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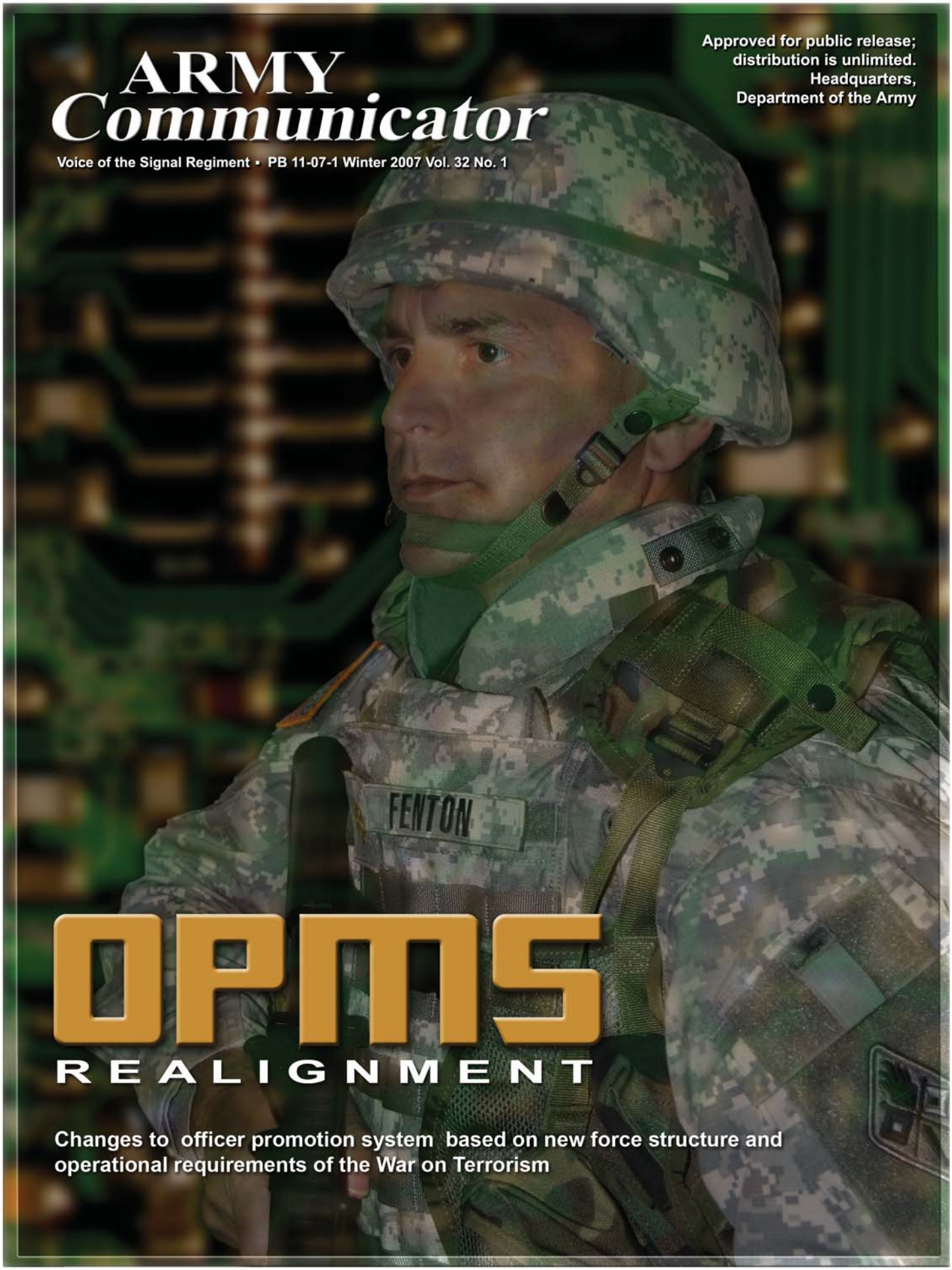

OPMS REALIGNMENT

Changes to officer promotion system based on new force structure and operational requirements of the War on Terrorism

Chief of Signal's Comments

Signal Regiment officer leadership

Regiment, this edition's comments will focus on our officers – branch, functional, and warrant.

The officers of the Signal Regiment are the commanders, leaders, and managers of Information Technology Warriors in today's "Army Strong" force.

Since the Army Chief of Staff GEN Peter J. Schoomaker directed the most aggressive and fundamental transformation of the Army since World War II, the Signal Regiment has embraced the challenge of networking the force and providing LandWarNet capabilities throughout the depth and breadth of the enterprise, not only for the Army but also joint and coalition forces.

Leading these efforts are the officers of the Signal Regiment; consisting of six closely related fields – Signal Officer (BR25), the Telecommunications Engineer (FA24), the Information Systems Officer (FA53), the Network Management Technician (250N), the Information Management Technician (251A), and the Signal Systems Support Technician (254A).

The holistic capabilities of the Signal Regiment officer team provide the Army with dedicated C4I (Command, Control, Communications, Computers and Intelligence) leaders who, together with the enlisted Signal Soldiers they lead, ensure knowledge dominance for the warfighter.

As the Army has undergone transformation, so too has the Officer Personnel Management System – over the last eight years we've gone from

BG Randolph P. Strong
Chief of Signal

OPMS II to OPMS XXI then OPMS III and now we're back to just OPMS. Behind these seemingly minor acronym changes are significant differences in the way we manage our officers. I want to highlight a few of the differences that have the most dramatic impact on our current leaders.

First, the Army is reorganizing the four officer career fields into three functional groupings for management and promotion. The three groupings are Maneuver, Fires and Effects; Operations Support; and Sustainment. Branches and functional areas will be grouped together. Signal and Military Intelligence, for example, are grouped together with Space Operations, Telecommunications Systems Engineering, Information Systems Management, Strategic Intelligence and more.

Signal Branch at Human Resources Command has already organized along these lines – BR25, FA24, FA53 and Signal Warrant Officer Assignments' officers have all been consolidated – it's now Networks and Space Operations Branch in the Operations Support Branch in the Operations Support Directorate.

Second, the focus of leader development is shifting from command-centric branch qualifying requirements to broader, less prescriptive, competency-based experiences.

The S6 and the G6 are evolving to equal importance with executive officer/S3 and battalion commander as the Army moves to a brigade-centric, modular force. Battalion and brigade S6s have increased responsibility and importance, and these positions are now key developmental positions for Signal captains and majors.

At division, the G6 is the premier Signal assignment — a "key billet" filled through the central selection board process. An officer's goal today should be to seek assignments at all levels and in different environments to develop a broad range of skills.

Third, is the implementation of Early Functional Designation to alleviate functional area captain shortages. These shortages are exacerbated for Signal by dramatic increases in the numbers of FA24 and FA53 captain

See Chief of Signal Comments continued on Inside Back Cover

Behind these seemingly minor acronym changes (we've gone from OPMS II to OPMS XXI then OPMS III and now were back to just OPMS) are significant differences in the way we manage our officers.

U.S. ARMY SIGNAL CENTER AND FORT GORDON

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Voice of the Signal Regiment

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Cover: This issue takes a look at OPM Realignment. Cover by Billy Cheney

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Make the connection with Army Communicator's Winter 07 Circuit Check

Get the rest of the story in the Winter 2007 Circuit Check found on page 45.

COL Thomas Hopkins, JCSE commander, passes the 4th JCS Squadron's colors to LTC Richard DuBreuil, incoming commander of the newly formed Army Reserve Element Squadron.

-- Circuit Check Winter 2007

0623701

LTC board to be first to use alignment system

By Jim Tice

Editor's Note: This article was originally run Nov. 27, 2006 in the Army Times.

The annual basic branch lieutenant colonel board that meets in February and March will be the first to use guidance based on a new specialty alignment system.

GEN Peter Schoomaker, Army chief of staff, approved changes to the Officer Personnel Management System in September based on new force structure and the operational requirements of the war on terrorism.

Specific details for each of the branches and functional areas of OPMS will be included in an upcoming revision to DA Pam 600-3, the officer career guide.

But, the biggest realignment of OPMS in more than 20 years moves 19 basic branches and 16 functional areas under three "functional categories," a new term for the career fields that have been at the center of the field-grade promotion and assignment system since the late 1990s.

Under the previous alignment, the promotion selection objectives provided to boards were based on branch and functional area requirements in the Operations, Operational Support, Information Operations, and Institutional Support career fields.

The operations career field was comprised primarily of majors, lieutenant colonels, and colonels who were single-tracking in their basic branch. Officers in the three specialty career fields held non-branch functional areas.

The inventory of branches and functional areas has been retained, but they have been redistributed to better reflect their roles within the Army.

Unlike the previous system, complementary branches and functional areas are aligned under appropriate functional categories.

For example, the maneuver branches of Infantry, Aviation, and Armor; the fires branches of Field Artillery and Air Defense; the maneuver support branches of Engineer, Military Police, and Chemical; the special operations branches of Special Forces, Psychological Operations, and Civil Affairs; and functional areas of Public Affairs and Information Operations are aligned under the new Maneuver, Fires, and Effects functional grouping.

Transition to the new alignment began late last summer with a reorganization of the officer assignment divisions at Human Resources Command.

Maneuver, Fires, and Effects replaces the Combat Arms Division. Operational Support replaces the Combat Support Division, and Force Sustainment replaces the Combat Service Support Division.

Officer record briefs will be amended to reflect an officer's functional category, which in the future could influence assignments.

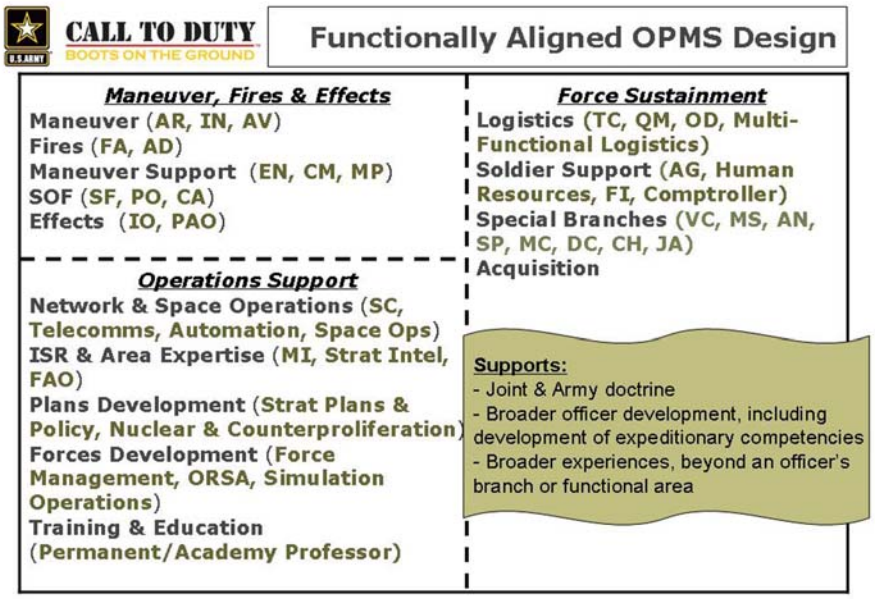
Officer management system

Schoomaker and other Army leaders are striving for an officer management system that will cultivate multi-skilled leaders.

Two recent initiatives are designed to jump-start the process.

One authorizes the assignment of officers outside their primary specialty to gain experience in joint, interagency, intergovernmental, and multinational operations.

A second allows officers to



serve 90-day details to a joint, interagency, intergovernmental, or multinational organization enroute to, or during, an assignment to a life-cycle unit.

"Some officers who are available to move next summer may be offered an opportunity to broaden their career development by working in another branch or functional area," said COL Pat Stallings, director of the OPMS Task Force.

The new management philosophy also is reflected in command selections where Schoomaker has expanded the key billet system for operational support and force sustainment officers, while authorizing increased brigade and battalion command opportunities for officers in selected branches.

For example, infantry and armor lieutenant colonels now can compete for command of Stryker battalions, combined arms battalions in heavy brigades, and reconnaissance, surveillance, and target acquisition battalions in all brigade combat teams.

The new system will be reflected in the zones of consideration and selection guidance provided to the Army Competitive Category major (April 10 to May 4), lieutenant colonel (Feb. 27 to March 23) and colonel (July 17 to Aug. 10) boards that meet in 2007.

Officers will compete for selection only against other members of their functional category.

"What we have modeled and seen in our testing is that this system will give the Army the best-qualified, multi-skilled leaders it needs in the future," Stallings said.

"The Army will continue to promote officers by branch and functional area to meet requirements, and all officers will have a reasonable chance for promotion.

"What we won't be doing is returning to the old system that gave officers selection opportunity in both a branch and functional area," he said.

Officers of the special branches – Chaplain Corps, Judge Advocate General's Corps, and the six health services branches – will continue to have separate categories for promotions and assignments.

Mr. Tice is a staff writer for Army Times.

Acronym QuickScan

OPMS – Officer Personnel Management System

Information management in Joint Multinational Operations: *Principles and Practices*

By MAJ Oliver F. Mintz

Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?
– T. S. Eliot

In the modern age, information is a commodity too often measured in gigabytes rather than quality. Unlike many other commodities, it can be distributed across the globe in seconds, with little effort or cost. The larger and more diverse the organization, the more assets are required to handle this commodity. Failure to have efficient systems will quickly lead to lost opportunities and poor organizational performance. Military organizations in a joint peacekeeping environment are particularly susceptible to the problems of information management and information saturation. Varying requirements, organizational practices, language barriers, and a high rate of personnel turnover all contribute to this susceptibility. It is essential these organizations create systems to facilitate rapid extraction and understanding of key information by individual users. This article seeks to examine some causes and solutions for military IM challenges and enable organizations to get the right information in front of the right person at the right time.

I. Defining and understanding "information"

It is wise to begin this discussion with a definition of terms. The word "information" has different meanings to different audiences. The engineer would likely define information as empirical measurements related to a given problem, while an executive manager would more likely view summarized and analyzed writing as good information. For purposes here, information will be defined as interpreted data. Interpreted data is factual events, places, and times (i.e. a SALUTE Report), placed in a larger context with analysis of surrounding circumstances in time, space, and linkage.

Before discussing systems to manage information it is important to understand the strata and development of information encountered in a military environment. Information in military operations generally

falls into four categories: Non-routine, Routine, Background, and Reference. An understanding of each of these categories is necessary, by both system designers and users. Non-routine information typically involves incident reporting as the result of an unplanned activity. Most often these reports follow a SITREP (situation report), SALUTE (Size, Activity, Location, Unit, Time, Equipment), or SALT (Size, Activity, Location, Time) format and are transmitted to a higher headquarters via a voice or data link. The defining qualities of this type of information are its relative brevity, and close relation in time to the event it describes. These reports often change as more information becomes available to clarify the initial report.

Routine information is that which is produced on a predictable basis with greater detail and analysis than non-routine information. Routine information includes daily and weekly SITREPS, intelligence rollups, and other specified reports that are produced on a defined schedule to account for information accumulated over a period of time. This information will continue to be amended as details, assessment, and analysis become available.

Background information is not used during daily operations, but is used as a foundation upon which decisions can be made based on recent reported activity. Generally it is readily accessible and used with a fairly high frequency. Examples include intelligence reports, developed target packages, and municipal assessments. Background information has a long shelf life, but does require updating on a periodic basis.

Reference information is the most basic and fundamental body of knowledge that an organization possesses. It is created from the three previous types of information and has a much longer shelf life than all other types. Typically it is referenced less frequently than background information and tends to consist of regulations and technical data that are unlikely to change frequently. Examples of reference information are manuals, mapping and geographic data, and strategic plans or intelligence. Much of what is currently classified reference information was, at one time, non-routine, routine, or background information.

II. Information transformation

Over time, information changes form. What begins as an incident report, when combined with others, becomes a weekly rollup. These rollups show patterns and trends. These patterns and trends can then be used to drive operations, as well as provide needed background to decision-makers and operators. When background information becomes so dependable and unchanging, it then moves into the realm of reference information. Both background and reference will become, to varying degrees, tacit knowledge.

Each strata of information can be related in terms of detail, timeliness, and changeability. As information ages it becomes more refined as additional details are collected and analyzed by intelligence personnel. As this detail emerges it becomes internalized and codified as part of the organization. Much as malleable coal compresses down to an unchanging diamond, so does information over time become more truth than perception or interpretation.

Information changes from one stratum to the next as it is processed through an organization's IM cycle. In generic terms an effective cycle moves through the following stages:[1]

- Capture/Acquire
- Organize
- Access/Search/Disseminate
- Use/Discover
- Share/Learn
- Create

This cycle transforms, filters, and develops the most rudimentary information into knowledge and practices that become part of the organization's backbone.

