would be called on to respond to in the future.

It was clear that as the force reduced in size, joint operations would become far more important. Operations-other-than-war would become the norm; warfare would no longer be fought on a linear battlefield. Network-centric warfare would be the future. Success would hinge on the ability to see and influence the battlefield three dimensionally and at greater distances with fewer forces than ever before.

Seamless integration of command, control, communications, computers and intelligence systems is critical to this new method of warfare. So the Army's challenge is to change an acquisition process that at one time supported many "stovepipe" information systems and meld it into a functional, interoperational communications architecture. What followed the mid-1990s adjustment to COTS was a series of advanced warfighting experiments intended to identify "high-payoff" technologies and shake out network C4I shortcomings.

From the warfighters' perspective, their mission was clear: learn how to use and employ the new information-technology systems to increase the unit's lethality and protect our forces. But for the PMs on the materiel-acquisition side, acquisition transformation introduced a whole new set of challenges, many of which they continue to wrestle with today.

First, their programs all have different acquisition strategies and fielding schedules. Second, each program is funded separately, independent of the maturity level of C4I programs with which it may interoperate. Third, each program is controlled by a different Training and Doctrine Command training center established to meet different requirements as laid out in the approved operational-requirements document. To further exacerbate the situation, many of the system ORDs have different environmental-performance requirements, in spite of the fact that these systems will, in most cases, have to perform side-by-side in the same environment.

What exactly is COTS?

COTS IT refers to a range of available hardware and software industry produces for use in commercial markets. It may refer to board-level components built into a product or system, or it may refer to a complete end-product or system. Since COTS is produced by the commercial sector, its development and marketing reflect typical commercial priorities such as cost competitiveness, time to market and the ability to capture market share (percent of the commercial market the firm wants to own and control), according to Dr. Alex Weiss in his September 2000 thesis on using COTS IT in operational defense equipment (Defense Engineering Group, University College of London).

When the Army decided to use COTS in a tactical environment, no one knew just what the implications of COTS integration might be. Even the term COTS means different things to different customers. If you ask anyone in the commercial sector to define COTS, their answer will be something you can buy and use "as is" directly from the vendor. DoD has a somewhat different definition, however. To DoD, COTS means that an item is manufactured using best commercial practices. The spirit of COTS is to use products, technologies and services that are readily available from industry without a government or military contractor having to develop them from scratch, according to Danny Oscadca, "Future of harsh environment and mission-critical COTS," ***COTS Journal***, May 2001.

The problem is there are few, if any, commercial contractors who manufacture computer or automation products that are sold on the consumer market and can meet Army user requirements "off the shelf" or "out of the box" as defined

The problem is there are few, if any, commercial contractors who manufacture computer or automation products that are sold on the consumer market and can meet Army user requirements "off the shelf" or "out of the box." ... Further, the operational-test community has shown tremendous reluctance in granting any program relief or negotiating a compromise in key-performance parameters as stated in the user's operational-requirements document, in spite of how unrealistic some KPPs may be. ...

in an approved ORD without, in some cases, significant modification. Further, the operational-test community has shown tremendous reluctance in granting any program relief or negotiating a compromise in key-performance parameters as stated in the user's ORD, in spite of how unrealistic some KPPs may be when evaluated in terms of the technical maturity of similar systems in the commercial market. Often this dilemma results in a good program dying a slow but certain death because the old paradigm of tailoring specific military development efforts and high user expectations can't be met with a pure COTS solution. If they could, the cost to modify or adapt COTS technology may prove to be cost-prohibitive.

In the end, the materiel developer could have provided the user leap-ahead capability and, by integrating COTS, could have kept the cost within available program-funding parameters. Instead, the user loses out because COTS "as is" cannot meet the KPP, and developing an objective system which meets all the user's requirements is cost-prohibitive.

Using COTS requires a number of trade-offs based upon the environment in which it'll be used. Army Materiel Command, Communications-Electronics Command and subordinate program executive offices are aggressively implementing Perry's vision of COTS integration using a strategy called "adopt, adapt and develop," as discussed by James Barbarello and Walter Kasian in a March 2000 white paper titled "U.S. Army COTS experience: the promises and realities." Each approach is explored based on the specific requirement, implementation cost and development schedule of the product.

The strategy of adopting COTS is certainly the most preferred from both a cost and schedule perspective; however, most systems required to operate in a field environment must, as I said earlier, undergo some degree of modification or adaptation to meet functionality and reliability requirements. Therefore most computer hardware procured and provided to combat units to date has been adapted COTS – components are modified or ruggedized to meet clearly defined performance parameters and packaged to meet a specific integration footprint.

The term ***adapted*** refers to the fact that at the board level, components in these tactical computers are pure COTS. However, to increase system reliability, robustness and tolerance to a full spectrum of environmental stresses, a number of manufacturing modifications must take place that may include (but would not be limited to):

- Exterior casings may be specially designed to absorb impact shock if the item is dropped;
- Specially designed removable hard-disk drive encasements are developed to reduce the impact of vibration while the system is in use and the combat platform is on the move (a requirement placed in many system ORDs and the Army Battle Command System's capstone-requirements document);
- Electromagnetic-interference gaskets and filtering are integrated throughout the complete system;
- Printed circuit boards are stiffened (reinforced); and
- Special mounting arrangements are developed to protect high-risk circuitry.

Without these modifications few, if any, commercial-grade computers would survive the demands placed on them in a fully tactical environment. Commercial computers aren't designed to meet EMI requirements. This is critical in avoiding cosite interference problems created by placing an automation system near or adjacent to other operational data-transmission devices (such as Single-Channel Ground and Airborne Radio System radios).

Commercial computers and automation systems are also not designed to survive high-altitude electromagnetic pulsing. This is an enemy's electronic countermeasure designed to destroy operational data systems such as the tactical computer, using a directed high-energy pulse emitted from aircraft or missiles flying over the designated target area.

The point is that COTS implementation shouldn't be strictly interpreted to have the military user believe these systems can meet the demands of combat and network-centric warfare with computers purchased directly from the civilian commercial market without being granted dramatic relief from system performance and reliability requirements as established by the user community.

When Perry announced his COTS and acquisition reform initiatives in 1994, commercial technology was turning over every five to seven years. Today that rate of turnover is occurring about every 18 months. New microprocessors are entering the commercial market every six months, and next-generation memory families every six to nine months, according to John McHale in "Obsolescence: every COTS designer's bad dream," ***Military and Aerospace Electronics Journal***, February 2000 edition.

Given this scenario, the maintenance cost can be staggering when you consider the current defense budget is forcing the services to get longer and longer service life from their systems. PMs are responsible for ensuring they have adequate funds fenced in the program-objective memorandum to support their out-year recapitalization strategies. It's necessary to understand that the strategies may vary from PM to PM based on a number of factors.

Recapitalization: upgrade vs. rebuild vs. rebuy?

The Army's recapitalization program clearly defines and delineates a number of possible approaches toward keeping fielded systems refreshed, relevant and formidable.

MODERNIZATION – The development and / or procurement of new systems with improved warfighting capabilities.

RECAPITALIZATION – The rebuilding and selected upgrade of cur-

rently fielded systems to ensure operational readiness and a zero-time/zero-mile system. Rebuilding restores a system to like-new condition and inserts new technology to improve reliability and maintainability. Upgrading rebuilds a system and adds warfighting-capability improvements to address capability shortcomings.

MAINTENANCE – Repair or replacement of end-items, parts, assemblies and subassemblies that wear or break, according to Eric Orsini and COL Glenn Harrold, "Recapitalization: a key element of Army transformation," ***Army AL&T Magazine***, January-February 2001.

A successful recapitalization plan for Army automation and C4I systems must implement more than one of the approaches I've cited – and, in some cases, must implement them simultaneously.

In view of the Army's inability to control the rapid evolution of computer components in the commercial sector, PMs and TRADOC system managers will have to adopt a number of strategies to extend the useful life of their systems. This strategy will require influencing hardware development, as well as closely overseeing software and its tendency to grow exponentially with each subsequent version or release package.

With regard to software oversight, the Army's Directorate of Information Systems for C4 – working closely with the deputy chief of staff for operations – has already taken a major step in addressing this potential problem by developing a software blocking policy. The significance of this initiative cannot be overstated. This policy provides executive-level oversight and approval authority for migration of ABCS and all its related applications' software-release packages.

Any new release package, operating system or improvement to ABCS and its subcomponents must be thoroughly tested at the Central Technical Support Facility located at Fort Hood, Texas, for impact on the system and the network as well as ensuring its stability before it's released to digitized units. Further, release of subsequent software-release packages will be limited to 18- and 36-month fielding cycles, providing greater stability within the ABCS architecture, reducing operational impact and providing units greater time to train on the new software before implementing the transition.