IM begins with the initial capture and acquisition, most likely via the Soldier on the ground seeing one incident through a very narrow field of view, and subsequently transmitting that data in the form of an incident report. This information is captured, organized, and confirmed or denied to become part of a daily or weekly SITREP. This SITREP is combined with other intelligence and operations reports to form a body of knowledge that is timely in nature, and relevant to current and future operations. This information is disseminated and used by those in need of that particular information. The use of the selected information is done through IM tools and techniques which is discussed later. Over time, information either ceases to be used, as it is neither timely nor relevant, or it is distilled and combined with other existing information to become part of the body of reference that is used far into the future.

Initial reports contain more data than analysis. As these reports are analyzed, developed, and combined with existing reporting the information becomes less data intensive, and more a depiction of trends, patterns, and expectations. Routine reporting contains the first level of analysis. As this information becomes background information used in current and future operations, the analysis and trend development continues. As the information passes out of current usage and is determined to be important enough to move into the organization's body of reference, it becomes more codified and factual, in effect returning to the form of hard data that lives in publications, long term assessments, and possibly even doctrine.

III. Challenges of a Joint Multinational Environment

No matter what the operation or organization, there will undoubtedly be agencies or nations who will have to be integrated into operations. These agencies will often have different systems and technologies, as well as existing procedures and processes. This problem is particularly acute in a joint multinational environment as currently exists in Iraq, Afghanistan, and the Balkans.

An understanding of these particular challenges is essential in the design of an IM process.

Multinational systems, by their nature, are different. Each nation or agency has a different format, frequency, and expectation in reporting, the first step of the IM cycle. Different players, based on their internal structures, expect reports to be submitted at different times, in different formats, in different languages, with different expectations in terms of detail and description. Additionally, these requirements may change with some frequency as the turnover among multinational units and some United States services range between four to six months. This creates a situation where new units adapt their processes to the existing one. More often than not this results in additions to existing formats and procedures, without the removal of that which is no longer needed. Organizations abhor change, and fear the removal of data even if it is not required, read, or acted upon. This fear is a result of being new to a situation and not wanting to change a process that they do not understand, or because new commanders have certain expectations of their staff. These expectations rarely call for a reduction in information, especially when coming into an unfamiliar situation. Thus, additions to reports and other requirements are constantly increasing. When examining a multinational IM process it is essential to accurately identify what is critical data and how it is reported and processed to ensure it captures that data which will become information. Failure to do this results in the processing of a large volume of unneeded data.

United States forces typically bring proven automation systems to all types of operation. Tools such as the U.S. SIPRN, Blue Force Tracker, ASAS, and MCS are often the gold standard. However, none of these systems are designed to be plugged into a multinational network. When entering a multinational or multiagency operation do not expect the integration of secure U.S. systems to be seamless. While this is problematic, it is far less so if planned for in the system design. One effective method to bridge this gap is the use of liaison officers at all levels. LNOs should be equipped with a full communications suite to have the ability to pass information through both systems. This is especially true when units or agencies are assigned on a temporary basis, or when the integration of specialized assets such as aviation are involved.

Communications and existing processes are the two largest obstacles to multinational and multiagency operations. Advance consideration of these potential problems will help in the effective design of processes that account for and create early solutions to avoid drastic changes during operational deployments.

IV. Building the process

Let's begin by defining what an IM process is and is not. IM is a comprehensive process, spanning all subunits and activities within an organization, that manages capture, flow, transformation, dissemination, and storage of all types of information to include electronic, written, voice, and tacit. IM is an *organizational function*. IM is *not* technology, although technology is a vital tool. An effective IM strategy to manage all information formats consists of three components:

- Tools
- Process
- Practices

An IM process must involve all individuals in the organization and must have the support and emphasis of the command. Each organization is different, and there is no blueprint for specific IM structure and practice. Furthermore, as the Army transforms, the rigid force structures which have characterized past deployments will no longer exist. Just as modular units will be configured to meet needs from Baghdad, to Kabul, to New Orleans, so must our organizations build processes based on principles, practices, and needs.

System design is not a task for one person or even a group of people. Typically it is left to a G/J6 with moderate oversight from operations. In fact, the opposite is the best path. By constructing a system based on your operations, and then applying technical expertise to meet the needs the customers is the most effective method. Design should be based on needs, not technology. Furthermore, for the IM system to function, all individual users must not only understand the operation, but also how and why the system functions. All users are stewards of the system.

a. Tools – web based and flexible

The tools in modern IM are based on computer networks and are adaptable to many situations. Given the large geographic span of modern military organizations, computer networks and web based systems are uniquely suited to this task. An IM system should be *web based but not web centric.* Web based systems are a tool, they are not the system. Building a website or database that collects, organizes, and indexes information is certainly useful, but there are many other components. A web-based system is part of a larger suite including, but not limited to an integrated communications system that allows real-time transfer of data and voice. Many of these tools are commercially available (if not already owned by the government), and are common enough that most users are already familiar with their operation. Such applications include the Microsoft Windows, Microsoft Office, Microsoft Server 2003, and Microsoft Share Point.

The design of network and computer systems is as much art as science. All systems should be designed to grow and change. As previously mentioned a high turnover will result in changing systems which will require flexibility and adaptability. Once a network system is in place you have reached the starting line. The network designer, especially one with a compressed timeline, will have to make assump-

tions based on experience and expectations. Undoubtedly they will be correct on some assumptions and wrong on others. Users will need new capabilities and will not use some that the designers thought useful. By closely monitoring user input and site statistics administrators and designers can streamline the system. These changes from the initial system highlight the need for flexibility.

Clearly defining the uses of each tool (email, shared folders, and web sites) is part of the system implementation and must receive command sponsorship. This sponsorship will ensure that users do not bypass things for their convenience, such as sending a mass email instead of posting an item to a website. This erodes the capabilities of the system and weakens the abilities of the technology. Using the system in its intended manner also ensures that information is distributed in a useful manner. The goal of any IM system is to get actionable information in front of the right person, at the right time to make a decision. This is a fine balance, and too often organizations err on the side of moving information "just in case." This creates a backlog of information, particularly at critical points, and often results in none of the information being received.

Too much information is as dangerous as too little. Leaders experiencing information saturation tend to read and digest little. Leaders receiving less tend to read and digest more. Technology can both create and solve these problems. However, technology will never accomplish this task without the involvement and understanding of the whole organization. IM is fundamentally an organizational function; far more so than the computers that help it run. When system users understand the concept of the right information in front of the right person at the right time they will use the system with that in mind. A strong command sponsorship ensures compliance with the rules of the system. The old FM 101-5, Appendix 1 stated that "Information management narrows the gap, as much as possible, between the information the commander requires and the information available to him." The IM process removes the difference between "available" and "required."

b. The process – four principles

As previously stated, there is no blueprint for an IM process.

Four principles

- **recognize complexity**
- **define priorities**
- **deliver immediate tangible benefits**
- **command emphasis**

Given the broad spectrum of operations and the multitude of players and systems involved, process design is as much art as science. However, there are principles that can guide the design of such integrated systems. Volumes have been written on IM, often called knowledge management, and future designers would do well to read on the subject in depth.

Despite this vast body of knowledge there are three principles[2] that seem to thread their way through current thought and are applicable to the military. The first of these axioms is to **recognize complexity**. Multinational and multiagency operations are complex. The goals are complex. Each player is complex. The constraints of each player are complex and are exponentially more so when combined. IM process engineers should not expect a seamless and complete integration, but rather one that is nearly seamless, limited by law and technology, and facilitated by planning and ingenuity. Furthermore, expect the complexity of the situation to change; not necessarily for the worse, but simply to change.

To mitigate this complexity, clearly **define priorities**. As with any military operation these priorities will be dictated by the commander. Typically these requirements would be contained in the Commander's Critical Information Requirements. While this may be true, there may be many other requirements beyond the CCIR. IM process designers must take into consideration the needs of staffs and subordinate commanders. For example, in the current conflict there is a need to closely monitor civil-military operations, although it may or may not be part of the CCIR. The requirement to define priorities for an IM process again highlights the need to have operators and members of other staff sections involved in the planning process, not simply those managing the communications infrastructure. Ultimately, if the system does not meet the needs of the users (since the users are the stewards of the system) it will not be as effective as it could be, if it is effective at all.

In order to move a new or improved system forward and truly show the users the value of the endeavor there must be a WIIFM (What's In It for Me). The process must be user friendly and effective. In short, it must **deliver immediate tangible benefits**. This principle dovetails tightly with the need for priorities. The priority of work must meet the commander's needs as well as show the users benefit. When the users see benefit they will be more likely to use the system, thus improving its utility. Additionally, the commander whose needs are met will be incented to continue an emphasis on the process.

While it is important throughout the life cycle of the process, **command emphasis** is essential at the beginning. Most importantly sponsorship during all phases will show the organization the importance of the process and make implementation far easier. IM planners must have the endorsement and support of the command from the planning stage. This is important so that the project is properly

supported in terms of material, but also so it is integrated into the training cycle, and eventually becomes part of the conduct of daily operations. This inclusion into training, if possible, is very valuable as it will allow designers and stakeholders to further refine the system prior to actual deployment.

While the aforementioned principles apply universally the actual complexities and nuances of an IM process will depend on the specific situation, organization, personalities, technologies, and skill sets of the players.

c. Practices – every user's responsibility

Hopefully, the role of the user has been sufficiently emphasized in effective IM implementation. As the true power plant of a good IM strategy the user must not only use the system as designed but must employ some specific practices during the course of their daily duties. Due to the commoditization of information, data is cheap.[3] Numbers, spreadsheets, and databases have made data ubiquitous. It is the human interpretation that adds value to the raw data. The availability of data has placed a high premium on those who can effectively **communicate using clear and concise prose** and apply thought and analysis to a given set of facts. This is made much easier when the facts are complete. Some staff functions require a complete set of raw data. Some commanders prefer to see data when making their decisions. Thus, the clear concise analysis should be the first thing seen, but the more complete set of facts made available as well.

In order to retain a high quality of information, **reporting must be complete, accurate, and concise**. This completeness will permit a thorough analysis, as well as enabling the person reading the information to continue to move forward without have to go back to get the complete set of facts. Clear, accurate, and concise reports of routine and non-routine information lead to complete reporting. Although web forms can be designed to validate the data entered they are not foolproof. Ultimately the user's attention to detail determines the accuracy of the data input.

Within well written and complete reports the structure should **enable quick scanning** by readers. Complex operations inevitably generate a large amount of both data and information. IM processes seek to sort the information on importance and relevance to give the reader the ability to internalize the most important information first. This practice includes using abstracts and executive summaries in both report headers and the subject lines of email.

User's responsibility

- **communicate using clear and concise prose**
- **reporting must be complete, accurate, and concise**
- **enable quick scanning**
- **practice email discipline**

While email can be an effective tool, it can also be a detractor from the comprehensive system, place unnecessary burden on the digital architecture, and waste the time of users thus counteracting the very goal of the system. In the days before email sending a message placed the burden on the sender (i.e. go to the post office, get a stamp). Now the burden is on the recipient to sort through the mountains of digital flotsam awaiting the average user. Users must understand and **practice email discipline**. Email creates records that are not searchable across the system by the average user. For this reason it is important that files be shared via a website or database where they are searchable and can run the course of information transformation. Furthermore, this reduces the stress on the infrastructure caused by mass emailing which as a rule should not be done. Before sending an email the sender should have a clearly defined task and purpose for each recipient. If not they should not receive the missive. The requirement for well written, complete information still exists.

V. Summary

Multinational and multiagency operations are increasing in scope, frequency, and complexity. The success of these operations is closely related to their ability to process information. There are no hard and fast blueprints for IM within these organizations. However, there are principles for both designers and users to follow that will enable the success of IM processes that integrate nations, agencies, technologies, and systems. No matter the exact application or situation, the goal remains to facilitate the ability to extract the pertinent information and deliver it to the right person at the right time.

Footnotes

[1] S.G. McIntyre, M. Gauvin, B. Waruszynski. "Knowledge Management in the Military Context" Canadian Military Journal, Spring 2003, p 35-40.

[2] Robertson, James. "10 Principles of Effective Information Management", www.steptwo.com.au/papers/kmc_effectiveim/index.html, accessed Feb. 18, 2006.

[3] Prusak, L. "Where Did Knowledge

Acronym QuickScan

ASAS – All Source Analysis System
CCIR – Commander's Critical Information Requirements
IM – information management
LNO – Liaison Officer
MCS – Maneuver Control System
SIPR – Secret Internet Protocol, Routed
SITREP – Situation Report
SALT – Size, Activity, Location, Time
SALUTE – Size, Activity, Location, Unit, Time, Equipment
U.S. – United States
WIIFM – What's In It for Me

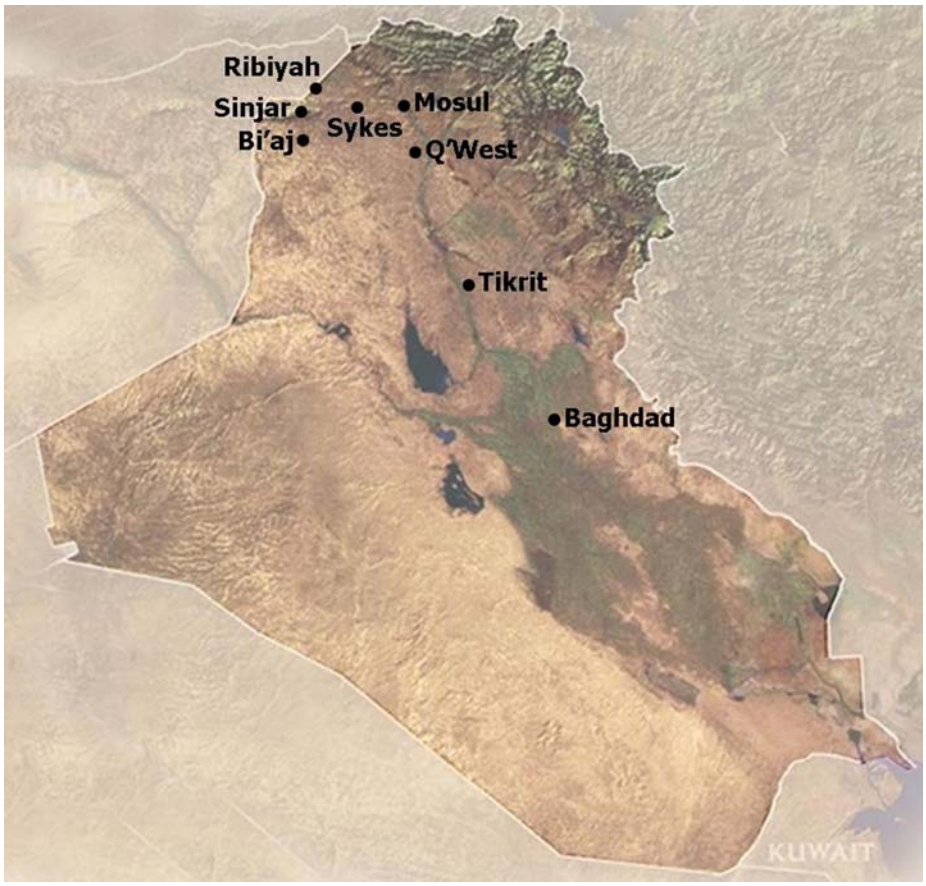
Come From?"
IBM Systems Journal, Vol 40, No 4, 2001, p1002-1007.

MAJ Mintz is a 1996 graduate of the United States Military Academy and currently serves as the battalion S3 for 1-141 IN (TXARNG) in Kosovo. Prior to his current assignment he served as the MNB-E (Kosovo) battle captain and designed the current information management system in use in MNB-E. Prior assignments include command of HHC 1-141 IN, trainer for the Afghan National Army, and assignments from Platoon Leader to Assistant S3 in 2-7 CAV (M), 1st Cavalry Division.

The Mosul story

By CPT Robert J. Harrison

In early December 2005, more than 600 Soldiers of the 29th Signal Battalion hit the ground in the Northwest Region of Iraq for Operation Iraqi Freedom 2005-07. After a 10-month turnaround, the 29th was back in Iraq following a one year rotation in OIF II where they maintained and improved mobile subscriber equipment tactical communications systems. In contrast to their previous experience, the 29th was tasked to commercialize the greater Mosul area. The ensuing months would take meticulous planning, precise coordination, and a "Team of Teams," to accomplish a task foreign to traditional tactical signal battalions.



Iraq

A fleeting home and insufficient equipment

The 29th Signal Battalion Task Force consisted of a specially organized version of the five organic Modified Table of Organization and Equipment companies plus the U.S. Army Reserve 842nd Signal Company for long-range transmissions capability. The 29th settled at Forward Operating Base Courage, FOB Diamondback, FOB Marez, FOB Sykes and FOB Endurance (Q'West) supporting the Multinational Brigade – Northwest battle space headed by Task Force Freedom at FOB Courage. Shortly after the arrival of the 29th, TFF was postured for redeployment with no replacement. With no incoming headquarters, the MNB-NW battle space would be assimilated by Multinational Division – North under the direction of the 101st Air Assault Division (TF Band of Brothers or simply TF BoB) from Continuous Operating Base Speicher. The departure of TFF also left FOB Courage without a mission, and the base was scheduled for closure in the early summer. As if the logistics of moving the 29th's entire network operations center, also located on FOB Courage, were not intimidating enough, the closure also meant the relocation of many strategic communications links in the volatile greater Mosul area.

In addition to the confluence of these external forces, the 29th faced more challenges. The unit's predecessor, the 16th Signal Battalion of Fort Hood, Texas, had been an asynchronous transfer mode MSE signal battalion with much greater bandwidth capabilities. Despite the tactical nature of their communica-

SGT Frank Ferguson, SSG Lonnie Colvin, and SPC Justin Rubio from the 842nd Signal Company conduct fiber training with Brad Smoczyk and Paul Johnson from the Anteon engineering and installation team.

tions assemblages, the 16th was able to provide a quality of service beyond the capability of the 29th's older Tactical High Speed Data Network flavor of MSE. Supported units had grown accustomed to far more demanding applications such as Voice over Internet Protocol, Wave Radio (a multicast IP version of combat net radio), Info-workspace collaboration suite and other high bandwidth or real-time applications. The 29th was not able to provide the level of service commensurate with the demand of these applications. The evidence of this fact came just days after the relief in place wherein the node center's THSDN-fielded routers' memory reached 98 percent utilization and frequently stalled communications. The message was clear: something had to be done. The leaders and Soldiers of the 29th together with TF Adler (22nd Signal Brigade), the unit's higher headquarters, proved to be up to the challenge.

With evidence of the THSDN architecture's inability to meet war fighter demands displayed on the network monitoring tools at TF Adler's network operations center every day, momentum to improve the situation quickly formed. TF Adler's network engineers decided to field a newer, enhanced router to replace the lagging THSDN equipment to alleviate the immediate strain on the network while a broader strategy was formed. Meanwhile, Soldiers from Alpha Company, 29th came up with solutions of their own. They teamed with the battalion network technician and upgraded key small extension nodes supporting the end-user and Node Center routers. This upgrade would boost the constricted bandwidth links by fifty percent.

While not a final solution by any means, these two upgrades lifted the network out of despair and allowed supported units to conduct business. Still the fact remained; the 29th's area of operations desperately needed an overhaul.

"We had no options but to learn and train outside our doctrinal MSE skills and change the way we executed network business on the Iraqi Battlefield."
–- SPC Riley Pacheco, Delta Company, 29th Signal Battalion

Because of the impending restructure of the MNB-NW/MND-N battlespace and the 29th's stressed equipment, the TF Adler leadership decided the thrust of the early commercialization effort would center on Mosul. The 29th Signal Battalion Task Force commander ensured his organization aligned with TF Adler, issuing a revised commander's intent emphasizing that a, "transition from a tactical to a commercial network for FOBs Diamondback /Marez, Sykes and Q'west hinges on our detailed planning and coordination with 22nd Signal Brigade." Nothing less would suffice.

The stage was set and the requirements were in place – build a new strategic presence at Mosul and get the users off the tactical systems and onto a yet-to-be constructed strategic local area network. In middle January 2006, transmission, circuits, and data engineers and planners set out to propose appropriate solutions to the obvious problems.

Executing the plan

The 29th Signal Battalion operations officer and staff seized the initiative – a theme that resonates throughout operations conducted by the 29th – and guided the Mosul commercialization effort. The battalion submitted a plan to TF Adler engineers and network operations staff and sought concurrence from TF BoB G-6. The plan contained eight major phases that were generally conditions-based and executed in logical sequence.

1. Restructure long-range transmissions
2. Stand up TCF with data presence and LOS link to FOB Courage
3. Move strategic links to the new technical control facility
4. Install voice links
5. Install data connectivity
6. Install Vantage switch at FOB Diamondback
7. Swing links from FOB Courage to FOB Marez
8. Withdraw all remaining personnel from FOB Courage

The plan was not complicated nor a significant departure from what had already been discussed during informal planning dialogues. But it did weave together several separate planning threads address-

ing the limitations of the 29th capabilities, logistic challenges, and operational requirements. The engineers then presented the plan to the TF Adler commander who summarily approved it. With an approved plan on paper, the 29th was ready to get to work.

Training

TF Adler and 29th leaders laid plans that required the 29th to run a strategic technical control facility, a mission for which a tactical signal battalion and troposcatter signal company were not doctrinally trained. Back at the battalion's home station, Fort Lewis, Wash., the unit had shown great foresight by deploying with two Promina P400 nodes and sending a team of Soldiers, designated as the Promina Section, to a training course. These Soldiers formed the core around which a TCF team was built. In addition to the Promina skills, Soldiers from the battalion needed more knowledge in order to operate and maintain a strategic TCF.

"Fiber training proved absolutely valuable to the success of providing responsive and reliable service to our customers."
– SSG Trevor Smith Delta Company, 29th Signal Battalion

The 29th prepared for the installation and operation of the LAN and TCF by training the Soldiers on commercial-off-the-shelf equipment and fiber installation. TF Adler leveraged resources in the 29th's favor by offering courses from Baghdad Signal University. The 29th quickly filled training slots, beginning in January, in anticipation of the upcoming mission. This training covered the operation of the TCF and much of the troubleshooting the team needed to complete, but installation of the fiber backbone would take an entirely different set of skills. Task Force Adler leveraged available assets by opening up training offered by the Kuwait Iraq C4 Commercialization project and Anteon contracted fiber experts. The 29th turned to their cable and wire installer/maintainers (MOS 25L) to receive this training and prepare to spearhead the installation of the LAN on FOB Diamondback and other locations. Through these courses, TF Adler and the 29th successfully provided MSE Soldiers with skills needed to operate and maintain the TCF and to install the LAN.

TCF planning and installation

Building a TCF from the ground up would be difficult enough, but building it in the logistically challenged Northwest region of Iraq was an extraordinarily demanding task. The facilities on FOB Diamondback at the outset of the transition were in no condition to house a strategic TCF. To remedy the situation, the 29th logisticians, led by the battalion executive officer, began acquiring and allocating resources. To renovate the ailing building designated for the TCF, the battalion enlisted the support of the 557th Expeditionary REDHORSE Squadron to renovate the heating, ventilating, and air conditioning systems as well as the structure itself. Kellogg, Brown, and Root, a commercial contractor, was brought in to make the building power infrastructure more robust and reliable.

Creating a hub around which the new LAN infrastructure could be built presented just one of the many tasks in planning for the migration of strategic services. The LAN itself needed to be constructed. For this task, TF Adler hedged its bet prior to approval of the final Mosul plan and dispatched the Anteon team, under the direction of the TF Adler commercialization officer, who conducted a site survey of Mosul. The survey yielded a plan for the fiber runs that would form the LAN as well as an estimate of materials needed to complete the project. Armed with this information, TF Adler provided the 29th with materials on-hand and submitted a purchase request for the balance.

As the project became more complicated, the 29th assigned a project manager to organize the disparate parts of the project that ultimately lead to the full commercialization of Mosul. The project manager facilitated information flow between the fiber team, the TCF team, the TF Adler commercialization team, 29th logisticians, and 29th operations. This link proved crucial to the success of the commercialization mission.

"Learning how to operate and maintain a technical control facility proved to be the best technical training I've ever received in the Army."
– 1LT Manuel Landron, 842nd Signal Company

Mosul was not the only location in the 29th's AO that required a TCF. Q'West already had a TCF in place from commercialization efforts predating the 29th's tenure. With the loss of contractor support at the TCF, the mission fell on the 842nd Signal Company, the only communicators assigned to the base. But the 842nd is a troposcatter transmission signal company that is neither tasked nor prepared to manage a strategic TCF. As a U.S. Army Reserve unit, the 842nd brought unique skills from the civilian world that proved to be extremely useful. Many Reservists held jobs with major telecommunications companies such as BellSouth, Verizon, and L3. They brought expertise and experience in maintaining local and wide-area communications networks. The 29th and TF Adler augmented the skills of the 842nd personnel with training at BSU to specialize individuals on circuit-switched voice, Promina multiplexing, VOIP, and IP networking. From automation to strategic circuits, the Q'West TCF team provided a broad range of communications support to Q'West, including installation of more than five-and-a-half miles of fiber optic cable to complete the LAN infrastructure. Within the first two months of operation, the 842nd Soldiers installed three new tier one circuits and a new Non-Secure Internet Protocol Routing VOIP call manager

– tasks far beyond the scope of typical TROPO operators. Operating this TCF also yielded valuable insight into some of the training, equipment, and manning challenges the 29th would face in establishing a new facility at FOB Diamondback. As iron sharpens iron, the 842nd team helped make the greater 29th team and the new TCF a success.

Soldiers from Delta Company, 29th Signal Battalion conduct Cable Cleanup on FOB Diamondback (Before & After).

Outside Plant/Inside Plant infrastructure and installation

After the migration of the first strategic circuits to the FOB Diamondback TCF in early March, the 29th's focus shifted to extension of these services onto a strategic LAN rather than tactical assemblages. During preparations for the TCF initialization, the OSP team had been training hard under the direction of the Anteon group to install the area distribution node backbone at FOB Diamondback and FOB Marez. With that plan in mind and the training under their belt, the cable and wire team, the Anteon team, and the 557th ERHS (who provided the trenching and digging capability) broke ground on a project that would be completed in record time.

Concurrently, the cable and wire team conducted an extensive cable cleanup project on Diamondback and Marez to make room for the new architecture and to improve services. It was not uncommon to encounter "rat's nests" of abandoned or damaged cable throughout the FOBs, leftovers from three years of previous tenants. Soldiers worked tirelessly to remove haphazardly installed and aging cable and wire from buildings, ground runs, and aerial runs. As a result, the Soldiers recovered 30 miles of WF-16 field wire and five miles of Category 5 UTP cable.

Meanwhile, the cable and wire team made remarkable progress on the backbone, though work was often stalled by equipment shortages and broken trenching equipment. Despite these obstacles, the cable and wire team pressed ahead with installation of the new backbone. By the time all the ADNs became operational, the Soldiers had lifted approximately 2,600 lbs. of CAT5 cable and installed nearly 23 miles. And the team laid another 14 miles of fiber-optic cable to complete the LAN.

SGT Richard Venson and SPC Jorge Vasquez from Delta Company, 29th Signal Battalion conduct inside plant operations inside a U.S. facility.

Information services

During the intensive LAN construction project, the 29th staff continued to plan for the development of information services to be provided by the TCF. Microsoft Domain, Microsoft Exchange, and anti-virus services fell into the realm of Multinational Corps Iraq Enterprise Services division of the communications staff (C-6). The progress in Mosul fit right in with MNC-I's concurrent but separate enterprise-wide effort to migrate off of un-trusted domains to a common IRAQ domain. With MNC-I Enterprise Services located at Camp Victory, the TF Adler automations OIC would serve as the link between the 29th and Enterprise Services and this broader plan. Back at Mosul, a SEN platoon became the newly formed Domain Transition Team to handle the installation and operation of the information system servers in the TCF as well as to ease users' transition off of the MNBNW domain onto the IRAQ domain.

The team experienced early setbacks, but quickly gained experience and momentum tackling each set of customers in two days – one day for preparation and validation, the second for execution. The domain migration team spent countless hours validating user-level connectivity, deploying baseline images to customers' computers, and assisting in setting up the users' new e-mail accounts. In fourteen days, the migration team had transitioned over 350 computers and 2,000 user accounts to the IRAQ domain. In approximately four months, TF Adler and the 29th had taken the FOB Diamondback TCF from concept to completion.

(Above) SGT Steve Achten Delta Company, 29th Signal Battalion installs aerial fiber at FOB Marez.

(Left) SGT Richard Venson, D Company, 29th Signal Company tests fiber at an ADN site.

FOB Sykes

With the completion of a fully-functional TCF, the 29th shifted focus westward towards FOB Sykes. Although FOBs Diamondback and Marez still required attention and improvement, the bulk of the planning and supplying for those projects had been completed, and all that remained was execution. The role of FOB Sykes, meanwhile, changed continuously over the course of the Mosul commercialization. The 3rd Armored Cavalry Regiment originally occupied FOB Sykes, and was later replaced by 1st Brigade, 1st Armored Division. Their stay proved to be short-lived as elements of the 172nd Stryker Brigade Combat Team, based in Mosul, replaced them after only a few months. Amid these changing operational requirements, the Diamondback TCF continued to mature and extend more services. Under these new circumstances, TF Adler engineers and the 29th worked together to create a plan for Sykes. Ultimately, the engineers and 29th decided the best way to serve FOB Sykes, given the existing constraints, would be to extend services from Mosul as a tier two campus extension.

The Anteon contractors diligently working at Mosul visited FOB Sykes during the original site survey of the region, and had prepared a commercial architecture for the requirements there. In light of the equipment shortfalls faced at Mosul, the 29th would not complete a new commercial architecture at FOB Sykes. The TF Adler commercialization team and 29th found solutions to the problems at Sykes with tactical commercialization. With the commercial assets they had on hand and a combination of MSE transmission systems, the team would install transmission data cases consisting of routers, switches, and encryption equipment to support the end users. This strategy would help reduce the number of tactical assemblages and enhance the services provided to the customer.

The 29th set out to install as much commercial architecture as they could out of the new FOB Sykes TCF, including nearly three miles of fiber, NIPR/SIPR data stacks, and NIPR/SIPR VOIP call managers. This TCF housed circuits tying directly into the strategic services offered by the Diamondback TCF. These services enabled the 29th to

(Left) SPC Veronica Gordon, SGT Detric Edwards, and SPC Cole Bennet from Bravo Company, 29th Signal Battalion, install fiber at FOB Sykes in the vicinity of Tal Afar. (Right) SPC James Kenimer and SGT Windon Copwood from Bravo Company, 29th Signal Battalion, configure switches to replace small extension nodes located at combat outposts near the Syrian border.

deploy a total of eleven transmission data cases. Some of these data cases were deployed to the tumultuous city of Tal Afar on a short-notice mission to support TF BoB combat elements. This mission required training on free-space optics, another new piece of COTS equipment as yet unemployed by the 29th. The 29th met the challenge head-on and quickly trained Soldiers to set up this equipment. Without the timely extension of services from Mosul onto Sykes' burgeoning commercial infrastructure, this mission would have been far more difficult to complete.

"Units we support, Cavalry Regiments, tank battalions, military transition teams, border transition teams, and governmental agencies recognized a significant improvement in the network speed and reliability compared to mobile subscriber equipment."
– SGT Kathy Barbosa, Bravo Company, 29th Signal Battalion

End of the road

Looking back on the situation the 29th encountered after arriving in Mosul, it is astonishing to see the vast improvements that have been made to the greater Mosul network. A tactical signal battalion, untrained for the majority of the tasks they were asked to undertake and with limited resources, transformed itself to meet the demands of the modern warfighter. Through their efforts, the 29th effectively reduced their tactical footprint from 132 to 36 tactical assemblages and reduced the manpower footprint by 80 percent.

As TF Adler and the 29th near their redeployment dates, many smaller projects remain and constant improvements to the LAN and TCF continue. FOB Diamondback, FOB Sykes and Q'west TCFs will remain testaments to the superior teamwork, ingenuity, and tenacity of the 29th Signal Battalion, the 842nd Signal Company, and TF Adler as long as there is an U.S. presence in the Ninewa province of Iraq.

CPT Harrison is currently assigned to the S3 section of HHC, 29th Signal Battalion. His previous duty assignments include nodal platoon leader, company executive officer, liaison officer, and brigade data engineer. Harrison holds a Bachelor of Science degree from the United States Military Academy in Computer Science.

Acronym QuickScan

AC – Army Communicator
ACR – Armored Cavalry Regiment
ADN – area distribution node
AO – area of operations
ATM – asynchronous transfer mode
BSU – Baghdad Signal University
COB – Continuous Operating Base
COTS – commercial off-the-shelf
ERHS – Expeditionary REDHORSE Squadron
FOB – Forward Operating Base
FSO – free-space optics
ISP – inside plant
IWS – Infoworkspace
KBR – Kellogg Brown and Root
KICC – Kuwait Iraq C4 Commercialization
LAN – local area network
MNC-I – Multinational Corps – Iraq
MND-N – Multinational Division – North
MNB-NW – Multinational Brigade – Northwest
MSE – Mobile Subscriber Equipment
MTOE – Modified Table of Organization and Equipment
NETOPS – network operations
NIPR – Non-secure Internet Protocol Router
OIC – officer-in-charge
OIF – Operation Iraqi Freedom
OSP – outside plant
QoS – quality of service
RIP – relief in place
SBCT – Stryker Brigade Combat Team
SEN – small extension node
SIRP – Secure Internet Protocol Router
TCF – technical control facility
THSDN – Tactical High Speed Data Network
TF BoB – TF Band of Brothers
TFF – Task Force Freedom
TROPO – troposcatter
U.S. – United States
VOIP – Voice over Internet Protocol

Fulfilling the promise of HF

By Mike Flynn

In 1987, FM 24-18, Tactical Single-Channel Radios Techniques, Appendix M, described how to use high frequency radio and the near-vertical incidence sky-wave mode to communicate throughout the brigade area. The radio technology and the number of radios available were not sufficient to do the job. The radios were large complex fixed frequency radio systems that required trained operators. Too few radios were fielded to provide adequate coverage throughout the brigade.