Recommendations

ESTABLISH A STABLE SOFTWARE BASELINE. The recapitalization activity of tactical computer and automation systems will be varied, based on a number of factors. In May 2001, PM-CHS commissioned a study to evaluate the most probable weak link in our current fielded tactical-computer systems. The analysis – reported in a Unixpros Inc. software-metrics test report for ABCS 6.2 foundation products done at Fort Monmouth, N.J. – showed the processors (at that time 440 megahertz) were in most cases almost fully used at certain times of operation. The computer's one gigabyte of random-access memory was found to be more than adequate to support combat operations with its current software.

That being the case, units that have already received or will receive the already-purchased 440-mhz systems should represent the baseline for software development. Future software releases must be evaluated against this hardware baseline until there's adequate funding to initiate a modernization effort based on a system rebuy for the first generation of fielded systems, since these tactical computers can't be upgraded beyond the 440-mhz processors installed on their motherboards. (Migration beyond the 440-mhz-processor architecture requires a different commercial motherboard.)

CONDUCT TRADE-OFF ANALYSES. For systems yet to be fielded to the rest of the First Digitized Corps, PMs will have tremendous latitude for decisions on how and when to recapitalize fielded systems. Based on information from both General Dynamics Communication Systems and Sun Microsystems, the next generation of computer motherboards will be able to support two 650-700 mhz processors and up to two GB RAM memory. The next generation will also be able to house a 73 GB removable hard drive – providing ample room for growth to support future requirements. The greater capacity will mean that cost trade-off analysis will be crucial in determining the cost-effectiveness of procuring a next-generation system vs. cannibalizing legacy systems and incorporating, where appropriate, the older components into the new computer housing and motherboard. As might be expected, this next-generation board doesn't fit into the exterior housing of the tactical computers currently fielded.

INCREASE FUNDING OF ABCS SYSTEM ENGINEERING AND INTEGRATION EFFORTS. Although application software (for example, Maneuver Control System and All-Source Analysis System) is being developed to meet individual TRADOC schoolhouse/combat-developer requirements for their respective user, the real strength of digitization comes from the synergy created by the seamless integration and interoperability of ABCS subsystems at the Army level. A solid integration process is key to the success of making ABCS and Force XXI Battle Command Brigade and Below into seamless entities. The only way to ensure this happens successfully is through a solid SE&I effort.

CONTROL SOFTWARE GROWTH. Computer hardware and software must be seen as "Siamese twins" in that what affects one will surely affect the other. This can't be emphasized enough! Never lose sight of the fact that the C4I architecture is only as fast and stable as its weakest link. All software, present and future, will have to run as efficiently on legacy systems sent to the field in the last three-five years as it does on next-generation systems going out the door today.

One of the greatest frustrations for those who develop military-oriented computer hardware today

is that PMs simply don't know what the minimum hardware requirements are to run the current version of ABCS 6.x (or 7 and beyond). Compound this by adding the Solaris 7.0 operating system (with plans to migrate to possible 8.0 or 9.0 in the next year or so), then add the battlefield-functional-area application software. Unlike the "minimum system requirements" printed on the side of a Windows 98 or 2000 box, the Army has yet to determine what the minimum requirements are for using tactical computers and the myriad of software bundles that form that situation-awareness product we refer to as ABCS.

As the Army and sister services determine software requirements for this new network-centric architecture, it's imperative CTSF establish "metrics" for determining the minimum and optimum hardware-performance requirements to efficiently run ABCS and all additional software. This will allow PMs to know the requirements of hardware that soldiers of the future need today and to be able to procure these systems with adequate growth built in, but at the same time not pay for performance far in excess of what will realistically be needed.

Reduce hardware-software interdependencies. System-application software developers often write their software code with a direct dependency on the specific system on which it's being run (for example, Sun UltraSparc IIi). This should be avoided. Open-architecture should be the standard! There maybe a good rationale for this, but it creates a number of problems for PMs.

First, any change in hardware platforms or subcomponents such as a hard drive (which is inevitable) requires the contractor to modify, change, tweak or develop the software to make the system continue to run properly. Not only does this take time, but it also leads to a second problem. Re-porting software to a new platform can be an expensive proposition if proper preparations and funding adjustments haven't been made or planned in advance. Minor software-development efforts can cost in the millions of dollars and often far exceed the cost of procuring the new hardware component.

Give PMs "cradle to grave" responsibility for their systems. There has been a great deal of discussion as to whether replacement or upgrade responsibility should go to the using unit once fielding has been complete. This approach can lead to significant problems and isn't recommended. Decentralizing of recapitalization requirements is the equivalent of herding cats. Every commander would have to plan for his or her system upgrades without being privy to or have control of external forces that might force system migration or maintain interoperability. Funds earmarked for upgrades or rebuy could easily be diverted to meet unanticipated but necessary contingencies. It's conceivable that within a short time, tactical data communication among major subordinate commands could become tenuous at best.

Make CTSF the Army's single point of distribution for all ABCS functional and program-specific application software. This is important because each product requiring interoperability with ABCS may consist of a number of software packages scheduled for release over a period of years (for instance, Advanced Field-Artillery Tactical Data System Package 9, Package 10, etc.). CTSF has the ability and charter to integrate these software packages, work out the bugs, coordinate the release schedules and analyze software and hardware impact on the total architecture.

The Army and DoD must continue to leverage research-and-development investments in the commercial sector. PMs, defense contractors and the user community must get together early in the spiral-development process to ensure all parties have a clear understanding of "threshold" vs. "objective" requirements, how realistic (achievable) they are, and the impact some requirements have on system cost. This would facilitate the identification of a system's functionality or capability, which – due to its current lack of technical maturity – may not be realistic to integrate in the near-term but could be met by implementing a "block improvement program" approach in system development. This approach would give users some leap-ahead capability in the near-term and an objective system consistent with their full requirements in a future block upgrade after the technology has matured to the point where it's ready for the user community.

Conclusion

In just a few short years, the Army has made incredible strides toward transforming into a truly lethal, responsive and relevant force for the 21st century. Network-centric warfare is here to stay and is clearly the way the Army will fight most of its adversaries in the future. The Army must continue to exploit information dominance's incredible potential and refine systems that will keep it the world's pre-eminent superpower.

At the same time, we can't forget that all these cutting-edge information systems, high-speed C2 networks and lethal sensor-to-shooter links still boil down to a soldier drawing a line in the sand and giving his or her life, if necessary, for principles established by this nation long before anyone dreamed of war as we know it today.

The Acquisition Corps has a tremendous responsibility to develop systems that first and foremost provide soldiers with an overpowering advantage over their adversaries. The corps must balance this with solid business decisions that will gain the greatest return on invested defense dollars, both near- and long-term.

LTC Payne's basic branch is infantry, but he's been in the Army Acquisition Corps since 1989. He just finished a stint as a fellow at the Army War College's Center for Strategic Analysis, University of Texas in Austin; it was from that assignment (and

experiences from his previous one) that this article was drawn. "Each year students attending this fellowship research a topic of relevance to national security and related issues," he said. "We focus on topics and issues of current interest to military leaders and strategists, and after conscientious and critical analysis, we provide conclusions and recommendations."

Before his fellowship, Payne served as PM-CHS at Fort Monmouth. During that assignment, he worked with DISC4 to investigate options/strategies on recapitalizing computers and related automation hardware. Selected for promotion to colonel, at the end of July he became commander of Electronic Proving Grounds, Fort Huachuca, Ariz. Payne holds a master's degree in public administration from Webster University and is also a graduate of the Defense Systems Management College.

ACRONYM QUICKSCAN

ABCS – Army Battle Command System
C2 – command and control
C4 – command, control, communications and computers
C4I – command, control, communications, computers and intelligence
CHS – Common Hardware Systems (program)
COTS – commercial-off-the-shelf
CTSF – Central Technical Support Facility
DISC4 – Director(ate) of Information Systems for Command, Control, Communications and Computers
DoD – Department of Defense
EMI – electromagnetic interference
Gb – gigabyte
IT – information technology
KPP – key-performance parameters
Mhz – megahertz
ORD – operational-requirements document
PM – program manager
RAM – random-access memory
SE&I – system engineering and integration
TRADOC – Training and Doctrine Command

Circuit check

News and trends of interest to the Signal Regiment

NEWS

SIGNAL CIVILIAN NAMED ARMY DEFENSE MESSAGE SYSTEM USER OF THE YEAR

by SGT Robyn Baer

FORT WAINWRIGHT, Alaska – A civilian employee with 507th Signal Company, 59th Signal Battalion, here has been awarded one of the highest honors a network-operations chief can receive.

Figure 41. Celine Johnson, Army DMS User of the Year.

Celine Johnson was given the Army Defense Message System User of the Year award April 8.

She was singled out because of her help with upgrades to e-mail systems here. Fort Wainwright was chosen as a testbed for e-mail upgrades and accomplished those upgrades ahead of schedule without causing any interruptions to the e-mail system.

"The only reason I was singled out is because of the team of system administrators and computer-support technicians I work with," Johnson said. "It's their excellence and commitment that led to my award."