Today, brigade-sized units rapidly deploy over great distances communicating continuously throughout the battle area. The distances exceed the line-of-sight distances provided by tactical single channel radios. All brigades are now being equipped with new digital software programmable HF radios, that provide secure long distance voice and data communications. The purpose of this article is to relate some success stories and provide availability of a template when implementing HF networks.

HF radio communications have historically been either a love or hate system. Most units avoid it because of the mistaken impression it is too difficult to set up, requires highly skilled operators, or is so effected by atmospheric conditions that it is unuseable. Believing this, the Army was aggressive in implementing tactical satellite systems to solve long-range battlefield communications requirements. Soon, satellite access became a major problem as too many users and systems competed for limited bandwidth and satellite access.

The promise of HF Radio has been long range, beyond line-of-sight secure, voice, and data communications. HF radio did provide good service up until the mid 1980s, when the Army's long-range tactical communications switched to satellite. The Signal Center then stopped teaching HF radio and the Army's HF radios skills quickly deteriorated. By 1991, the Army's tactical beyond-line-of-sight on the move capability at the brigade and below had ceased to exist. This was partly because of the lack of training and more importantly because the technology of HF radio had not kept pace with the rapid advances in computer technology.

By the end of the 1990s, HF radio technology caught up and the promise of secure continuous long-range voice and data, BLOS/OTM became a reality. We began to relearn how to set up antennas so that HF radio can provide very effective short-range omni-directional communications coverage from zero to greater than 300 miles. Radios are now computers that receive and transmit. Automatic link establishment and link quality analysis functions in the radio provide the capability to automatically scan and select the best frequency and connect to remote radios. These new capabilities reduce the technical skill required for operators.

The HF radio currently is being implemented as commercial off-the-shelf, non-developmental item. The preferred HF radio is the Harris AN/PRC-150, Falcon II series radios. The radio comes in a 20-watt man pack, a 20-watt and 150-watt vehicular, and a 150-watt and 400-watt base station. These radios are fielded normally at battalion, brigade, and division levels but some of the reconnaissance surveillance and target acquisition squadrons have them distributed down to scout squad level. The guiding principle on who should get these radios is: "*Does the unit need communications beyond the normal SINCGARS range that is not covered by retrans?"*

Normally a brigade will require short range omni-directional, mobile HF communications (0 - >300 miles), while a division will need the long range point-to-point (500-2000 miles) reach back HF communications capabilities. Each of these networks requires a different approach to frequency and antenna selection. The division and above will normally employ a fixed site with point-to-point shots to higher, subordinate, and adjacent units while the brigade will want a more mobile omni-directional system that does not rely on fixed site infrastructure.

HF communications requires a good amount of fore thought, planning, and practice. Nets, frequency, antennas, station locations, and radio power are all components of successful long range communications.

NETS:

The table below (Figure 1.)

UNIT	AN/PRC-150 Radio	AN/VRC-104(V)1 20W Vehicular	AN/VRC-104(V)3 150W Vehicular	Man Pack	AN/TRC-209 150W T Case	AN/TRC-210 400W T Case
Division	19	0	18	0	0	1
Infantry BCT	84	0	53	25	6	0
Heavy BCT	77	0	66	4	7	0
Stryker BCT	75	7	34	33	0	1
Sustainment	19	0	19	0	0	0
Aviation	9	0	9	0	0	0
Fires	29	0	29	0	0	0
ME Bde	TBD	TBD	TBD	TBD	TBD	TBD
BFSB	60	TBD	TBD	TBD	TBD	TBD

Figure 1.

shows the expected distribution of HF radios by type. Since these are not on the Modified Table of Organization and Equipment and the number of systems exceeds the older fixed-channel HF radios, the brigade S6 and the force modernization officer have to develop the detailed distribution based on the commander's guidance. The distribution plan starts with what nets do you need and who should be in them.

The traditional HF nets are command and control, administration and logistics, operations and intelligence, fires, and other specialty uses such as reconnaissance. These nets were limited due to the small number of radios. Now a brigade has between 70 to 80 HF radios and can establish nets down to company and lower levels when the situation warrants it.

It is not uncommon to have four to six HF nets in the brigade in addition to battalion nets. Network membership becomes the issue because HF automatic link establishment networks are limited to 30 stations. Plan on keeping the number of stations down to the people who need mobile secure BLOS communications.

Frequencies:

HF radio propagation changes as the sun rises and sets lower frequencies work at night and higher frequencies work during the day. Frequencies need to be selected based on the type of network and the distance between radios.

Brigades normally will operate omni-directional mobile nets, requiring frequencies between 2.0 MHz and 8.0 MHz. The new HF radios are programmable with a range of frequencies and they scan all of the assigned frequencies listening for a call and establish the link on the best available frequency for that time of day. As such, each net requires more than just a day time and night time frequency. Depending upon the range between stations it is not uncommon to use between five and seven frequencies per net. A brigade with 10 nets could require between 50 to 70 frequencies to provide adequate coverage.

Additionally, to effectively implement NVIS the highest useable frequency is normally 8.0 MHz which eliminates roughly 2/3rds of the HF spectrum. Spectrum managers will have a difficult time meeting the demand for frequencies from their existing frequency sets.

In order to determine the correct frequencies, a propagation prediction program like "Speed" or "VOACAP" should be used to determine the frequencies that will provide 24- hour coverage between all stations in the net. The plot below (Figure 2.) shows a 5 Mhz plot prediction of one point-to-point link. The green line indicates the best frequency for that time-of-day. Similar plots would be run for all locations until a common set of frequencies is found that will maintain 24-hour communications with all stations in the net.

Antennas:

Several types of antennas are available in the brigade. The type of antenna used depends on the network architecture and frequencies. Normally the brigade uses a horizontally polarized dipole antenna system to take advantage of the NVIS and antenna gain. Stationary sites should set up a horizontal dipole that is less than 30-feet off the ground. These antennas dramatically improve the strength of the signal and can have a doubling effect on the relative power of a system. The selected length of the dipole antenna should provide resonance near the middle of the frequencies available. If possible, the fan dipole, that comes with the base station Harris RF-1912 should be used because it provides broader frequency coverage and more reliable communications.

Vehicles are equipped with a 16/32 foot vertical whip antenna create a horizontal antenna when the antenna is tied down over the top of the vehicle. This provides for the horizontally polarized near vertical incident sky wave while on the move. At the halt the antenna should be extended to 32 feet, flipped to the rear and the vehicle and the radio grounded, transforming the vehicle and the antenna into a horizontal polarized dipole.

The figure below depicts the signal patterns created by a fan dipole less than 30 feet off the ground, as you vary the frequency from 2 MHz to 16 MHz. The radiation patterns change dramatically making the dipole bi-directional above about 10 MHz. To get the near vertical incidence omni directional coverage, the frequency has to be kept below 8 MHz. Frequencies higher than this will pass through the ionosphere and not reflect back to earth.

Several excellent examples of reliable HF Radio communications being implemented over short to medium distances in mountainous terrain follow. The successes were predominately due to proper frequency and antenna selection.

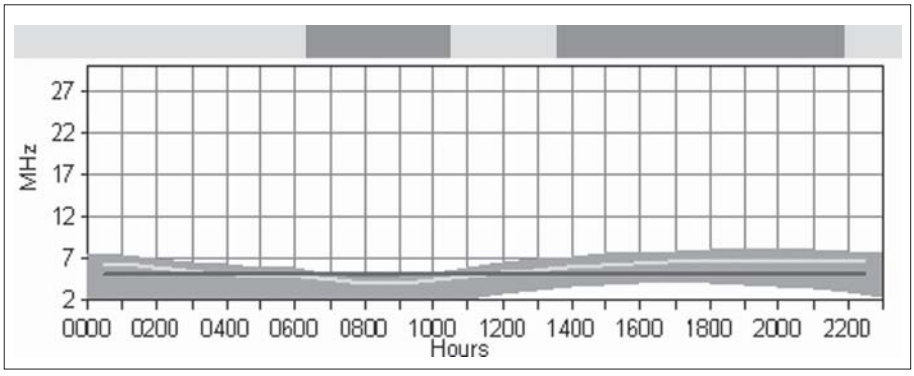


Figure 2.

First Example:

The 2nd Brigade, 2nd Infantry Division conducted a communica-

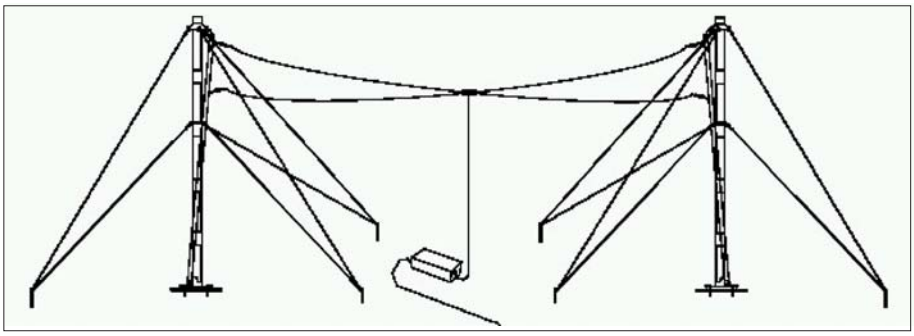


Figure 3. RF-1912 E/T Antenna -- Transit Case configuration

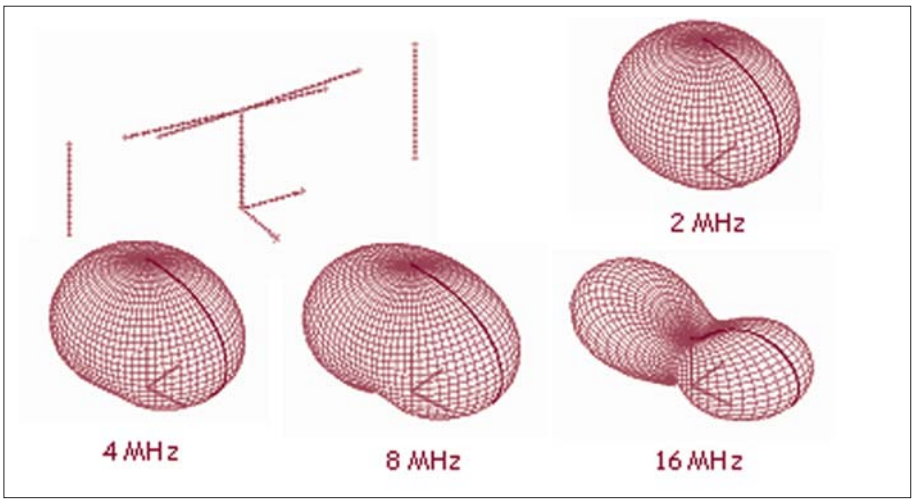


Figure 4. Fan Dipole Signal Patterns

tions exercise in preparation for deployment to the National Training Center. Each of the battalions rotated to the Pinion Canyon training area roughly 100 miles south of Fort Carson. HF communications were established between the brigade headquarters at Fort Carson and each battalion at Pinion Canyon. The frequencies selected allowed 24-hour BLOS/OTM communications but because of the newness of these radios to the brigade they were neither relied upon nor integrated well into the overall communications plan for the brigade. During the NTC the brigade again attempted HF communications, this time with great success. They used HF for the initial movement to the field and successfully communicated throughout the brigade operational area at NTC area without retrans. In both cases 2/2 ID set up their AN/TRC-209 base station and the Harris RF-1912 fan dipole antenna at their TOC. All of the radios, equipment and antennas used are items that are being fielded to all the brigades

Second Example:

During a class for the 56th Brigade SBCT-6 at Fort Indiantown Gap a three-element field-expedient fan dipole antenna was used to establish communications with Fort Monmouth, N.J.; Rochester, N.Y.; Norfolk, Va., and Fort Gordon, Ga., with 20 watt man pack AN/PRC-150 radio. 100 percent successful communications were achieved with both voice and data. Frequencies ranged from 2.3600 to 9.1200 MHZ and the antenna tested at 1.0:1 22 watts on all frequencies. (That is perfect.)

The antenna support poles were OE-254 masts. Care was taken to put the top tie down rings close to the top of the masts to be able to support the weight of the antenna elements. Additionally we made sure that one of the tie-down rope sets was placed to pull away from the line of the antenna.

The elements were made from three RF-1941 Harris Dipole antennas attached to a single cobra head. The cords from the elements were passed through extra tie-down rings and used as halyards to raise and lower the antenna after the poles were erected. We did install the cords before erecting the poles. Care needs to be taken to avoid tangling the elements and cords when raising the poles. The counterpoise was not

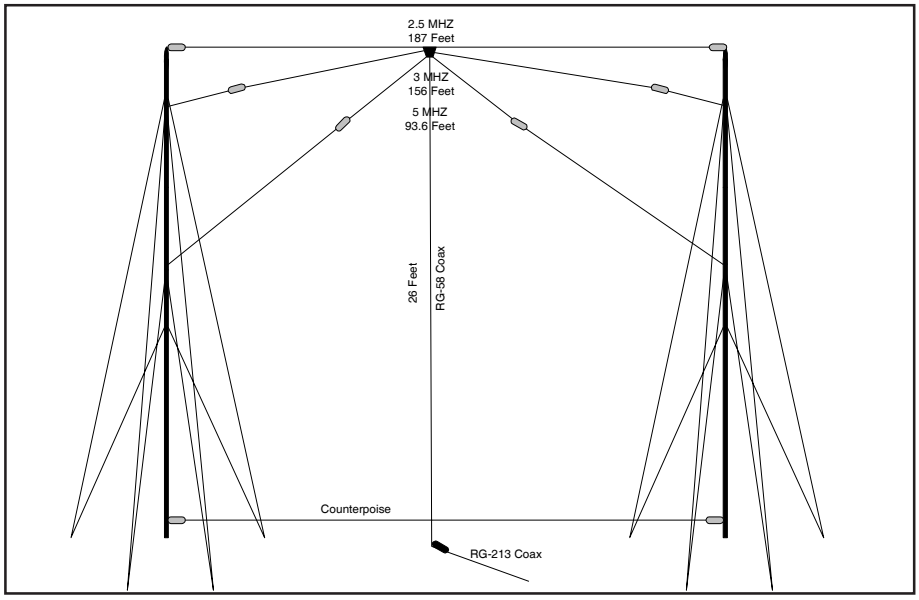


Figure 5. Three-element field-expedient fan dipole antenna

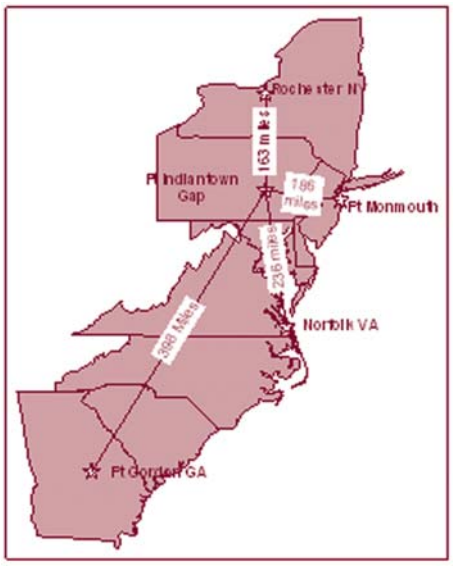


Figure 6. Map of network station contacts.

used because we had such a strong signal from each station.

Antenna elements were selected that were 2.5 MHz (187 feet), 3.0 MHz (156 feet) and 5 MHz (93.6 feet) long to make this antenna. We selected these lengths to give us good broadband coverage across the 2.0 MHz to 8 MHz range.

The radio used was an AN/PRC-150(C) 20 watt man pack radio operating in 3rd generation automatic link establishment mode. (3G ALE) The strength and quality of the signal was amazing. Most of the remote stations were AN/TRC-209 150 watt base stations and one was a AN/TRC-210 400 watt base station. All of the radios in this test used some form of horizontal dipole antenna. All of these radios and antennas are typically found in the maneuver battalions, brigades, and division headquarters. All of the dipole antennas were less than a quarter wave off the ground at the frequencies being used. This ensured that we were getting omni-directional, NVIS.

The ALE feature of the AN/PRC-150 scans the list of frequencies provided, listening for a call from another station. The radios link on the best available frequency. A series of six frequencies between 2.0 and 8.0 Mhz insured continuous coverage. In a properly architected ALE network the HF network manager (usually the brigade S6) and the brigade frequency manager analyze the possible locations for the various stations and determine which frequencies and antennas will provide continuous coverage. In an ALE network, between six and eight frequencies are normally needed to provide adequate coverage to all locations day and night.

Because we used 3G ALE on all of our nets, the initial contacts between all stations were requests for synchronization. We needed to set our radio to with in seven minutes of the time server to be able to get a successful synchronization. This was done by setting all radios to Zulu time with no offsets.

We subsequently established both voice and then data communications using TacChat software that comes with the radios. Calls to each station were initiated and linked quite quickly because of the synchronized scanning provided by 3G ALE. Voice connectivity was established with all of the remote stations using the digital voice encoder which is part of the radio. We did not use encryption because all stations did not have access to the current fill. Data transmissions were done point-to-point.

Finally with the phone feature we called Rochester and were able to call a cell phone in the class. As you can see from the map all of these links are a challenge for a 20 watt HF radio, but we received link quality scores of 40 percent to 50 percent on several of the channels on each of the links

Omni-directional communications over 200 miles with the vehicular AN/VRC-104(V)3 150 Watt HF radio can easily provide a maneuver brigade with excellent secure voice communications when other systems can not.

Emphasis needs to be on establishing and maintaining the brigade HF network control stations. Habitually, the NCS for the FM command net has been the brigade S3, the FM admin log net, the support battalion. These are the logical candidates to act as the HF NCS stations.

Conclusion:

HF communications is a viable and effective means of communication in the maneuver brigade. It provides reliable omni-directional secure, beyond line-of-sight on-the-move communications in critical command and control, administrative, logistical and fires networks. It has the ability to pass digital traffic and interface with other Army voice and data systems. Advanced software programmable radio design takes a lot of the technical difficulty out of HF, while at the same time enhancing the capability of the radio to use the ionosphere. Brigade signal officers and the S6 section are responsible for planning and designing High Frequency networks but it is up to all of the radio users in the brigade to effectively implement these systems.

Mr. Flynn III is a retired New Jersey National Guard Infantry and Armor colonel who has been working on the PM-TRCS High Frequency and Multi Band Radios fielding team for the past four years. He received his commission from Infantry OCS at Fort Benning in 1967. He was an Infantry platoon leader with 25th Infantry in Vietnam. He has served in numerous command and staff positions from battalion to division and was a Communications Electronics staff officer in an Infantry battalion. Flynn is a 1990 War College Graduate and has commanded both Armored and Infantry Battalions.

Acronym QuickScan

ALE – Automatic Link Establishment
BLOS – beyond-line-of-sight
COTS – Commercial off-the-Shelf
FM – Frequency Modulation
HF – High Frequency
LOS – line-of-sight
NCS – network control stations
NDI – Non-Developmental item
NVIS – Near Vertical Incidence Skywave
OTM – on-the-move
RSTA – Reconnaissance Surveillance and Target Acquisition

Modularity & the Signal Network
One company's success story

By 1LT James Simpson and 2LT Chad McMillen

A Bravo Company Soldier inspects the KU band terminals.

When the 4th Infantry Division redeployed from Operation Iraqi Freedom in 2004, the leadership immediately began preparation for its next deployment. Among numerous tasks was modularizing maneuver brigades into Brigade Combat Teams under the Army's new brigade-based doctrine. This task had a large impact on the division's Signal battalion. Each Signal company was sent from the Signal battalion to a Special Troops Battalion within a BCT. B Company, 1st STB is the Signal company for 1BCT in 4ID. The company became a permanent part of 1st Brigade in late 2004. This new modular organization successfully provides Signal support and vastly contributes to the brigade's self reliance and improved functionality.

Bravo Company moved to the Special Troops Battalion while simultaneously resetting and maintaining legacy equipment and fielding new signal assets. The Joint Network Node was fielded prior to the National Training Center rotation in preparation for OIF 2005-07. Signal leaders were concerned whether adequate resources would be made available to field this new communications equipment. This challenge required leadership and vision on the part of commanders. The 1st Brigade Commander, COL James F. Pasquarette showed a firm commitment to the Joint Network Node's success from the day it was purchased. He ensured its involvement in practically every exercise prior to deployment. During NTC training, the 1st Special Troops Battalion successfully integrated the JNN and its components into the brigade's communications architecture and worked out any "kinks" in the system. By the time the Signal company deployed in December, 2005, its Soldiers were extremely confident in JNN. The legacy signal equipment was left behind and the challenge remained to employ a large signal network in a combat zone.

Upon arrival in theater, the Signal Company Commander, CPT Alfredo Rodriguez III prepared the JNNs and all KU-band elements for the brigade's network during RSOI. Before leaving Kuwait every link was rehearsed and every fault repaired. The company then deployed its equipment to Camp Taji, Iraq. The company commander and the brigade network technician, WO1 Anthony Collins personally managed every KU Port Terminal and line-of-site terminal in the brigade. The network soon included every organic battalion, the 9th Iraqi Army, and several patrol bases. As the battlefield continually changed, the network expanded. By June, 1st Brigade owned the largest deployed signal network. The 1st STB Commander LTC John Cross allowed his Signal commander the flexibility and the resources requisite for success on the battlefield. At the one year anniversary of the battalion's existence, the unit was praised by the entire chain of command.

In July, 2006 CPT Reginald Evans took command of Bravo Company and the success continued throughout the deployment. Under his leadership are two JNN platoons,

KU operators, LOS operators, EPLRS operators and a highly competent net operations and security cell. The company also provides a Tiger Team who provide 24-hour support to any communication's failure on the battlefield. The company has overcome each communication's obstacle to the 1st BCT and has supported every significant operation. With civilian support from General Dynamics and Datapath, the Signal company mastered the JNN and is ready for any upgrades and additional equipment. They contribute to 1st Brigade's superior C2 advantage over anti-Iraqi Forces and prove the overall benefit of the BCT concept.

As the deployment draws to a close, 1st Brigade leaders once again face the task of resetting equipment in preparation for future deployments. The challenges posed to the BCT's Signal network by modularity have been largely overcome. Quiet professionals who maintain highly technical equipment have brought the Army into the 21st century. If the same commitment is made to signal elements in future transformation, modularity can be a true success. The benefit of organic signal elements to train and deploy with the BCT comes at a cost. STB commanders must continue to support the Signal company in garrison by planning and implementing the essential training opportunities once provided by a Signal battalion. The Soldiers who lead the world in communications must stay abreast on the latest technology to be the highly specialized support required for future battles.

1LT Simpson and 2LT McMillen are Company Executive Officer and JNN Platoon Leader in B Company 1st Special Troops Battalion, 1st Brigade Combat Team, 4th Infantry Division (Mechanized). Their unit is currently stationed at Camp Taji, Iraq, and serving in support of multi-National Division Baghdad for OIF 2005-07.

Acronym QuickScan

BCT – Brigade Combat Team
C2 – Command and Control
EPLRS – Enhanced Position Location and Reporting System
ID – Infantry Division
JNN – Joint Network Node
LOS – Line-of-Sight
NTC – National Training Center
OIF – Operation Iraqi Freedom
RSOI – Reception, Staging, Onward-movement & Integration
STB – Special Troops Battalion

Americans, Iraqis communicate together

By 2LT Ronald Carter

As 1st Brigade 4th Infantry Division strives to build a capable Iraqi Army, a continual effort is maintained to provide adequate communications to the 9th Iraqi Division. In order for the mission to be a success, the American and Iraqi units must be able to effectively "communicate together". This is a difficult task due to the wide range communications abilities of each unit's communications equipment.

The Iraqi Army relies mainly on hand-held radios which are capable of networking together allowing them to communicate the span of the area of operation, while the Americans possess a more robust communications architecture. In order to bridge the communications gap, 1st Brigade imbedded one of its Joint Network Node Platoons with the 9th Iraqi Division.

"The JNN (Joint Network Node) platoon serves a vital role in the overall operation of the Iraqi 9th Division," said SFC Joseph Gonzalez, platoon sergeant, Company B, 1st Special Troops Battalion, 1st Brigade Combat Team, 4th Infantry Division. Bravo Company's 2nd Joint Network Node platoon is responsible for providing communications and technical

SPC Ryan Bock, Eustis, Fla., native, serves as a Network Switching System Operator, Company B, 1st Special Troops Battalion, 1st Brigade Combat Team, 4th Infantry Division, above with an Iraqi Soldier from 9th Iraqi Division.

SPC Nathan Thompson, a Stouts Mills, W.V., native, who serves as a Satellite Communications System Operator, Company B, 1st Special Troops Battalion, 1st Brigade Combat Team, 4th Infantry Division, performs maintenance on a KU Band Satellite Sub-System Aug. 30.

support for the entire 9th Iraqi Division. This includes both 1st and 2nd Battalion 9th Iraqi Army Brigade tactical operations centers. The Joint Network Node platoon provides the 9th Iraqi Army the same secure and non-secure communications as provided to our own American forces. This allows Iraqi and American forces to effectively execute cooperative missions.

"I am proud of what I do everyday," said SPC Ryan Bock, Network Switching System Operator, Company B, 1st Special Troops Battalion, 1st Brigade Combat Team, 4th Infantry Division. The JNN platoon operates 24 hours-a-day, seven days-a-week, continually providing ready and reliable communications and technical support.

Due to the communications support of the JNN Platoon, the Iraqi Army is not only able to effectively manage cooperative missions with coalition forces, but is also able to take the lead as the main effort for their area of operations in Iraq.

Iraqi Soldiers, 9th Iraqi Division, working in the 9th Iraqi Division headquarters TOC Aug. 30.

2LT Carter is the JNN Platoon Leader from Enterprise, Ala.

Acronym QuickScan

JNN – Joint Network Node

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Titles

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101st Airborne Division

8th Army

11th Signal Brigade

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35th Division

Doctrine update

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

Concept capability plans shape emerging Signal doctrine

By Richard C. Breakiron and MAJ Jim Lopez

The Signal Regiment's Capabilities Development and Integration Directorate[1] is designated under an Integrated Concept Development Team charter to lead the development of two Concept Capability Plans: the Network Transport and Services, and the Electromagnetic Spectrum Operations. The CCPs must support the full span of operational conditions: Garrison, Alert/Mobilization, Enroute/Deploy, Initial Entry, Decisive Operations, and Stability and Sustainment. Implicit in this analysis is the net-centric operational environment requirement for a standard of minimal to no interruption of network services.

The Network Transport and Services CCP will focus on a knowledge-based network of networks that ensures decision and information superiority and the synchronization of activities necessary for decisive mission accomplishment. The network is defined as all end-to-end information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating, and managing information on

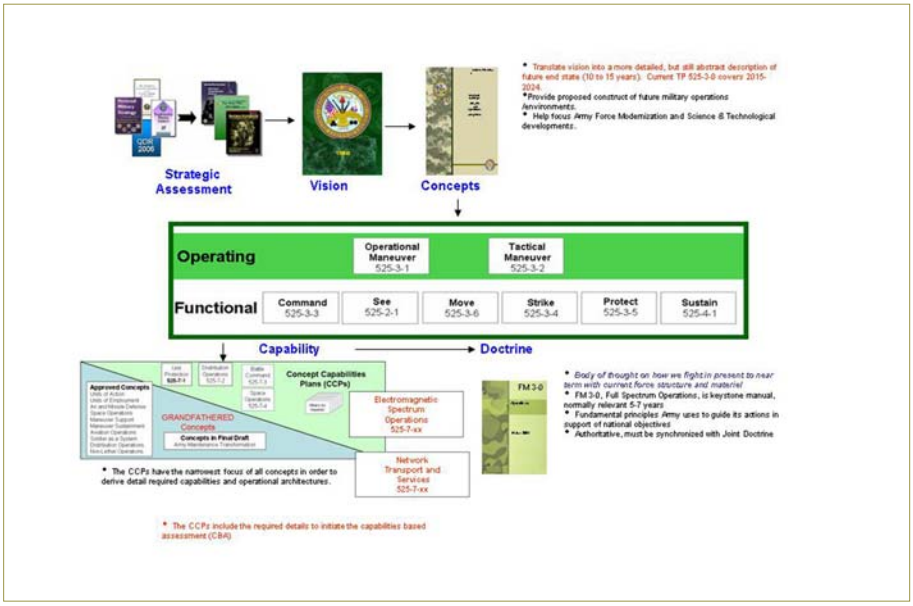


Figure 1.

demand to warfighters, policy makers, and support personnel across the Joint Force unhindered by distance, terrain, weather, or hostile activity. Information will include all media types of voice, data, and video. This CCP will integrate network transport, network services, network communications relay, assured mobility communications, Future Force Network, and the federation of networks.

To ensure its effectiveness, the CCP must focus on the role of the commanders and key decision makers in the field who depend on this information to make critical combat decisions. Upon its completion, the Network Transport and Services CCP will outline the necessary details and architecture to allow for testing and experimentation of all facets of the networks associated with the stated capabilities.

The Electromagnetic Spectrum Operations CCP will focus on the tactical deployed unit that incorporates spectrum management, frequency assignments, policy, and host

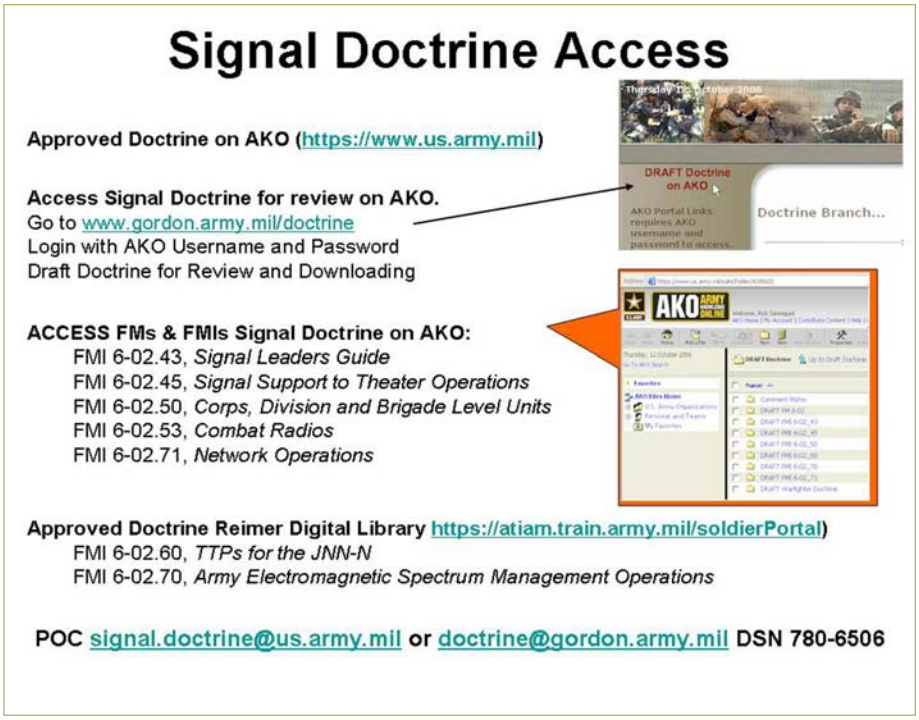


Figure 2.

nation coordination to enable the efficient use of the electromagnetic spectrum battlespace for combat operations. Spectrum operations consider both military and non-military applications for the future modular force. Electromagnetic spectrum operations enable and support network operations for communications systems and all domains of electronic warfare. It consists of planning, coordinating, and managing joint use of the electromagnetic spectrum through operational, engineering, and administrative procedures. The Electromagnetic Spectrum Operations CCP will provide the necessary detail and framework for the Capabilities Based Assessment to ensure that capability gaps are overcome and that electronic systems are able to perform their functions in the intended environment without causing or suffering unacceptable frequency interference.

Approved CCPs are the foundation for the capabilities-based assessments, which upon completion initiate either a Doctrine Change Request or an Initial Capabilities Document. The DCR is used for a non-materiel solution, and the ICD is used when a materiel solution is required. Upon completion of the CBA process, the analysis is submitted to Training andDoctrine Command for a Post Independent Analysis to determine whether a DCR, ICD, or both DCR and ICD are implemented. Figure 1 outlines the process a concept takes from strategic assessment to doctrine development.