Nonetheless, her supervisors and coworkers had high praise for her cyberskills. "Celine Johnson is not only a superior technician, whose advice on DMS issues is often sought by U.S. Army Pacific for her trouble-solving capability, but she also leads a great team of soldiers and civilians," said CPT Dean Denter, 507th Signal Company commander. "If you rely on e-mail at Fort Wainwright or Fort Greely, you can feel a little better with Celine behind the monitor, focused on customer service and recognized as the best in the Army."

Johnson said the new system is more comparable with civilian corporations on the same versions.

"We're trying to stay in line with what's available in industry. Now if you try to send an e-mail home, it won't fail because our version is too old," she said.

SGT Baer is assigned to the public-affairs office at Fort Wainwright. See related story under "Signal units" heading for more 58th and 59th Signal Battalion DMS awards.

516TH'S TANABE WINS PACIFIC EMPLOYEE OF THE YEAR TITLE

by Bill McPherson

FORT SHAFTER, Hawaii – Jerome Tanabe, an information-technology specialist at 516th Signal Brigade, was selected as the Pacific-wide Employee of the Year 2002 in the professional-administrative-technical (action officer) category June 5. He won the title in competition with 23 other nominated federal-action officers of the year.

"Jerry Tanabe definitely earned this Pacific-wide recognition," said COL Monica Gorzelnik, brigade commander, who selected him as the brigade action officer of the year.

"Jerry's completion of four major information-technology infrastructure projects in 2001 couldn't have been more timely," Gorzelnik said. "All four projects were in place and provided secure, dramatically enhanced command-and-control communications capability for the senior leadership of U.S. Army Pacific during our crisis-management mode following the terrorist attacks on our nation Sept. 11, 2001."

Tanabe was cited for overseeing completion of $14.2 million Common-User Information Transfer Network IT infrastructure projects at Fort Shafter, Hawaii, and Fort Wainwright, Alaska. He also spearheaded the cutover of the Defense Department's new Defense Message System theater-wide and the installation of public-key-infrastructure encryption keys for all USARPAC general officers and key staff members. Tanabe also procured and fielded more than 550 secure-terminal-equipment consoles (telephones for secure, classified conversations) to key personnel throughout the theater.

Mr. McPherson is 516th Signal Brigade's public-affairs officer.

516TH'S ZAYAS WINS NATIONAL IMAGE AWARD

by Bill McPherson

FORT SHAFTER, Hawaii – SFC Eduardo Zayas, 516th Signal Brigade's equal-opportunity adviser, was awarded the Army's National Image, Inc. 2002 Meritorious Service Award at the 14th annual "Salute to Hispanics" awards banquet in Las Vegas May 30.

Charles Abell, assistant secretary of defense for force-management policy, presented the award to Zayas and to winners from the other U.S. armed services.

"My grandmother always told me, 'If you always work with your heart and spread goodness around, things will come back to you.' Those words remained in my mind throughout all the ceremony," Zayas said. "In the program booklet, I read all the accomplishments done by all the other awardees, and I felt real proud to be sitting next to them.

"I think if everyone would just give a little of their time to help others, this world would be a better place," said Zayas.

Figure 42. SFC Eduardo Zayas.

Zayas was cited for supporting programs on behalf of human rights, race relations, equal opportunity, affirmative action and public service throughout his 19-year military career.

"Zayas has been visibly proactive, creative and thoroughly professional in spearheading ethnic and affirmative-action observances for the brigade and for the Army in Hawaii," said COL Monica Gorzelnik, brigade commander, who nominated Zayas for the award. "He brings events to life by having participants dressed in costumes related to the particular theme, by arranging for high-profile guest speakers, by involving musicians and dancers, and by setting up static or multimedia displays. He pools resources with other Army Hawaii EO advisors, and rolls up his sleeves in directing behind-the-scenes logistics for our events. His organizational skills are phenomenal!"

At this spring's Women's History Month prayer luncheon, Zayas arranged for women soldiers to dress in uniforms from various eras of the U.S. Army. For last year's Black History Month celebration, Zayas had volunteers dress in costumes and provide vignettes for the audience to guess their names (for instance, Louis Armstrong, Rosa Parks and George Washington Carver).

"He goes the extra mile in ensuring the programs are interesting and memorable," Gorzelnik said. "He gets the audience's attention and, in the process, he ***teaches*** them about the rich heritage of our diverse Army workforce."

An award-winning poet since he was a child, Zayas was cited for writing a poem directly related to the EO themes being observed, which are always read at events.

Zayas was also commended for his volunteer support for the local community, including donating more than 520 hours after work and on weekends as a coach for five different sports at the Aliamanu Military Reservation Youth Center in Honolulu.

Mr. McPherson is 516th Signal Brigade's public-affairs officer.

MILLENNIUM CHALLENGE EXPERIMENT TESTS JOINT INFORMATION CAPABILITIES

by Gerry Gilmore

WASHINGTON – A joint military experiment this summer sought to use technology to link the services' individual information, command, communications and operations elements as part of ongoing force-transformation efforts.

Defense Department planners want to integrate those capabilities among the services and "have them mutually supportable" on the ground, air and sea, Air Force BG James Smith told reporters May 22 at the Pentagon.

Smith headed the Millennium Challenge 2002 joint warfighting experiment July 24-Aug. 15.

As part of envisioned "effect-based operations," Smith said DoD looks for forces to quickly access rapidly gathered and digitally stored information to get inside an adversary's mind even before the first shots are fired.

Doing so, he explained, would dissuade potential enemies by producing a military "checkmate" favorable to American and allied national interests. Under this strategy, political or diplomatic solutions could be implemented before events escalate to war. If war does occur, such a capability enables U.S. military planners to be a step or two ahead of the enemy.

To do this, Smith said, the services must become more interoperable

and share their information. "Why … have stray electrons going around the battlefield that nobody knows where they came from, or who's seeing them?" he asked.

"We ought to be able to see them all," said Smith, who's also deputy commander of the Joint Warfighting Center at Suffolk, Va., part of U.S. Joint Forces Command, Norfolk, Va.

The experiment examined those, and other, capabilities the U.S. military would like to have around 2007, Smith said. Events involving a potential future adversary – played by fictional "Country X" – were part of the experiment's crisis scenario.

About 80 percent of the experiment consisted of tabletop activities, while 20 percent involved troops and equipment, Smith said. Troop activity, he continued, occurred at Fort Irwin, Calif.; air operations were conducted at Nellis AFB, Nevada; and Navy and Marine activities were held off the coast of California.

Part of the experiment, Smith said, involved the newly created standing-joint-force headquarters-element concept that involves freestanding groups of joint planning, information and communication experts.

These standing staff cells – which can contain updated information about potential opponents' infrastructure and other information of military value – can be attached to each joint-force task force as it deploys, Smith said. DoD plans to form five of these deployable headquarters and provide them to unified combatant commanders within a few years.

The process of obtaining joint interoperability "is going to be its own challenge," Smith pointed out, noting, "You've got to build relationships, you've got to be willing to share information."

Mr. Gilmore writes for American Forces Press Service.

DEFENSE DEPARTMENT ANNOUNCES MERGER OF U.S. SPACE AND STRATEGIC COMMANDS

WASHINGTON – As part of the ongoing initiative to transform the U.S. military into a 21st-century fighting force, Secretary of Defense Donald Rumsfeld announced his intention to merge two unified commands whose missions include control of America's nuclear forces, military-space operations, computer-network operations, strategic warning and global planning.

The intended merger of U.S. Space Command and U.S. Strategic Command will improve combat effectiveness and speed up information collection and assessment needed for strategic decision-making, Rumsfeld said.

"The missions of SPACECOM and STRATCOM have evolved to the point where merging the two into a single entity will eliminate redundancies in the command structure and streamline the decision-making process," said Rumsfeld.

STRATCOM, located at Offutt AFB in Nebraska, is the command-and-control center for U.S. nuclear forces. SPACECOM in Colorado Springs, Colo., commands military-space operations, information operations, computer-network operations and space-campaign planning. Both commands are charged with countering the proliferation of weapons of mass destruction.

"The merged command will be responsible for both early warning of and defense against missile attack as well as long-range conventional attacks," Rumsfeld said.

The intended merger is scheduled to take place in October, and the preferred location for the command headquarters is Offutt AFB, Neb.

UPDATES

CHIP GIZMO LINKS UP WITH BEETLE BAILEY

by Patrick Swan

WASHINGTON (*Army News Service*) – SPC Chip Gizmo reported for duty at Camp Swampy July 4 as GEN Halftrack's new gadget-loving information-technology soldier. And one of the real Army's top IT officers had a hand in selecting the character.

Back in May, "Beetle Bailey" creator Mort Walker invited readers to enter a national contest to name a new computer-specialist character for the long-running comic strip.

Figure 43. Mort Walker's new "Beetle Bailey" comic strip character, Chip Gizmo, represents the Signaleer. *(Copyright 2002 King Features Syndicate; used by permission)*

Readers submitted more than 84,000 names. A panel of judges from government information offices, including one from the Army's G-6 staff, perused the names, ultimately selecting "Specialist Chip Gizmo" for the job. State Department employee Earl Hemminger, who said that he was helped by three colleagues, sent in the winning entry.

Had the judges felt differently, the new IT soldier might have been called Fidget, Glitch, Geekster or even Scuzzy. Those names and several others were part of the top 12 finalists. In that case, Gizmo would still be on the unemployment line.

Instead, it is the spiky-haired, gadget-toting Gizmo who finds himself in military uniform, interacting with the familiar faces of Beetle Bailey,

Sarge, LT Jack Flap, GEN Halftrack and Miss Buxley.

"We believed that name accurately represents what this new character is all about," said COL Edward Siomacco, who represented LTG Peter Cuviello, the Army's chief information officer, as a judge on the selection panel.

"Chip Gizmo is a name that is descriptive without being derogatory," said Siomacco, director of the Army's Strategic Communications and Initiatives Office. "Specialist is a rank that is appropriate for the job he performs."

Cuviello, better known to some as the Army's top Signal officer, said he was pleased with the selected name.

"Chip Gizmo is a good choice and a good agent for the Army Signal community," he said. "When a comic strip as famous and beloved as 'Beetle Bailey' decides to recognize the importance of our Army IT efforts, we know we've arrived. This is just one more indication of the importance we ''knowledge warriors' play in the Army's transformation to the Objective Force."

Gizmo's debut in the Beatle Bailey comic strip came July 4. And according to a source close to Walker, the new IT character has the background for his new assignment. He reportedly earned his bachelor's degree in computer science in 1992. In the mid-1990s, he landed a high-paying job with a fast-moving dot.com firm. Following the terror attacks of Sept. 11, 2001, he searched his soul for a means to show his enhanced sense of patriotism and love for country.

His search ended at Camp Swampy, when he enlisted in the Army.

Dell Computer Corporation underwrote costs for the "Name the IT Character" contest, with Northwest Airlines providing prize donations and the military Times newspapers offering promotional support.

Contest officials encouraged entrants to make a donation to the Fisher House Foundation, a non-profit organization that provides families of military personnel with temporary lodging in a home environment when visiting sick or injured active military members or veterans. More than $105,000 poured in. In August, to coincide with the opening of the newest Fisher House location, Dell will provide a desktop computer for each of the foundation's 30 locations around the world.

"Our contest to name the new computer guy has been a lot of fun," Walker said.

Beetle Bailey made his comic-strip debut as a college cutup on Sept. 4, 1950 in a mere 12 newspapers. Today, King Features syndicates "Beetle Bailey" to more than 1,800 newspapers around the globe, and it has become the third most widely distributed comic strip of all time. In May 2000, during the yearlong celebration of the 50th anniversary of "Beetle Bailey," the Army honored Walker at the Pentagon with the Decoration for Distinguished Civilian Service, the highest award the Army can bestow on a civilian.

Mr. Swan writes for the Army's chief information office/G-6.

ARMY DEPOT EMPLOYEE EARNS HUMANITARIAN AWARD FOR LIFE-SAVING ACTIONS

by Kevin Toolan

TOBYHANNA ARMY DEPOT, Pa. – Travel can create unforgettable memories. Just ask Leo Kieczkajlo and Jim Dudley.

Kieczkajlo recently earned the Humanitarian Service Award for life-saving actions during his co-worker's medical emergency.

Tobyhanna's liaison officer at the U.S. Army Aviation and Missile Command, Huntsville, Ala., Kieczkajlo was at Fort Gordon, Ga., with Dudley, a logistics-management specialist in the depot's Business Management Directorate. They were there to staff a depot exhibit at the Signal Symposium in November 2001 at the Army's Signal Center.

Early the morning of Nov. 29, Dudley's after-dinner "indigestion" had turned into severe chest pain. He told Kieczkajlo of his discomfort. Kieczkajlo urged the front-desk worker of the hotel where the men were staying to call a local ambulance service. Medical technicians checked Dudley's vital signs but couldn't determine his status, so they recommended he go to the hospital for a more thorough examination.

"Jim could have gone in the ambulance, but since we both were awake, I drove him to University Hospital in Augusta [Ga.], which happens to specialize in cardiac medicine," Kieczkajlo said.

Doctors at University Hospital said Dudley was having a heart attack. Dudley was immediately hospitalized and scheduled for emergency surgical procedures, including angioplasty and placement of a stint.

While he was being admitted, Kieczkajlo reported Dudley's condition to his acting director, Marti Stanczak. Stanczak contacted Dudley's wife, Pat. Pat, their son and oldest daughter immediately began driving to Georgia, with Kieczkajlo relaying medical updates back through the depot to the family. He also arranged to have accommodations ready for them when they arrived; the Dudley family arrived while Jim was in surgery.

"Leo was invaluable. I can't put a price on what he did in helping me and in keeping my family informed," Dudley said.

The hospital's physicians believed Kieczkajlo's prompt actions in the early morning hours of Nov. 29, combined with their diagnosis and immediate surgery, were lifesavers.

With Dudley out of danger, Kieczkajlo returned to the symposium for the rest of the event and then handled all the administrative details to return the depot display to Tobyhanna. Dudley was discharged three days after his surgery and traveled home with his family.

After his recuperation, Dudley returned to work earlier this year. He reports he has made a full recovery and feels well.

Mr. Toolan is Tobyhanna's public-affairs officer.

WHITE PRAISES INFORMATION-TECHNOLOGY WARRIORS

by Patrick Swan

ATLANTA – The information war is an ongoing battle that informa-

tion-technology warriors fight every day, Army Secretary Thomas White said to the more than 2,000 attendees at the 2002 Directorate of Information Management Conference here May 13-16.

"The efforts put forth by men and women in DOIMs around the world are vital to the Army and the nation," White said in his keynote remarks. "This asymmetric threat will continue to grow, and it will require vigilance and innovation on your part to overcome."

White said that while people in the Pentagon can establish policy and guidelines, the "heavy lifting" to carry out those policies and guidelines is done by DOIMs. "And you've never failed," he said.

LTG Peter Cuviello, the chief information officer / G-6, also addressed the conference. "Our top priority is transforming the mindsets and behaviors of Army senior leaders to the enterprise management of the IT world," Cuviello said. "We have highly skilled resources dedicated to our five Army Knowledge Management goals, and we are getting excellent results."

Those goals are to reshape IT investment strategy; integrate knowledge management and best-business practices into Army processes; manage the infostructure at the enterprise level; scale Army Knowledge On-line as the enterprise portal; and harness human capital.

The CIO / G-6's director of enterprise integration, Miriam Browning, said there was a great deal of interest this year in the realignment of the Army's information-management community and in the transformation of the Army's installation-management world.

MG James Hylton, Army Signal Command's commander, and Jan Menig, deputy assistant chief of staff for installation management, provided updates at the plenary session. They discussed the regionalization of both the G-6 and installation functions into four continental U.S. areas (Northeast, Northwest, Southeast and Southwest) and three overseas areas (Korea, Pacific and Europe).

Information assurance supporting homeland security was also an agenda highlight. Panel members for that discussion included representatives from the Army, state government, academia and the private sector.

"Each had a different perspective to share, but all had a common goal – how to work together, using best practices / procedures and collaborative technologies, to achieve better information flows and stronger security in all areas of homeland security," Browning said.

"One of the reasons we sponsor this conference every year is to bring people together to learn from each other – and this year's conference certainly met that expectation," she added.

Mr. Swan is the public-affairs liaison to the CIO/G-6.

9TH QUADRENNIAL REVIEW OF MILITARY COMPENSATION RELEASED

WASHINGTON – The Defense Department released the ninth Quadrennial Review of Military Compensation May 17, which assesses the effectiveness of military pay and benefits in recruiting and retaining a high-quality force.

Today's force is more educated than in the past, according to the report, which concluded that current pay doesn't include a premium high enough to retain this more educated force.

The ninth QRMC found that compensation, particularly for mid-grade enlisted members and junior officers, hasn't kept pace with the earnings of comparably educated workers in the private sector. The 2002 pay raise, the largest in two decades, was based on the QRMC findings and did much to remedy the situation.

The QRMC also recommends that military pay compensate for the special demands associated with military life. To do so, the report says, pay should be set above average levels in the private sector, at around the 70th percentile of comparably educated civilians. To meet this goal in retaining high-quality service members, additional targeted pay raises will be needed. These targeted pay raises are included in DoD's proposed budget for fiscal 2003.

The ninth QRMC also examined special pays and bonuses and the financial well-being of certain segments of the military population. These included:

- Junior-enlisted family income (including eligibility for food stamps);
- Earnings of military spouses;
- Allowances for members assigned overseas;
- Veterans' educational benefits; and
- Military retiree post-service earnings.

The ninth QRMC is on the web at http://dticaw.dtic.mil/prhome/qrmc/.

PENTAGON ROLLS OUT 'LATEST, GREATEST PROTOTYPE' SOLDIER SYSTEM

by SFC Kathleen Rhem

WASHINGTON – Defense Department engineers are developing the 2010-era Objective Force Warrior even before the next-generation Land Warrior is fielded in 2004.