When the doctrine process is initiated, a field manual is updated or a field manual interim is written to meet the organizational changes that have been developed due to new threats. The FMI provides an expedited delivery of urgently needed doctrine that the proponent has approved for use without placing it through the standard development process. The FMI will continue to evolve to meet the rapidly changing operational environment and will eventually become an approved FM within two years. FMI 6-02.60, Tactics Techniques and Procedures for the Joint Network Node-Network, and FMI 6-02.70, Army Electromagnetic Spectrum Management Operations, will be significantly impacted by the development of these two CCPs.

The Signal Regiment is making every effort to meet the doctrinal needs of our forward-deployed forces. Commanders and forward-deployed forces are encouraged to view and download current approved doctrine on the Reimer Digital Library and Army Knowledge Online Doctrine knowledge areas (see Figure 2).

Footnotes:

[1]*Concepts and Doctrine Branch, now part of the CDID, formerly known as Combat Development Directorate.*

Mr. Breakiron, retired Signal Corps major now employed by Janus Research Group, is working in the Concepts and Doctrine Branch, Capability Development and Integration Directorate. He has been a consultant for numerous Department of Defense and federal agency projects including the development of the Management Information Systems, Decision Theory, and Management Control Systems, and Capstone courses for the Defense Leadership and Management Program. His final active duty assignments were as Associate Professor for Economics, Department of Social Science, at the United States Military Academy and as the director of 5th Signal Command's first Theater Network Operations Center.

MAJ Lopez is a Signal Officer and a graduate of the Combat Developers Course with more than 25 years experience. He has served in a myriad of Signal units to include tactical, strategic, and training. He is currently assigned to Fort Gordon's Concepts, Requirements & Doctrine Division, CDID.

Acronym QuickScan

CBA – capabilities -based assessments
CCP – concept capabilities plans
CDID – Concepts and Doctrine Branch, Capability Development and Integration Directorate
DCR – Doctrine Change Request
FM – frequency modulation
ICD – Initial Capabilities Document

TCM update

Updates from Training and Doctrine Command Capability Manager for networks and services including satellite communications, tactical radio and Warfighter Information Network-Tactical

TCM-SATCOM

TCM-SNE Update (SATCOM)

By LTC Gene E. Griffin and TCM SNE Action Officers

We have a name change! By the time this article is published, we will no longer be TSM SATCOM. Under the Training and Doctrine Command Center of Excellence reorganization, we become TRADOC Capability Manager for Satellite Communications and Network Extension or TCM SNE. Meanwhile, we are heavily engaged in a variety of Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities or DOTMLPF actions to ensure the current and future forces are equipped with the best beyond line-of-sight communications available.

This update will focus on the status of several SATCOM programs important to the modular force, to include AN/TSC-154 Secure Mobile Anti-Jam Reliable Tactical Terminal, Global Broadcast Service, AN/TSC-156 Phoenix, AN/TSC- 85/93DGMF terminals, AN/PSC-5C Shadowfire, Defense Advanced GPS Receiver, and AN/PRQ-7 Combat Survivor Evader Locator.

Intense coordination between our office, Forces Command, Headquarters Department of the Army G-3/CIO-G6/G-8, Army Test and Evaluation Command, Army Materiel Command, ASA(ALT), and Program Executive Office/Program Manager community has ensured that SATCOM systems are delivered in time for modular unit conversions, unit training and pre-deployment readiness exercises, and ultimate deployment in accordance with the Army Forces Generation model.

AN/TSC-154 Secure Mobile Anti-Jam Reliable Tactical Terminal: Provides a protected (Low Probability of Intercept, Low Probability of Detect, Low Probability of Intercept, Anti-Jam) beyond line-of-sight command and control communications capability in threat environments with a medium data rate (up to 1.544 Mbps). This terminal operates on the MILSTAR satellite constellation. The requirement is two per brigade and three at division; however, available funding limits us to an authorization of one per brigade and three per division. The AN/PSQ-17 Extremely High Frequency Communication Planning System is fielded with the Secure Mobile Anti-Jam Reliable Tactical Terminal which allows decentralized control and resource allocation. To date, all active duty units have been fielded SMART-T and Communication Planning System, with the exception of pending changes for modular 1st Armored Division units. Current actions include: fielding SMART-T to Army National Guard units; force design update to add two SMART-T systems for Corps; and system redesign to comply with the Up-Armored Highly Mobile Multi-wheeled Vehicle mandate. The SMART-T will be upgraded beginning in fiscal year 2008 to coincide with the Advanced Extremely High Frequency constellation launch. The upgrade will include improved protection, higher data rates (up to 8.192 Mbps), and an improved communication planning tool (AEHF Mission Planning Element).

Point of contact on this subject is Dean Hokrein; DSN: 780-8156.

Global Broadcast Service: Provides a high data rate (23.5 Mbps) one-way broadcast of data and video down to the battalion command post. The system consists of a primary injection point, a theater injection point, and the AN/TRS-8 Tactical Ground Receive Suite. The previously fielded ATM-based Tactical Ground Receive Suite is being replaced with a lighter, more capable Internet Protocol version. This terminal operates on the Ka-capable UHF Follow On satellites and commercial Ku satellites. The system is still in testing and is not yet approved for full rate

SMART-T

GBS TGRS

production. However, in response to several unit-generated operational needs statements, the system is currently being fielded in limited quantities to deploying units under an urgent materiel release. To date, 120 TGRS have been issued, with a projected 60 more in FY07. Current actions include: detailed planning for a Multi-Service Operational Test and Evaluation (April 07) in preparation for a full rate production decision in FY08; and force design update to increase basis of issue authorizations to meet Modularity requirements.

Point of contact for this subject is: Lynn Epperson; DSN: 780-2352.

AN/TSC-156 Quad-Band Phoenix: Provides quad band (C, X, Ku and Ka) range extension, transport capability with high data rates (Block 1=10 Mbps; Block 2=20 Mbps). This rugged commercial based system is mounted on an M-1113 Enhanced Capability Vehicle (Block 1 & early Block 2) or M-1152 ECV (production Block 2). It is being fielded to the Integrated Theater Signal Battalions based on Major Army Commands initiated Operational Needs Statements. Based on the ITSB doctrine, the Phoenix can provide range extension transport to Joint Task Force Headquarters, Echelons above Corps support, or provide task organized support down to brigades (see previous editions of *Army Communicator* for Phoenix details).

AN/TSC-156 Quad-Band Phoenix

Current actions include: upgrading previously fielded Block 1 systems to Block 2 (Ka capable) standard (AN/TSC-156A); fielding remaining units with production Block 2 systems mounted on M-1152 Enhanced Capability Vehicles (AN/TSC-156B) and reconfiguring the system to comply with the long term up-armored strategy.

Phoenix Block 2 terminals are also being procured for use as the Global Broadcast Service Theater Injection Point Radio Frequency function.

Point of contact for this subject is: Bill Campbell; DSN: 780-7886.

AN/TSC 85D & 93D Ground Mobile Forces SATCOM Terminals: As units convert to modular formations, the Department of the Army directs units to return their existing AN/TSC 85/93s to depot for refurbishment, an upgrade to the D Model, and then cascaded to the Active, Reserve, and National Guard EAC units, to include the ITSBs. A total of 81 AN/TSC 85 and 121 AN/TSC 93 will be upgraded and fielded across the force. To date, more than 50 percent of the total fielding is complete. The fielding is projected to be completed in September 2008. The systems will be upgraded with armor in accordance with the Long Term Armor Strategy.

AN/TSC-85

AN/TSC-85

Point of contact for this subject is: Paul Chernek; DSN: 780-7490.

Defense Advanced GPS Receiver: The Defense Advanced GPS Receiver is the latest handheld military GPS receiver. Selective Availability Anti-Spoofing Module technology allows the DAGR to function much more effectively in an electronic warfare environment than its predecessor, the Precision Lightweight GPS Receiver, and much better than current commercial GPS receivers. The DAGR was designed to not only work effectively during electronic warfare conditions but its user-friendly design also allows it to fit into a standard ammunition pouch and to use standard AA batteries as the primary power source. To date, more than 52,000 DAGRs are fielded with thousands of troops receiving training on the use of the DAGR. Fielding for the next couple of years will see an additional 31,000 DAGRs going to members of all United States armed forces.

Point of contact for this subject is: MAJ Robert Cannaday; DSN: 780-4242.

AN/PSC-5C SHADOWFIRE: The SHADOWFIRE is the upgrade to the previously fielded AN/PSC-5 Spitfire radios. The SHADOWFIRE provides the additional capabilities of single channeled air-to-ground radio system or single-channeled ground to air radio system, HaveQuick I and II, and Maritime operating modes, increased data rates up to 48 kbps, and vastly increased communications

security capabilities to include Over-the-Air Rekey and Over-the-Air Transmit. The upgrade includes an embedded ViaSat Personal Data Controller capability, eliminating the need for a Personal Computer Memory Card International Association card to transmit data. Fielding of the upgrade kits is ongoing, with the objective being all terminals upgraded after funding is received from the FY07 supplemental budget. Currently, approximately 2100 upgrade kits have been purchased to upgrade terminals fielded (approximately 3435 – radios and spares).

To date, almost 100 of the kits have been fielded to units.

Point of contact for this subject is: Cori Braswell: DSN: 780-7934.

AN/PRQ-7 Combat Survivor Evader Locator: The Combat Survivor Evader Locator radio is being fielded to replace the old survivor radios which include the AN/PRC-90 and AN/PRC-112. The radio provides enhanced features to the LOS voice of the old radios. It can do six programmable UHF unencrypted voice frequencies along with the standard four emergency frequencies. It provides data messaging in Ultra High Frequency SATCOM mode and embedded Selective Availability Anti-Spoof Module GPS functions. It also has beacon capabilities that include the new 406 MHz satellite beacon mode. The radio is being fielded to 70 percent of the documented requirements for the Army Aviation and Special Forces units. This provides approximately one radio per aircraft for the Aviation units and 70 percent of the Soldiers in a Special Forces Group. To date approximately 3,552 of the 8,505 funded terminals have been fielded or in the process of being fielded.

CSEL

AN/PSC-5C SHADOWFIRE

Acronym QuickScan

AD – Armored Division
AEHF – Advanced Extremely High Frequency
AJ – Anti-Jam
AMC – Army Materiel Command
AMPE – AEHF Mission Planning Element
ARFORGEN – Army Forces Generation
ASA (ALT) – Assistant Secretary of the Army (Acquisition, Logistics, and Technology)
ATEC – Army Test and Evaluation Command
ATM – Asynchronous Transfer Mode
C2 – Command and Control
COMSEC – communications security
CP – Command Post
CPS – Communication Planning System
CSEL – Combat Survivor Evader Locator
DAGR – Defense Advanced GPS Receiver
DOTMLPF – Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities
EAC – Echelons above Corps
ECV – Enhanced Capability Vehicle
EHF – Extremely High Frequency
EW – electronic warfare
FORSCOM – Forces Command
FY – fiscal year
GBS – Global Broadcast Service
GMF – Ground Mobile Forces
GPS – Global Positioning System
HMMWV – Highly Mobile Multi-wheeled Vehicle
HQDA – Headquarters, Department of the Army
IAW – in accordance with
ITSB – Integrated Theater Signal Battalions
JTF – Joint Task Force
LOS – line-of-sight
LPD – Low Probability of Detect
LPI – Low Probability of Intercept
MACOM – Major Command
ONS – Operational Needs Statements
OTAR – Over-the-Air Rekey
OTAT – Over-the-Air Transmit
PCMCIA – Personal Computer Memory Card International Association
PDC – Personal Data Controller
PEO – Program Executive Office
PIP – primary injection point
PLGR – Precision Lightweight GPS Receiver
PM – Program Manager
POC – point of contact
RF – Radio Frequency
SAAAM – Selective Availability Anti-Spoof Module
SATCOM – satellite communications
SINCGARS – single-channeled ground to air radio system
SMART-T – Secure Mobile Anti-Jam Reliable Tactical Terminal
TCM SNE – TRADOC Capability Manager for Satellite Communicationa and Network Extension
TGRS – Tactical Ground Receive Suite
TIP – theater injection point
TRADOC – Training and Doctrine Command
UFO – UHF Follow On
UHF – Ultra High Frequency
UMR – urgent materiel release

Point of contact for this subject is: Cori Braswell: DSN: 780-7934.

LTC Griffin is currently assigned as the military deputy for TCM-SNE, SATCOM, Fort Gordon, Ga. He is an acquisition corps officer with various assignments and certifications in program management, test and evaluation, and research and development. His operational experience consists of typical command and staff assignments as a combat engineer. Griffin graduated from USMA in 1987 with a B.S. in Mechanical Engineering and received a masters in acquisition management from Florida Institute of Technology in 1996. Updates for this article were prepared by TCM-SNE action officers.

TCM-WIN-T

TCM NS (WIN-T)

By Russell Benoit

TSM WIN-T is now part of the Capabilities Development Integration Directorate organization and our name has changed to the Training and Doctrine Command Capabilities Manager Networks and Services.

As part of the CDID restructuring, TCM NS assumes all program responsibilities after the Initial Capabilities Document is complete (milestone A) for the following: Warfighter Information Network – Tactical; Bridge to Future Network (Joint Network Transport Capability – Spiral and Joint Network Node); Integrated System Control; Army Key Management System, Local Key Management System, Army Communications Engineering System, and Simple Key Loader; Joint Network Management System; Common Management System; LandWarNet Network Transport and Services Mission area; integration of separate networks into one LandWarNet; Tactical Operation Center, Army Battle Command Information Services, and other common servers migration to network provided services; Army implementation of Global Information Grid Enterprise Services; Network Operations Systems; and the integration of all Army, joint, strategic, interagency, multinational, combined, and commercial information systems. TCMs will continue to provide life-cycle-support through the life of the system addressing unit concerns and represent user at Configuration Control Boards and Post Deployment Software Support/Post Production Software Support reviews.

Information provided by Russell Benoit, TCM NS, 706-791-7501. DSN prefix is 780. Email addresses are benoitr@gordon.army.mil

Mr. Benoit is currently an assistant TCM and senior telecommunications specialist for TCM NS. Benoit has been working Network Operations and JNMS since 1997.

Acronym QuickScan

ACES – Army Communications Engineering System
AKMS – Army Key Management System
BFN – Bridge to Future Network
CCB – Configuration Control Boards
CDID – Capabilities Development Integration Directorate
CMS – Common Management System
GIG – Global Information Grid
ICD – Initial Capabilities Document
ISYCON – Integrated System Control
JNCT-S – Joint Network Transport Capability – Spiral
JNMS – Joint Network Management System
JNN – Joint Network Node
LCMS – Local Key Management System
PDSS – Post Deployment Software Support
PPSS – Post Production Software Support
SKL – Simple Key Loader
TCM NS – TRADOC Capabilities Manager Networks and Services
TOC – Tactical Operation Center
TRADOC – Training and Doctrine Command
WIN-T – Warfighter Information Network – Tactical

TCM-JNMS

Update on the Joint Network Management System

By Russell Benoit and Billy Rogers

The Joint Network Management System planning and management functionalities are being separated in the next software release (Version 1.4). The overall system footprint will also be reduced by implementing the software on laptop computers; replacing the transit cased mounted servers. The software is currently in contractor Functional Qualification Testing in Piscataway, N.J. The FQT is scheduled for completion in February 2007. The Army's Test and Evaluation Command will then conduct an independent government assessment of the new software baselines using military communications planners and managers. Upon successful completion of the Government Assessment, the JNMS Product Manager, NetOps-Current Force, will obtain approval from the Milestone Decision Authority to begin fielding in 2nd quarter fiscal year 2008. The joint fielding plan is currently being revised to reflect the changes in which units will be getting which functionality (planning, management or both). The Army fielding plan will be prioritized and approved by HQDA G3. The Army fielding plan has now been validated and approved by Department of the Army, G3.

The Inter-Service Training Review Organization study that was conducted to determine the feasibility of consolidating all Service's resident JNMS training at Fort Gordon was approved in October. Personnel actions to obtain the required instructors from each of the Services have been initiated. Equipment installation is scheduled for May 2007 followed by instructor training in the June/July timeframe. The first iteration of JNMS training is scheduled to begin in 1st quarter FY08.

For further information on JNMS, contact Russell Benoit or Billy Rogers, TCM NS, 706-791-7501/2334, respectively. DSN prefix is 780. Email addresses are benoitr@gordon.army.mil or rogersb@gordon.army.mil.

Mr. Benoit is currently an assistant TCM and senior telecommunications specialist for TCM NS. Benoit has been working Network Operations and JNMS since 1997.

Mr. Rogers is a Senior Systems Analyst with Femme Comp, Inc. and provides TSM NS (formerly TSM WIN-T) with contract support services for the JNMS program. Mr. Rogers has been the primary TRADOC point of contact for the JNMS since 1998. He managed the development of network management programs for the Defense Information Systems Agency prior to his retirement from the Army and also provided contract support services to TSM Network Management before its merger with TSM WIN-T in 2001.