Project managers from the Natick Soldier Center in Natick, Mass., rolled out a prototype OF Warrior for the Pentagon press corps May 23.

Project engineer Dutch Degay called the prototype the "latest and greatest" individual soldier system. He explained that Army Chief of Staff GEN Eric Shinseki tasked the Natick lab to "completely rebuild the (combat) soldier as we know him."

Historically, researchers have devised upgrades to current equipment. The OF Warrior program tossed out the current system of individual equipment in its entirety and designed a new "integrated, holistic" system from the skin out, Degay said.

He explained that the Land Warrior system adds many new capabilities to the current system of field gear through an electronic component soldiers will carry.

The OF Warrior system, scheduled for fielding in 2008, completely integrates these electronic capabilities. Degay explained that soldiers will never again have to wear cumbersome night-vision or infrared goggles or

heavy laser-training components on their helmets. These and other features – thermal sensors, day-night video cameras, and chemical and biological sensors – are fully integrated within the helmet. The OF Warrior system also includes a visor that can act as a "heads-up display monitor" equivalent to two 17-inch computer monitors in front of the soldier's eyes.

The uniform system is a multi-function garment working from the inside out, Degay said. It incorporates physiological sensors that allow the soldier, the chain of command and nearby medics to monitor the soldier's blood pressure, heart rate, internal and external body temperature, and caloric consumption rate. Commanders and medics can access the information through a tactical local-area network.

Heat and cold injuries are responsible for a large percentage of casualties in both battle and training, Degay said. But if a medic can monitor a soldier's vital signs, many of these types of injuries can be prevented.

Figure 44. A mannequin wears the prototype Objective Force Warrior system.

If a soldier is injured, medics can start making an assessment before they even get to an injured soldier. "And that saves time on the battlefield," Degay said.

The OF Warrior system has a built-in "microclimate conditioning system." Degay explained the private climate-control system has a "spacer fabric" that's a little bit thicker than a regular cotton T-shirt. The garment has "capillaries" that blow hot or cold air through the system.

The system's many functions are powered by fuel cells, which Degay described as "cellphone batteries on steroids."

A primary concern in designing the OF Warrior system is overall weight carried by individual soldiers. Soldiers on combat patrols in Afghanistan today typically carry 92 to 105 pounds of mission-essential equipment, Degay said. This can include extra ammunition, chemical protective gear and cold-weather clothing.

The requirement for the OF Warrior system is to weigh no more than 45 to 50 pounds. Many of the system's built-in functions do away with the need to carry extra equipment. The climate-control feature eliminates the need to carry extra clothing. The outer garment has some biological and chemical protection capabilities, reducing the need to carry extra protective gear.

"What we're trying to do at the very fabric-of-the-uniform level is consolidate all those systems into one so we lessen the overall bulk and weight" carried by soldiers, Degay said.

Anything else that's mission-essential but not built into the individual soldier system will be carried on a "robotic mule." Degay explained the mule is part of the system. Each squad will have one of the small, remote-controlled wheeled vehicles that can perform a multitude of functions for the soldiers.

"(The mule) will assist with not only taking some of the load carriage off the individual soldier, but it also provides a host of other functions," he said. "Primarily water generation (and) water purification. It's a recharging battery station for all the individual OF Warriors in the squad. It acts as a weapons platform. It has day and night thermal, infrared and forward-looking imaging systems inside the nose of the mule, as well as chemical-biological sensors."

The mule can also communicate with unmanned aerial vehicles to give the squad members a true 360-degree image of the battlefield. Currently this capability isn't available below the battalion level, Degay said.

"It's a follower, and it can be manipulated and brought forth by any member of the squad," he said. "It's essentially a mini load-carriage system that's there for them all the time, which allows us to lighten the load for the individual soldier, but it has resupply available at a moment's notice."

Degay said that in the past, such foresight and interchangeability has only gone into major weapons and vehicle platforms.

"Historically we have spent millions of dollars on platforms," he said. But, "the soldier is the centerpiece of our Army, and we are finally making that investment for (the soldier) individually."

SFC Rhem writes for American Forces Press Service.

LEADER TRANSITIONS

REGIMENT RECEIVES NEW CHIEF OF SIGNAL

FORT GORDON, Ga. – The U.S. Army Signal Center and Fort Gordon welcomed a new commanding general as BG Janet Hicks took the reins from MG John "Pat" Cavanaugh in a change-of-command ceremony Aug. 7.

Hicks became the Army's 30th but first female Chief of Signal.

Hicks was reassigned from serving as director of Command, Control, Communications and Computer Systems/J-6, U.S. Pacific Command, Camp Smith, Hawaii, for two years. Previously she was the Signal Center's chief of staff July 1999-May 2000 and commanded 516th Signal Brigade at Fort Shafter, Hawaii, June 1997-June

Figure 45. BG Janet Hicks smiles after accepting the guidon from GEN John Abrams, Training and Doctrine Command's commander. Outgoing Chief of Signal MG John Cavanaugh faces the new Chief of Signal.

1999. Other assignments include chief of Personnel Command's Signal Branch, Officer Personnel Management Directorate; 125th Signal Battalion's commander; and communications officer in U.S. Central Command's J-6 office.

She has been a Signal officer since March 1975, when she received a direct appointment to second lieutenant. She holds a bachelor's degree in French language and literature from Simpson College and a master's degree in education from Georgia Southern University.

Cavanaugh, who has been Chief of Signal since July 2000, retires after 32 years' service. Beginning Sept. 3, he became president of Gate Safe Inc., which inspects and verifies all Federal Aviation Administration-mandated security functions related to the packing and delivery of in-flight food and beverages to the U.S. commercial-airline industry.

PIONEER DIES

AUGUSTA, Ga. – Percy Ricks died here July 14. Ricks was perhaps best known for being the youngest first sergeant (age 22) in contemporary Army history and the first black first sergeant of a racially mixed Signal Corps unit (U.S. Army Photographic Center, Long Island, N.Y.) – two years before President Harry Truman signed the executive order ending segregation in the armed forces.

Drafted like many Americans in the pre-World War II Army build-up of September 1941, within 11 months he was promoted to first sergeant and assigned as special cadre in charge of two training companies at Camp Carson, Colo. One year later, in April 1943, Ricks' company deployed overseas to Tunisia and then to Italy.

Once his World War II service ended and he was discharged, he reenlisted for three years, regaining his rank and position as a Signal Corps first sergeant. He retired in 1962 after 21 years' service.

He donated his personal papers to the Signal Center in 1993. On Jan. 25 of this year, the Army art room at the Signal Museum on Fort Gordon, Ga., was designated the Percy Ricks Room in his honor. The room contains his uniform, Army art going back to World War II and an Oscar the Army won in 1946.

*This article drawn from Fort Gordon public-affairs office sources and from an article in **Army Communicator**'s World War II edition, www.gordon.army.mil/ac/WWII/ricks.htm.*

SIGNAL UNITS

COBRA GOLD '02 SEES SEVERAL FIRSTS

by MAJ Joseph Berry Jr.

SATTAHIP, Thailand – About 21,000 soldiers, airmen, sailors and Marines from the U.S., Thai and Singapore militaries – including 10 soldiers from Team Signal and dozens of other Signal soldiers from the Pacific theater – took part in the largest exercise in the Asia-Pacific region.

Along with the exercise participants, there were 18 other countries participating as observers, including Russia, China and Indonesia. This 21st Cobra Gold exercise focused on peace-enforcement operations, which included evacuating civilians from Thailand to Singapore.

"In the wake of the events of Sept. 11, [2001], this year's military training was more focused on real-world challenges," said MAJ Kay Slagle of the U.S. Army Pacific G-6 staff, who served as the exercise's coalition executive assistant. Born in Thailand, she was instrumental as a communications liaison between U.S. and Thai communicators, helping to lift the language barrier.

"The exercise involved both conventional and unconventional forces and was designed to improve U.S./Thai/Singapore combat readiness and interoperability while enhancing security relations and demonstrating U.S. resolve to support the security interest of friends and allies in the region," Slagle said.

The Third Marine Expeditionary

Figure 46. SFC Paul McCoy of 804th Signal Company runs CX11230 cable from the Joint Communications Control Center to CTF headquarters in Sattahip, Thailand, during Exercise Cobra Gold '02.

Force was the designated joint-task-force command, with COL Tim Learn serving as the combined-task-force J-6 officer. He was charged with the overall mission of developing the communications plan supporting the warfighters.

The communications architecture also encompassed the requirements of the Combined Exercise Control Group led by MG Roger Brautigan, deputy commander of I Corps. The 29th Signal Battalion, Fort Lewis, Wash., provided communications for this element.

"The result of this plan was seamless communications networks, which provided robust voice, data and message traffic," Slagle explained. "The data networks included coalition wide-area network, which was the primary means of communications, secure Internet-protocol routing network for classified traffic and nonsecure Internet-protocol routing network for unclassified e-mail."

Slagle said this year's exercise manifested a number of firsts. Cobra Gold '02 marked the first U.S.-Thai videoconference interface, which extended from various locations throughout Thailand back to Hawaii. The Hawaii connection included the U.S. Pacific Command J-6 director, BG Jan Hicks.

Another achievement was the integrated digital voice interface between the Thai "Cobra" switch and the U.S. AN/TTC-39D triservice-tactical switch, provided by 319th Signal Battalion out of Sacramento, Calif. – courtesy of a dismountable commercial private-branch exchange switch known as "Redcom," which was provided by PACOM.

The final first was the establishment of an "Internet Café" via a commercial Internet service provider. Although used by all, this was instrumental in providing the Thai military a tool to pass unclassified data since they don't have NIPRNET capability, Slagle explained.

In addition to Slagle, Team Signal participants included two other soldiers from the USARPAC G-6/516th Signal Brigade's Tactical Support Division. MAJ Joseph Berry served as a plans officer and host-nation communications officer, responsible for communications planning and coordinating all host-nation communications support for U.S. forces. MSG Jesus Soto was dual-hatted as the JTF operations chief and noncommissioned officer-in-charge of the Joint Spectrum Management Element, responsible for overall communications expertise and frequency management.

SFC Julius Taylor, 59th Signal Battalion, Alaska, served as a Joint Communications Control Center watch chief, responsible for maintaining communications status.

From 78th Signal Battalion, Camp Zama, Japan, were SSG Jose Leon, who worked in the message center and was responsible for sending and receiving record traffic, both real-world and exercise; and SGT Melissa Eccleston and SPC Shani Fielder, who both worked diligently with the data-communications section keeping the CTF staff operational.

From 58th Signal Battalion, Okinawa, Japan, were SGT Bradley Wheeler, SPC Justin Lidgett and SPC John Macleod – all satellite-communications operators – who served as technical controllers supporting the CTF in Sattahip and the Marine Expeditionary Brigade in Samaesan. They were vital in coordinating and troubleshooting reachback into the standardized-tactical-entry-point sites located at Fort Buckner, Japan, and Wahaiwa, Hawaii.

Other Signal support from USARPAC included participation by 804th Signal Company (U.S. Army Reserve), which supported CTF headquarters. The 804th was augmented with five soldiers from 319th Signal Battalion, who manned the AN/TTC-39D. This switch was used because of 804th's single-shelter switch new-equipment fielding/training.

The 125th Signal Battalion again participated, playing a vital role in providing communications support to the Army forces located in Sa Kaeo, Thailand.

"The result of Cobra Gold 2002 was another great, successful exercise that was a product of the tireless efforts, dedication and hard work of all soldiers, airmen, sailors and Marines from the U.S., Thai and Singapore militaries," said Slagle. "In the mighty words of an unknown Marine, 'It was the best Cobra Gold ever.'"

MAJ Berry is assigned as operations and exercise officer, Tactical Support Division, G-6, USARPAC, at Fort Shafter, Hawaii.

58TH AND 59TH CAPTURE FIVE DEFENSE MESSAGE SYSTEM AWARDS

by Bill McPherson

SAN DIEGO – Members of two battalions from 516th Signal Brigade swept five of the seven Army Defense Message System awards presented April 8 at the DMS Users' Conference in San Diego, according to Jerry Tanabe, brigade DMS project manager.

Plaques were presented to the following Team Signal winners from Okinawa and Alaska:

- DMS Pioneer Award – SFC Randall Ferson, 58th Signal Battalion;
- DMS User of the Year – Celine Johnson, 507th Signal Company, 59th Signal Battalion;
- Local Control Center Team of the Year – Fort Richardson, Alaska, LCC, 59th Signal Battalion;
- DMS System Administrator of the Year – SGT Andrewlo Jackson, Fort Buckner LCC, 58th Signal Battalion; and
- LCC of the Year – Fort Buckner, 58th Signal Battalion.

"Ferson's Pioneer Award was in recognition of his valiant efforts involved with the initial installation of DMS fielding at Torii Station, Okinawa," said Tanabe, who won the prestigious award last year for spearheading DMS' implementation Pacific theater-wide.

"Later in the year, it was decided to move the LCC at Torii Station to Fort Buckner, which had a larger customer base," Tanabe explained. "Jackson is the LCC chief and, under his leadership, they relocated the LCC to Buckner, working long hours on the logistics and closely coordinating all aspects of the move with the customers.

"Due to the successful move, excellent training of LCC personnel and outstanding maintenance of servers at the now-Fort Buckner LCC, its personnel provided conspicuously outstanding support to all Army organizations on Okinawa," Tanabe said. "Thus its LCC of the Year award."

The 59th Signal Battalion in Alaska, which took the LCC of the Year award last year, received two awards this year.

Celine Johnson, DMS User of the Year, was recognized for her proactive help with upgrades to e-mail systems at Fort Wainwright, which had been chosen as a testbed for e-mail upgrades. "Celine accomplished those upgrades ahead of schedule without causing any interruptions to the e-mail system," noted Tanabe.

The Fort Richardson LCC also received the DMS LCC Team of the Year award.

"The knowledge, expertise and teamwork of the Fort Richardson LCC team have been instrumental in their success of implementing and maintaining DMS throughout U.S. Army Alaska," said CPT Dean Denter, 507th Signal Company's commander. "As a team they have exceeded the Automatic Digital Network-to-DMS transition deadline; upgraded all DMS servers and client workstations to 2.2 ahead of schedule; and completed the Certification Authority Workstation 4.2.1 upgrade with no impact to the customers. By combining their experience, the support provided to the customers within USARAK has ensured confidence in DMS as the new messaging system for the 21st-century Army."

Mr. McPherson is 516th Signal Brigade's public-affairs officer. SGT Robyn Baer of Fort Wainwright's public-affairs office and MSG Catherine Bridge of 59th Signal Battalion also contributed to this article.

507TH SUPPORTS GREELY EXPANSION FOR MISSILE-DEFENSE MISSION

by CPT Dean Denter

FORT GREELY, Alaska – In response to a changing mission at Fort Greely and build-up of a missile-defense program here, the 507th Signal Company workforce is undergoing an increase of 100-percent strength, with more changes and personnel expected in the future.

Two signal companies, 408th and 507th – both part of 59th Signal Battalion – were merged in August 2000. The merger was part of the congressionally mandated base realignment and closure of Fort Greely, which was

Figure 47. LTC James Riseley (left), 59th Signal Battalion's commander, discusses communications support to missile-defense projects with MG James Hylton, Army Signal Command's commander, during a Chinook flight from Fort Wainwright to Fort Greely.

then nearly complete.

When the companies were combined, 507th's headquarters was relocated to Fort Wainwright, Alaska, and only three civilian technicians remained at Fort Greely to support the remaining units and training requirements here.

"With the current expansion of the post because of the Ground-based Midcourse Defense Joint Program Office and Space and Missile Defense Command, Fort Greely is going through rapid and large growing pains," said LTC James Riseley, 59th Signal Battalion's commander, who briefed MG James Hylton, Army Signal Command's commander, on the expansion project during a command visit to Alaska in May.

"One thing is for certain, with the final BRAC of Fort Greely in 2001 and the buildup of GMD and SMDC starting shortly afterwards, 507th Signal Company's mission at Fort Greely has been anything but closed," Riseley noted.

Increased Signal requirements at Fort Greely include more than 500 additional telephone lines and new network requirements to support GMD JPO and SMDC, Riseley explained. Also, several contractors, the largest of which is Boeing, have set up operations at Greely as they plan and build to reach a schedule for the defense test site to be operational in Fall 2004.

CPT Denter is 507th Signal Company's commander.

7 TEAM SIGNALEERS SUPPORT BALIKATAN 02-2

by MSG Bill Gierke

FORT SHAFTER, Hawaii – Seven soldiers from Team Signal deployed to the Philippines this spring to support Exercise Balikatan 02-2 civil-military operations.

MSG Bill Gierke of Detachment 1, 311th Theater Signal Command; SSG Melvin Machado and SPC Benjamin Schrempp, 516th Signal Brigade; and SSG Les Call, SGT Eric McCrory, SPC Ben Camerlin and PFC Gary Hill, 30th Signal Battalion; made up the Signal team.

Before they arrived in Ternate, Cavite, the Philippines, team members learned to operate a piece of equipment unfamiliar to them: the AN / PSC-5 "Spitfire" single-channel tactical-satellite radio, used in the demand-assigned multiple-access mode. In addition to Spitfire, Team Signaleers provided communications connectivity via Iridium satellite phones, cellular phones and International Maritime Satellite.

Based on force-protection issues associated with the Philippines, these communications systems provided valuable communication links to the civil-military operations headquarters and to the exercise-directive headquarters located at Clark Field. Team Signaleers were also instrumental in training Armed Forces Philippines soldiers on using satellite systems, e-mail, Microsoft information systems, Iridium phones and INMARSAT. This was a great opportunity for soldiers to experience the multicultural flair which combined joint exercises provide.

In addition to providing communications between the outlying sites, McCrory produced a video of CMO activities and of the exercise's closing ceremonies.