Acronym QuickScan

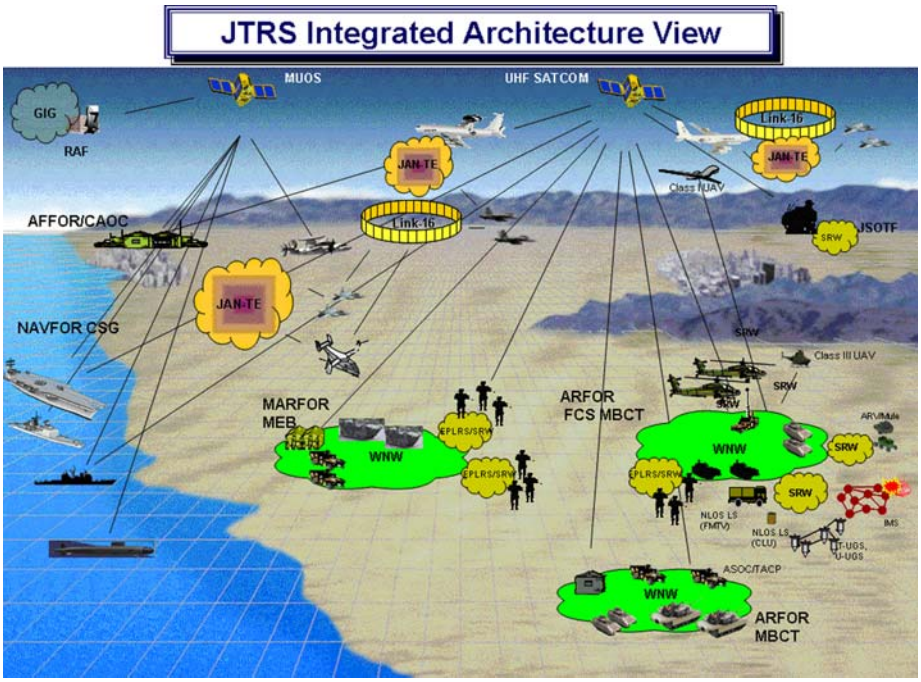
ATEC – Army's Test and Evaluation Command
FQT – Functional Qualification Testing
FY – Fiscal year
GA – government assessment
ITRO – Inter-Service Training Review Organization
JTMS – Joint Network Management System
MDA – Milestone Decision Authority
TSM NS – TRADOC System Manager for Networks and Services

TCM-Tactical Radio

Joint Tactical Radio System Update: Tactical Networking

By COL John K. Dewey

The Joint Tactical Radio System is a transformational communications capability that will bring the "network" to brigade and below, mounted and dismounted, Soldiers. JTRS will connect the warfighter on the ground into the networking capabilities that are delivered through the Global Information Grid.



A Joint Tactical Radio set is a software-defined radio allowing it to be reprogrammed via software to alter its basic functions. The main software in a JTR is the waveform. A waveform is a set of radio and communications functions performed on inputs before transmitted as radio frequency output. In a JTR the waveform is implemented software. The reprogrammable nature of the radio allows selection of the software waveform giving it multiple radio and networking capabilities, including legacy capabilities in one JTR set.

Wireless tactical networking is one of the most critical capabilities a JTRS software-defined radio will provide to the warfighter. The new JTRS networking waveforms enable extension of networking to the battalion, company, and dismounted soldiers. These new networking waveforms cover a wide range of needs in the tactical domain and include the following: Wideband Networking Waveform; Soldier Radio Waveform; Joint Airborne Network – Tactical Edge and Mobile User Objective System. Each of these waveforms fills a particular operational need in the tactical environment, yet each provides a common transport function for Internet Protocol – based traffic.

Figure 1 illustrates how the new JTRS networking waveforms interoperate to extend the network below battalion to the dismounted Soldier.

The Waveforms

WNW supports the ground vehicular environment and provides mobile, backbone transit routing capabilities. WNW's adaptive networking architecture is optimized for network routing performance, network stability, and higher data throughput. SRW is optimized for dismounted applications and small form factors (severe size, weight, and power constraints). SRW forms stub networks (small clusters of terminals with limited transit capability to other SRW networks that rely on WNW for backbone services). SRW extends the network to battery-powered platforms including dismounted soldiers and unmanned systems. The JAN-TE waveform supports the tactical airborne domain of weapons platforms that require very low-latency traffic. The MUOS Common Air Interface waveform provides beyond line-of-sight satellite communications.

The Environment

The employment of IP net-

Capability	*WNW*	*SRW*
Intended Waveform Applications	High capacity backbone network	Battery powered applications – Land Warrior, Sensors, Intelligent Munitions, UAVs, UGVs
Maximum Data Rate	2 Mbps	2 Mbps
Signals in Space / Modes	1) OFDM - Wideband, bandwidth efficient 2) LPI/LPD-Low data rate spread waveform 3) AJ - Wideband anti-jam, less efficient 4) BEAM - Narrowband applications	1) Combat Comms – wideband, bandwidth efficient 2) LPI/LPD spread featureless 3) Electronic Warfare – wideband anti-jam
Special features for SWAP	Waveform designed for vehicular use, no features in support of SWAP	Energy based routing metrics, power management
Algorithm Complexity and Processing Load	USAP/TDMA and Routing - 930 MIPS	Hybrid CSMA/TDMA MAC and Routing - 200 MIPS
Network Size	Up to 1630 nodes	Up to 800 nodes
Range Requirement	10 km ground vehicle to ground vehicle	1 – 5 km dismounted SFF user to dismounted SFF user.

Table 1 Capabilities of WNW and SRW

working at the tactical edge is challenging because most commercial IP networks are static and operate over very high bandwidth transport connections. The opposite is true in JTRS. Network nodes physically and logically move and the bandwidth of connections between nodes is limited. Mobile ad-hoc networking protocols are designed to handle these mobile environments. Each JTRS networking waveform employs a MANET protocol designed for a particular environment. These protocols interact with the IP layers in the radios to enable terminal mobility and mask the network dynamics from the host applications to facilitate end-to-end connectivity.

Wideband Networking Waveform

The JTRS WNW provides a wideband interoperable waveform supporting key mobile backbone subscribers and joint service communication needs. The Army's operational objective for WNW is threefold. The primary objective is to perform backbone routing and retransmission, to include range extension for the Soldier Radio Waveform nets, and the legacy radio nets (SINCGARS, EPLRS). Secondly, WNW will serve as a GIG access point (Gateway) for all IP-capable, tactical, radio nets. Third, the JTRS WNW will augment the Joint Network Node-Network and Warfighters Information Network – Tactical Tactical Operation Centers to TOC communication requirements. The Army is targeting WNW for vehicular configurations (HMMWV, Abrams, Bradley, etc.,), Class IV Unmanned Aerial Vehicles, and rotary-wing aircraft such as the Apache, Chinook, and Blackhawk. WNW will be used to provide a connected backbone between the ground and airborne domains.

WNW Features / Technical Characteristics

WNW is targeted to provide a voice capability as well as a robust IP data delivery capability (2-Mbps minimum / 5 Mbps desired). WNW uses common IP-based networking concepts, as well as, new mobile ad-hoc networking technology to integrate voice, video, and data communications. WNW occupies the following bands of the frequency spectrum: 225-450 MHz, 1350-1390 MHz, and 1755-1850 MHz. In addition it has the following minimum transmission ranges: Air-to-Air (370 km), Air-to-Ground/Surface (370 km), Ground-to-Ground (10 km), Ship-to-Ship (28 km), and Ship-to-Shore (at least 28 km).

A heterogeneous networking core is the main component of the waveform. It provides a common set of standardized protocol elements that integrate the wireless network into an interoperable, connected, IP network. The HETNET core provides IP support, internet routing (unicast - point to point, multicast - point to multipoint), Quality of Service, directory services (Domain Name Services, Dynamic Host Configuration Protocol), network management, communication security (High Assurance Internet Protocol Encryption, Public Key Infrastructure), and information assurance. The HETNET core uses industry standard routing protocols (non-proprietary) such as Open Shortest Path First and Border Gateway Protocol that are interoperable with our current force. The HETNET core provides a black core routing capability. The black core routing permits encrypted IP packets from one Radio Frequency subnet to be directly routed to another RF subnet without an intermediate encryption and decryption process. The transit networking capability of WNW uses black core routing between its RF subnets to form a common heterogeneous network. The black core network can be extended to other external networks or the encrypted packets can be unencrypted via HAIPE and passed to red-side networks that carry user traffic. User traffic at different security levels will be cryptographically separated by the HAIPE and the radio platform's security architecture. The JAN-TE and SRW networks are intended to serve as stub networks for their end-user applications. As stub networks, these networks will have minimal inherent routing capability and will connect to WNW transit networks via

external gateway devices.

The Mobile Intranet layer of WNW performs the mobile ad-hoc networking function by maintaining a multi-level link state routing topology of the network. The MI layer manages network resources to ensure the waveform maintains a connected topology that can be quickly sent to the routing table for IP delivery. In addition the MI layer controls data flow to maintain quality of service.

The Mobile Data Link layer provides Media Access Control and logical link control services. This layer is where data time slotting is allocated and controlled by the waveform. The MDL uses a hybrid Time Division Multiple Access / Frequency Domain Multiple Access technique called Orthogonal Domain Multiple Access in combination with a protocol named Unifying Slot Allocation Protocol. These features allow the waveform to fully distribute the negotiation of time slots and to adapt the data rate to channel conditions.

The Signals In Space layer of the WNW has four different signals in space. They are Orthogonal Frequency Domain Multiple Access (OFDM - wideband), Anti-jam (wideband), BEAM (narrowband), and LPI/LPD (Low Probability of Intercept/Detection - Narrowband). The SIS layer covers a variety of bandwidths and data rates. Each signal in space is a unique signaling method. However, a single transmission security design supports all signals in space.

Soldier Radio Waveform

The Soldier Radio Waveform is a JTRS software-defined waveform that will operate on the HandHeld, Man-Pack and Small Form Fit JTR sets to provide a networked battlefield communications capability for disadvantaged users engaged in land combat operations. SRW will provide network functions and communications services to support delivery of classified and unclassified voice, video, and data communications to the immediate battlefield. SRW is targeted to operate on the following types of platforms: vehicles (manned and unmanned), rotary wing aircraft, dismounted Soldiers, munitions, sensors, and Unmanned Aerial Vehicles. Functional software applications will use SRW-enabled JTR sets for information transport over IP-capable networks. SRW will be interoperable with WNW and use this higher-throughput, networking waveform for backbone routing.

This connectivity will enable information exchanges through the Global Information Grid to the soldier and provide entirely new capabilities for battlefield communications and information sharing. SRW has a push-to-talk Combat Net Radio capability as well as a point-to-point calling capability.

These services are provided through the global and local CNR applications running on the red side of the waveform stack. SRW will provide a throughput data rate from 50 Kbps up to 2 Mbps depending on the operational mode of the waveform.

In addition to SRW's new voice and data capability, it will also be backward compatible and interoperable with EPLRS, SINCGARS, HF, and UHF SATCOM legacy radio nets through the route and retransmission functions that reside on the JTR set.

SRW Features / Technical Characteristics

SRW supports frequency channels with discrete bandwidths for Combat Communications, Electronic Warfare, and LPI / LPD modes of operation. It occupies frequency bands 225-420 MHz and 1350-2500 MHz.

Transmission ranges of the SRW waveform are dependant upon the JTR form factor and the operational mode of the waveform. The MP variant has a Line-of-Sight range of up to 10 Km while the HH JTR transmission range is five Km. The SFF variants (B, C, and I), which are used in the Ground Soldier System, have a minimum transmission requirement of five Km. SRW operating on the one channel SFF-A for Intelligent Munitions Systems and Unattended Ground Sensors has a minimum requirement of five Km, while the two channel SFF-H has a one Km requirement.

SRW has three operational modes. They are CC, EW, and LPI / LPD. SRW communication modes are configurable with respect to operating frequency, bandwidth, modulation, coding, and transmit power to support spectrum management policies and worldwide regulations for over-the-air operation.

The SRW waveform parameters will automatically adapt to traffic loading, propagation, interference, and electronic warfare threat conditions. CC mode is the primary mode of operation at startup and is used to support Soldier System, Non Line-of-Sight Launch System, and UAV / UGV domains.

This mode is primarily intended to provide networked and point-to-point communications between the SRW embedded systems platforms. SRW will dynamically adapt the links based on channel propagation conditions through mechanisms such as adaptive data rates, and Forward Error Correction.

In this mode of operation, SRW will perform network control handshaking / signaling to support network join functions. Point-to-point and point-to-relay-to-point connections will receive between one Mbps and two Mbps throughput in the CC mode. The EW mode is the normal start up mode for the UGS and IMS domains. This mode will provide an additional 10 dB signal-to-jammer margin over the CC mode, while still providing a network throughput of 100 to 300 Kbps for its nodes.

The SRW Featureless LPI / LPD operating mode will support covert operations using LPI / LPD techniques and has the capability to be networked with a minimum of 10 nodes per subset. Table 1 displays the key capabilities of the WNW and SRW waveforms.

Multiple Waveforms – Network of

Networks

Each JTRS product is designed with a basic networking architecture to enable it to support specific tactical operations. The combination of MANET technologies, black core IP routing, HAIPE and multiple levels of red IP networks, and network management are the basic components of the JTRS networking architecture. This networking architecture will use each of the new networking waveforms in concert with the legacy radio waveforms to create a dynamic, interoperable network-of-networks. The JTRS network is a truly transformational communications capability for the warfighter.

COL Dewey became TRADOC Capability Manager for Tactical Radios at Fort Gordon, Ga., as of Oct. 20, 2006.

Acronym QuickScan

BGP – Border Gateway Protocol
CAI – Common Air Interface
CC – Combat Communications
CNR – Combat Net Radio
DHCP – Dynamic Host Configuration Protocol
DNS – Domain Name Services
EPLRS – Enhanced Position Location and Reporting System
EW – Electronic Warfare
FEC – Forward Error Correction
FDMA – Frequency Domain Multiple Access
GIG – Global Information Grid
GSS – Ground Soldier System
HAIPE – High Assurance Internet Protocol Encryption
HETNET – heterogeneous networking
HH – Hand Held
IP – Internet Protocol
JAN-TE – Joint Airborne Network – Tactical Edge
JNN-N – Joint Network Node-Network
JTR – Joint Tactical Radio
JTRS – Joint Tactical Radio System
LLC – logical link control
LOS – Line-Of-Sight
LPI – Low Probability of Intercept
LPD – Low Probability of Detection
IMS – Intelligent Munitions Systems
MAC – Media Access Control
MANET – Mobile ad-hoc networking
MDL – Mobile Data Link
MI — Mobile Intranet
MP – Man-Pack
MUOS – Mobile User Objective System
NLOS-LS Non Line-Of-Sight Launch
ODMA – Orthogonal Domain Multiple Access
OFDM – Orthogonal Frequency Domain Multiple Access
OSPF – Open Shortest Path First
PKI – Public Key Infrastructure
QoS – Quality of Service
RF – radio frequency
SFF – Small Form Fit
SINCGARS – Single-Channeled Ground-to-Air Radio Systems
SIS – Signals In Space
SRW – Soldier Radio Waveform
SS – Soldier System
SAP – severe size, weight, and power
TDMA – Time Division Multiple Access
TOC – Tactical Operation Centers
UAV – Unmanned Aerial Vehicles
UGS – Unattended Ground Sensors
UHF SATCOM – Ultra High Frequency SATCOM
USAP – Unifying Slot Allocation Protocol
WIN-T – Warfighters Information Network – Tactical
WNW – Wideband Networking Waveform

Training update

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

Knowledge Management Efforts Expanded at LandWarNet eUniversity

The Signal School has partnered with the Battle Command Knowledge System out of Fort Leavenworth, to foster collaboration among Soldiers and units in order to share expertise and experience. Battle Command Knowledge System provides training on Knowledge Management to select personnel in each unit on their role and responsibilities as members of their Unit's Knowledge Management Cell. We are also expanding our outreach to unit trainers in other areas through our Extension Campus program to provide customized training content throughout the Army on demand.

LandWarNet eUniversity Signal Extension Campus provides an on-line training resource to commanders.

The LandWarNet eUniversity Signal Extension Campus has grown significantly and now enables commanders to tailor and manage their unit training using individual virtual extension campuses. The virtual extension campuses are created and administered by Lifelong Learning Center personnel at Fort Gordon and contain training products and courses tailored to each unit's training requirements; providing sustainment training on Signal military occupational specialties, information technology and communications equipment. This on-line training is MOS based classroom training material developed by Fort Gordon training developers and approved by the Fort Gordon Directorate of Training.