MSG Gierke is assigned to Detachment 1, 311th Theater Signal Command.

Figure 48. SPC Benjamin Schrempp, 516th Signal Brigade, uses a Spitfire radio to check into the net with the civil-military operations headquarters during Exercise Balikatan '02.

44TH SIGNAL BATTALION 'MINI-PACKAGE' RETURNS FROM NIGERIA

by 1LT Chris Melary

MANNHEIM, Germany – An eight-soldier "mini-package" from Company C, 44th Signal Battalion, 7th Signal Brigade, 5th Signal Command, here returned April 19 from Lagos, Nigeria, marking the successful end to Operation Avid Recovery.

The "mini-package" – so named when 21st Theater Support Command based in Kaiserslautern, Germany, limited the light-package size to eight soldiers – provided critical reachback capabilities for a 60-person task force.

The task force, mostly made up of explosive-ordnance-disposal and medical soldiers, was sent on short notice to assist the Nigerian government in the cleanup of a disastrous ammunition-depot explosion. The explosion rocked a heavily populated military installation in the middle of Lagos in late January and caused more than 1,000 deaths in the city of nearly 14 million people. It left a large part of the installation littered with unexploded ordnance.

The team's equipment and bags

were already packed and ready to deploy as the Command-and-Control Force's Enhancement-Module Package, which is 5th Signal Command's contribution to U.S. Army Europe's Immediate Ready Force.

After they arrived in Nigeria Feb. 27, 44th Signal Battalion soldiers established the communications network for the task force while the medical team established a field-surgery site at the airfield. Once communications and medical people gave the thumbs up, explosive-ordnance-disposal soldiers began disposing of the unexploded ordnance hazards.

1LT Melary is assigned to 44th Signal Battalion in Mannheim.

44TH SIGNAL BATTALION ADDS STREAMER TO COLORS

by 1LT Daniel Caunt

MANNHEIM, Germany – The Fighting 44th Signal Battalion took part in a historic ceremony April 16 in which the Operation Desert Shield / Desert Storm campaign streamer was added to the battalion's colors.

MG James Hylton, Army Signal Command's commander, and LTC Theresa Coles, 44th Signal Battalion's commander, participated in the ceremony.

The 44th is part of 7th Signal Brigade, 5th Signal Command, ASC. Originally constituted Feb. 3, 1944, 44th Signal Battalion went through a series of activations and deactivations until Sept. 16, 1980, when it was activated in the Republic of Germany, where it remains today.

Hylton's presence at the ceremony made it special, since it was under his command more than a decade ago that 44th Signal Battalion served in Southwest Asia supporting Operation Desert Shield / Desert Storm.

1LT Caunt is assigned to 44th Signal Battalion in Mannheim.

Figure 49. MAJ Kelly Knitter, operations officer with Task Force 86, Bagram, Afghanistan, hands out toys at an Internally Displaced Persons camp outside an air base. Veritas Christian Community School from Sierra Vista, Ariz., supplied the toys, as well as blankets and children's clothes.

SOLDIERS, LOCAL SCHOOL SUPPORT AFGHAN CHILDREN FUND

by SSG Tywanna Sparks

FORT HUACHUCA, Ariz. – Youths from a local school and 11th Signal Brigade soldiers teamed up to donate bedding and stuffed animals to an Afghanistan refugee camp in May during the unit's Operation Enduring Freedom deployment.

Students from Veritas Christian Community School in Sierra Vista, Ariz., donated 15 boxes filled with stuffed animals, clothes, blankets and sheets to the camp, said MAJ Kelly Knitter, operations officer, 86th Signal Battalion, 11th Signal Brigade.

The humanitarian effort began when a soldier visited a children's hospital to fix a generator, she said.

"After the soldier returned from the hospital, he told the command how bad the conditions were. Children were sleeping on the floor, they had no toys and they needed clothes. Our battalion commander (LTC David Dodd) expressed how he wanted to do something for these children," Knitter said.

The battalion's family-readiness group leader, Sharon Dodd, then stepped in and contacted the faculty at the school in Sierra Vista.

Late last year the school was involved in a project in support of America's Fund for Afghan Children. Students made flags, and a private donor stepped forward and bought each flag for $1. Students then passed out the flags to soldiers in 11th Signal Brigade and the money was donated to the fund, Dodd said.

"They started off with making a little flag and donating a dollar, and it grew into helping quite a few children. It's amazing to see how a little seed that was planted grew," she said.

The entire school family became involved in this project, said Karen Bolton, Veritas Christian Community School principal.

"When we received the message about the deplorable conditions over there, we decided what we could do is collect donations and buy new items," Bolton said. "We sent a message home to our parents asking them for donations to take care of shipping costs. We had items donated from the Sierra Vista Police Department and Grace Church. Some of our students even packed their favorite toys in the boxes that were shipped."

It was a humbling experience for all involved, she said.

"I think it's amazing because our students can't relate to Afghan children. They are half a world away, and they just don't understand what it means to never have held a stuffed animal before or not to have sheets on their beds. Being able to see these pictures and see how happy they are with whatever we can give them is a real eye opener for them," Bolton said.

"I think that this experience touched not only children at Veritas, but also soldiers' lives and certainly everyone involved," Dodd said.

"When the items were distributed to Afghan children in May, it was an unforgettable experience," Knitter said.

"It's hard to describe what a refugee camp is like. It's a very sparse and lonely place populated with women, children and elderly men. When we arrived at the camp, a swarm of kids welcomed us," she said. "Soldiers greeted them with toys, stuffed animals and other goodies. The children were very determined and aggressive at times, but they were just so excited that we were there. This experience was probably the highlight of my time here. It brought a smile to the faces of soldiers involved."

SSG Sparks is assigned to 11th Signal Brigade's public-affairs office at Fort Huachuca.

OF INTEREST

NEW LOGO REPRESENTS INFORMATION-MANAGEMENT TRANSFORMATION

by Patrick Swan

WASHINGTON – Calling it a symbol of how a transforming Army won't engage in "business as usual," the Army's chief information officer unveiled a logo for the CIO / G-6 staff directorate here July 1.

LTG Peter Cuviello rolled out the logo during a "town hall" meeting in the Pentagon, where he briefed about 100 workers on information-management initiatives.

LTC Raymond Jones, a member of Cuviello's staff, designed the CIO / G-6 logo, basing it on an exiting logo for Army Knowledge Management.

Figure 50. The Army CIO's new logo.

Various features in the CIO / G-6 logo are emblematic. The "A" stands for Army. The circling electron represents the future network-centric Army. The orange in the electron draws its roots from the Signal Branch colors; the migration of orange to yellow represents the transition to the light of knowledge. The world map represents the global reach of the Army knowledge.

The name change to CIO / G-6 became necessary when the Army refocused the mission and focus for the former Directorate of Information Systems for Command, Control, Communications and Computers – as part of its overall headquarters Army realignment announced in December 2001.

The Army Chief of Staff, GEN Eric Shinseki, outlined the tenets of that realignment. These include the elimination of redundancies; the movement of operational functions to field units and commands; the centralization of management functions at Army headquarters; the refocusing of organizations on their core missions and functions; and the return of manpower savings to operational organizations.

Today, as the CIO / deputy chief of staff, G-6, Cuviello provides guidance and direction for the Army's transformation into a network-centric, knowledge-based enterprise and force.

"With the Army undergoing the most fundamental change in more than a century, we're making great progress in achieving our enterprise vision of a single Army network, a single-enterprise Army portal and universal access to Army knowledge wherever a soldier may be," Cuviello said. "This refocusing of the CIO / G-6 mission signifies a fundamental shift in how the Army manages its infostructure. It establishes a collaborative operational model to accomplish missions in either the tactical or functional (institutional) Army.

"This CIO / G-6 logo is simply a reminder about what we are all about," he said.

Mr. Swan provides public-affairs support to the Army CIO/G-6.

NAVY SCHOOL OFFERS OFFICERS MASTER'S OF BUSINESS ADMINISTRATION DEGREES

by SFC Kathleen Rhem

WASHINGTON – Military officers and Defense Department civilians can now earn a defense-focused masters of business-administration degree through the Naval Postgraduate School in Monterey, Calif.

The program covers all the elements of a typical MBA program but focuses some of the material on military-specific issues, according to Douglas Brook, dean of the institution's Graduate School of Business and Public Policy.

Brook said this is the only defense-focused MBA program in the country.

Military officers, typically in the O-3 to O-4 ranks, attend the school for 18 months on a resident basis. Brook explained that most of the officers are from the Navy, but officers from other services and civilians are welcome to apply.

The first 50 students in the program began their coursework in January, and another 100 began studies this summer. Brook explained new classes start twice each year.

In September, the school will enter into a partnership with the University of Maryland to offer the same degree on a nonresident basis in Washington. Classes will meet on Saturdays with Maryland professors and instructors teaching the common subjects, and military-specific subjects being taught by visiting faculty from Monterey or

through distance-learning methods.

"We're taking our basic MBA program here and offering it to a different population of students – people who would never be able to come to Monterey on a resident program but would like a defense-focused MBA," Brook said.

He said he expects 12 to 25 DoD civilians to enroll in the new program here this year.

The defense-focused MBA has three pieces, Brook said. A business core will reflect subjects covered in other MBA programs, but with a DoD focus. For instance, subjects might include economics for a defense manager, and an organizational design course would focus on defense organizations, Brook explained.

A mission-related segment of coursework would include broad courses aimed at defense management, including courses in DoD strategy and policy, DoD resource determination, e-business for defense, and the budget and appropriations process.

The third piece of this degree is what Brooks called an individual concentration. "They'll concentrate coursework on areas in which they might be assigned," he said. "This way they'll get what they need in terms of more direct professional qualifications."

He said individual concentration areas could include acquisition and contracting, logistics, financial management, human-resource management or information management.

Individuals seeking more information on the defense-focused MBA programs through the Naval Postgraduate School should speak to their assignments manager or detailer, or check the school's website at www.nps.navy.mil.

SFC Rhem writes for American Forces Press Service.

NEW WEBSITE SPOTLIGHTS WAR ON TERROR

by Linda Kozaryn

WASHINGTON – The Defense Department's unconventional war against terrorism has spawned an unconventional website to report news about that war: DefendAmerica.mil.

The new site, which can also be found at DefendAmerica.gov, offers the latest news, photographs, transcripts and other information about the U.S.-led global effort against terrorism. As DefendAmerica's editor, David Jackson, put it: "If it has anything to do with the war, we're interested."

DoD launched the site before Operation Enduring Freedom began last October. The goal was to inform the public, both in the United States and abroad, of what America was doing to combat global terrorism, according to Victoria Clarke, assistant secretary of defense for public affairs.

"We wanted people to know what our service members were doing at home and overseas," the Pentagon spokeswoman said. "Our goal is to help the public understand and appreciate how dedicated and committed our men and women in uniform really are."

The site captured attention quickly. Shortly after DefendAmerica's debut on the Internet, USA Today named it a "hot site" and ***Time Magazine*** reported: "If you want the official war news, that's easy – go to the Pentagon's comprehensive site, www.DefendAmerica.mil."

Although DefendAmerica has been available to the public for only seven months, it already boasts readers in more than 70 countries, and links to it can be found on websites all over the Internet, according to Jackson, a veteran newspaper and magazine journalist who was brought on board to edit DefendAmerica.

Content on the site changes daily, Jackson said, and includes coverage of every Pentagon briefing by Defense Secretary Donald Rumsfeld and other top military officials.

A feature called "Americans Working Together" reports on the myriad ways Americans are working together to combat terrorism, while "Profile" spotlights individuals and the roles they play in the war effort. Archives of both features can be accessed on the site.

DefendAmerica was also the home of "America's Thank You Note," an on-line form where supporters were invited to sign a virtual thank-you note to U.S. service members during May for National Military Appreciation Month.

A daily feature titled "We Remember Their Sacrifice" pays tribute to each victim who died in last year's Sept. 11 attack on the Pentagon.

Military buffs have found the site to be a rich source of information on military aircraft and equipment. A section called "Database" offers technical information about a range of military systems and equipment, from the perennial M-16 rifle to the newest Predator aerial vehicle. Another section, "Backgrounder," offers information on subjects from Afghanistan to weather and its influence on warfare.

The site also contains links to other U.S. government and military websites along with streaming audio and video news stories.

DefendAmerica reports on all branches of the military, including the Army, Navy, Marine Corps, Air Force and Coast Guard, both active-duty and reserve components.

Probably the most popular feature, according to Jackson, has been DefendAmerica's photo-gallery archive, which offers photo essays by Joint Combat Camera and other military photographers that chronicle the progress of the war, from the Sept. 11 terrorists' attacks to the current campaign to help Afghanistan rebuild after years of civil war and unrest.

"There are a lot of stories to tell about this war effort," Jackson said, "and there's an enormous demand out there from both Americans and our international readers to learn more. We're glad they're finding us an authoritative place to see what's going on."

Ms. Kozaryn writes for American Forces Press Service.

EXITING CHIEF OF STAFF COMPARES SIGNAL, MILINTEL

by SSG Gary Watson

FORT HUACHUCA, Ariz. – When PVT Ed Menard arrived here in 1971 after basic training, he was already on "Plan B," which was to at-

tend military-intelligence school, serve his three-year enlistment and return to university teaching. "Plan A" had been to continue teaching.

Now COL Ed Menard, assistant chief of staff, G-2 (intelligence) for Army Signal Command here, is leaving ASC for his final military assignment.

Menard's new assignment is the new North Atlantic Treaty Organization headquarters in Greece, the Joint Command South Center in Lárisa. Menard, who graduated with departmental honors in history from American International College in Springfield, Mass., notes that the headquarters is on NATO's southern flank "at the historic line where the Greeks stood off the Persians and Turks."

His new assignment won't be his first with NATO, which in a way prepared him for his ASC post. "I was working in NATO headquarters in Brussels on my previous assignment when the Melissa virus hit, and I saw the 19 countries either knocked off the air or voluntarily pull off the air, and I happen to believe that the kinds of threats to our networks today represent one of the new modern threats in the post-Cold War period, and so I wanted to learn more about network operations, threats to networks, network security," he said. "So when the opportunity came to become the G-2 of this command, I grabbed it."

Menard sees a close relationship between Signal and intelligence. "My own personal view is that MI and Signal are variations of a theme and the flip side of a coin," he said.

His views of Signal influenced him to become a ham-radio operator. "Now I'm involved in MARS," he said. ASC runs the Army Military Affiliate Radio System.

"One of my goals as I move off to Greece is to identify other American ham operators that might be in the force. … What I'd like to do is to establish a MARS station working out of Lárisa that would link into 5th Signal Command and obviously the folks back home," he said.

Menard envisions more high-tech developments in both Signal and MI, and sees the two working even more closely together in the future. "I think MI and Signal cannot survive without each other working hand in glove," he said.

When he began, he said, high-tech might consist of blue ink from the mimeograph. Now he sees the expanded use of unmanned aerial vehicles in areas of hostilities. "MI needs UAV video bandwidth" to bring real-time or near-real-time video from the battlefield to the commanders, he said.

SSG Watson is assigned to ASC's public-affairs office.

RUMSFELD: 'JOINT OPERATIONS WILL BE KEY' IN 21ST CENTURY

by Gerry Gilmore

WASHINGTON – Pointing to U.S. combined-arms success against terrorists in Afghanistan, Defense Secretary Donald Rumsfeld recently said that joint operations would be the major element of America's 21st-century military.

Rumsfeld, joined by Air Force GEN Richard Myers, chairman of the Joint Chiefs of Staff, and other senior Pentagon officials, kicked off this year's May 17-18 Joint Service Open House at Andrews AFB, Md., outside Washington.

The secretary noted that visitors "would see men and women and equipment from all the services of the U.S. military." America's service members, he added, "work together to carry out America's missions around the world. Indeed, joint operations are and will be the key to our success on the battlefield throughout the 21st century."

Rumsfeld noted that America's military today is not only engaged in a global war on terrorism, it's also in the midst of transforming itself to better meet anticipated threats of the future.

Just as America's allies helped achieve victory in World War II, today America has allies in the global war on terrorism, Rumsfeld pointed out. He praised the allied Airborne Warning and Control System crews from 13 countries that had patrolled U.S. airspace from Oct. 9, 2001, until May 16 as part of homeland-defense efforts.

That assistance, Rumsfeld noted, was the first time that North Atlantic Treaty Organization assets were deployed in direct support of operations in the continental United States. That support underlined "the strong commitment of NATO in the fight against terrorism," the secretary said. "We appreciate what they've done, we appreciate the people of those NATO countries who enabled them to do that."

Mr. Gilmore writes for American Forces Press Service.

ACRONYM QUICKSCAN

ASC – Army Signal Command
BRAC – base realignment and closure
CIO – chief information officer
CMO – civil-military operations
CTF – combined task force
DMS – Defense Message System
DoD – Department of Defense
DOIM – Directorate of Information Management
EO – equal opportunity
GMD – Ground-based Midcourse Defense
INMARSAT – International Maritime Satellite
IT – information technology
JPO – Joint Program Office
JTF – joint task force
LCC – local control center
MARS – Military Affiliate Radio System
MBA – master's of business administration
MI – military intelligence
NATO – North Atlantic Treaty Organization
NIPRNET – nonsecure Internet-protocol routing network
OF – Objective Force
PACOM – (U.S.) Pacific Command
QRMC – Quadrennial Review of Military Compensation
SMDC – Space and Missile Defense Command
SPACECOM – U.S. Space Command
STRATCOM – U.S. Strategic Command
UAV – unmanned aerial vehicle
USARAK – U.S. Army Alaska
USARPAC – U.S. Army Pacific

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On-line registration is available. Link to the symposium website and follow the directions under the "Registration" link. Cutoff for early registration is Nov. 8.

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