The virtual extension campus sites also provide quick access to the latest Interactive Courseware and Simulator products available for download via LandWarNet eUniversity. In addition to the training provided by Fort Gordon, unit training personnel can load unit specific training created by their unit onto virtual extension campuses. Incorporated into every virtual extension campus are tools for leaders to manage and monitor the progress of the unit's training down to the individual Soldier level. Unit Soldiers can access their virtual extension campus training from any computer that has access to the internet.

Examples of training that can be immediately loaded on your individual virtual extension campus site include Information Technology/Networking, Promina, Force XXI Battle Command, Brigade-and-Below, Network Management, ISYSCON, Joint Network Node, Tactical Radios, Multiplexing, Multichannel Systems, and Satellite Communications Systems. To request the creation of specific training for your unit use the virtual extension campuses.

Virtual Extension Campuses can be established for any Active, Reserve, or National Guard Unit regardless of size. Recent additions to the LWN-eU Extension Campus include: 335th Signal Command (Theater), 359th Signal Brigade, 93rd Signal Brigade, and 392nd Signal Battalion. Other unit relationships have been established to provide units deployed in Iraq and Kuwait with training via LandWarNet eUniversity Signal Extension Campus.

For more information on, or to request a virtual extension campus, contact Floyd Orial, Lifelong Learning Center LWN-eU Signal Extension Campus Coordinator, (contractor - General Dynamics Information Technology), floyd.orial@us.army.mil, DSN 780-2571 or commercial (706) 791-2571.

Support training and education during all phases of the Army Force Generation.

The support of education and training is a prime objective of the University of Information Technology Division. Evaluation of Interactive Courseware and Virtual/PC-Based Simulators is a pivotal process in making this objective a reality. The process of evaluation is vital in getting distributed learning products to the force. This becomes more critical as greater reliance is placed on distributed learning products to train the force and enhance the skillsets of Soldiers and civilians. The courseware evaluation process is the cornerstone of quality training.

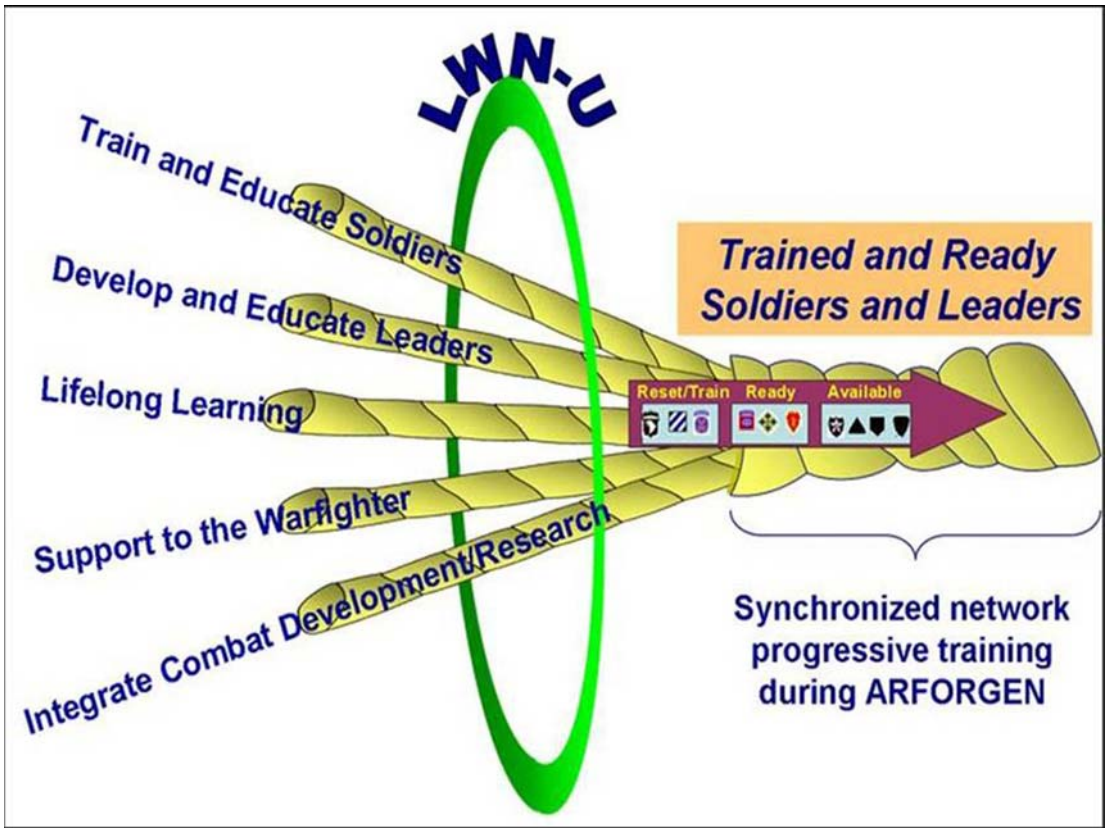
UIT provides oversight of the validation phase of the evaluation process for ICW and Virtual/PC-Based Simulators released to the force. Validation was completed for

the following ICW and Simulators fielded in FY06:

- 25S10 Satellite Systems Operator/Maintainer Course ICW (Target audience: 25S10)
- Signal Captains Career Course Phase 2 ICW (Target audience: Signal Captains)

Validation is underway for the following ICW and Simulators scheduled for FY07 fielding:

- SCCC Phase 4 ICW (Target audience: Signal Captains)
- LAN/WAN Simulator (Target audience: 25B30 TATS-C)
- SATCOM System Operator-Maintainer Common Core (SCP) ICW (Target audience: 25S10)
- Phoenix (AN/TSC-156) Simulator (TGT Audience: 25S10)
- SATCOM Hub (AN/TSC-169) Simulator (Target audience: 25S10)
- 85/93 (AN/TSC-85/93) Simulator (TGT Audience: 25S10)



LWN-U training assists Soldiers and leaders to be ready through syncronized progressive training.

Validation will occur for the following Simulators scheduled for FY08 fielding:

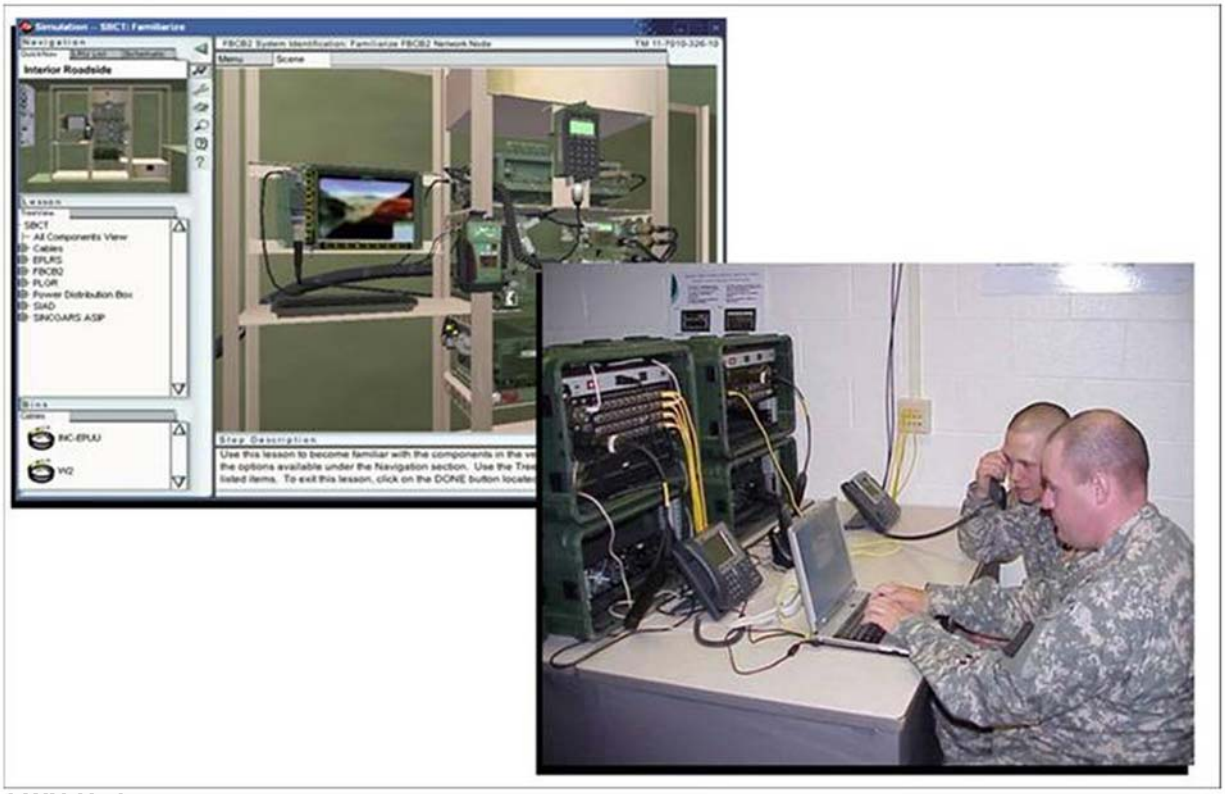
S6 Simulator (Target audience: 25A, FA53, 250N, 254A, 25U50)
JNN-N Simulator Upgrades (From Spirals 1-4, To Spirals 5-7 and Spiral 8)

Validation will occur for the Nodal Network Simulator (Target audience: All JNN-N officers, warrant officers, NCOs and Soldiers) in FY09.

During the validation process, subject matter experts, instructors, training developers, and Active and/or Reserve Component Soldiers who represent members of the "target audience" for courseware work together to ensure a "Fully Functional" product is delivered to Soldiers in a resident school or field environment prior to final delivery of the product. In short, the validation phase checks the products for usability, efficiency, effectiveness, doctrinal and technical correctness, and compliance with current Army/TRADOC policy and TRADOC Technical Media Standards. This is akin to the "Final Exam" for courseware in the final phases of development.

In addition to the aforementioned ICW and Simulators scheduled for validation and fielding in FY 07-09, the following 11 Simulators are currently available for download from LandWarNet eUniversity:

- JNN/BDE Transit Cases (AN/TSC-59, Spiral 1) Simulator (Target audience: 25N10)
- BNCPN (OM/87-T, Spiral 1) Simulator (Target audience: 25B10)
- KU BAND Trailer (AN/TSC-167, Spiral 1) Simulator (Target audience: 25Q10)
- Digital Tactical Operations (DTOC) Simulator (Target audience: 25B10)
- Tactical Internet Management System (TIMS) Simulator (TGT Audience: 25B10)
- HCLOS (AN/GRC-245, V3) Simulator (Target audience: 25Q10)
- TRC-173 (AN/TRC-173B) Simulator (Target audience: 25P10, 25Q10)
- FBCB2 (AN/UYK-128) Simulator (Target audience: 25U10)
- GSC-52 (An/GSC-52A) Simulator (Target audience: 25S10)
- BSN (AN/TYC-25) Simula-



LWN-U classroom

tor (Target audience: 25F10, 25Q10, 25P10)

For resident training and distributed learning these Signal Center Simulators are used in lieu of actual equipment, for concurrent training, remedial training, and practical exercises. As a non-resident training tool these Signal Center Simulators support Sergeant's Time Training, Soldier sustainment training and professional development.

For more information on the status of ICW and Simulator training products, contact Bennita Freeman, chief, Distance Education Branch at DSN 780-2303 or MAJ Chuck Dugle, chief, Simulations Branch at DSN 780-8681 or commercial at (706) 791-8681.

Acronym QuickScan

BCKS – Battle Command Knowledge System
FBCB2 – Force XXI Battle Command, Brigade-and-Below
FY – fiscal year
ICW – Interactive Courseware
LWN-eU – LandWarNet eUniversity
MOS – military occupational specialties
SCCC – Signal Captains Career Course
TRADOC – Training and Doctrine Command
UIT – University of Information Technology

Brigade Network Operations and Security Cell *– where does it belong?*

By CPT Reggie K. Evans

Where to locate the Network Operations and Security Cell in the Brigade Combat Team creates a discussion among Signaleers. Prior to modularity, the Network Systems Control Section operated under the supervision of the Signal Battalion.

Under the modular Modified Table of Organization and Equipment, the Brigade Network Operations Cell assumes all network responsibilities.

After first-hand experience with Bravo Company, 1st Special Troops Battalion, 1BCT, 4th Infantry Division (M) (Signal Company), the recommendation is that the Network Operations and Security Cell integrates with the brigade S6 section, but the company commander maintains operational control. The following article points support this recommendation.

Command influence

Locating the Network Operations and Security Cell at the company level, allows the Signal Company to easily integrate and solve network issues with the full weight of the company. This technique, used with B/1STB, 1BCT, 4ID(M) during OIF 05-07, benefited from heavy involvement from the command team. This relationship allowed the commander to easily solve maintenance and personnel issues at the lowest level before they affected the brigade's network. For instance, the company executed seamless transition for shift changing, generator maintenance, and tasking management, all of which require command influence or supervision.

The S6 should not concern himself with coordination for generator mechanics to conduct services or discussion of troop-to-task issues with the Brigade Special Troops Battalion S3. Sustain the NETOPS and Security Cell under the command of the company commander; thus, empowering the commander with direct influence on day to day execution of network operations.

Integration of S6 Operations and Signal Company Network Operations

The S6 Operations and the Signal Company Network Operations must be no more than 150 meters apart; however, the two entities must still operate independently.

This brigade has had success with co-locating these two operations cells in previous training events. During the tactical training phase at the NTC, the Network Operations Cell occupied a separate compartment in the brigade's TOC. Throughout the exercise, the brigade S6 readily maintained situational awareness on the network status.

While deployed in Iraq, the brigade allocated physical space to an S6/Network Operations Center located near the Brigade Tactical Operations Center, approximately 100 meters away. This facilitated communications and coordination, greatly enhancing the C4I capabilities of the brigade. Continue to operate the brigade S6 operations and Signal Company Network Operations physically as close as possible.

The brigade S3 operations section allocates the physical space and must acknowledge that integrating S6 operations and the Signal Company Network Operations is vital to the Tactical Operations Center support team.

Network Situational Awareness

A closed NETOPS structure supervised solely by the brigade S6 does not facilitate open and free-flowing communication. Control by the company enhances situational awareness among all key personnel. For instance, platoon leaders act as the liaison between the users and JNNs, keeping users informed about the network status, scheduled outages, and network upgrades.

The NETOPS corresponds directly with the JNN operators and platoon leaders for all information requirements and updated statuses on maintenance issues. The NETOPS Technician routes information and reporting requirements to the division NETOPS, the brigade S6, and the commander, thus ensuring continuous information flow across the network. Additionally, the NETOPS issues telecommunications service orders to the platoon leaders, through the company chain of command, with the brigade S6's guidance and input, with productive results. Sustain the NETOPS and Security Cell under the Signal Company to ensure communications flow across the mesh through total involvement of key personnel.

Signal Company Maintenance

The brigade S6 lacks the assets necessary to support signal maintenance. Maintenance is conducted at the company level or higher; therefore, is a function of the company commander to ensure maintenance is conducted to standard. Through coordination with the Brigade Special Troops Battalion staff and the division's Communications and Electronics Shop, the Signal Company maintains the network. The NETOPS commands and controls

the network. The company maintains the network and reports to the brigade S6.

Sustain network maintenance as a function of the company commander. Ensure the Signal Company contains organic communications and electronic maintenance support personnel.

The command influence required to operate the brigade's NETOPS and Security Cell can only be fulfilled by the Signal company commander. The commander and brigade S6 both share an inherent responsibility to integrate company operations and S6 operations. Under the control of the Signal Company, operators, platoon leaders, the S6, and division NETOPS maintain situational awareness on the brigade's network status. The Brigade Network Operations and Security Cell should remain under the command of the Signal company in order to maximize the efficiency of all assets engaged in the network.

CPT Evans is the commander of B Company, 1st Special Troops Battalion, 1st Brigade Combat Team, 4th Infantry Division (Mechanized). He and his unit are currently stationed at Camp Taji, Iraq, and serve with Multi-National Division Baghdad in support of Operation Iraqi Freedom 05-07.

Acronym QuickScan

BCT – Brigade Combat Team
C4I – Command, Control, Communications, Computers
JNN – Joint Network Node
NETOPS – Network Operations

New quasi LOS system provides

flexible solution to modular 3IBCT/25ID network

By CW2 Billy F. Schultze and SGT Ashley Stalvey

Operation Iraqi Freedom presents the challenge of providing access to secure voice and large amounts of data to multi-training teams, patrol bases, and forward operating bases across the 3rd Infantry Brigade Combat Team's vast area of operation. One solution 3IBCT is employing is the Orthogon Systems: OS Spectra. This quasi line-of-sight system is used by itself or integrated into the command post network, as part of the Joint Network Transport Capabilities System, to allow commanders and MiTT leaders faster access to collaboration tools like File Transfer Protocol servers; real-time intelligence like Unmanned Aerial Vehicle feeds; and COPs like Maneuver Control System.

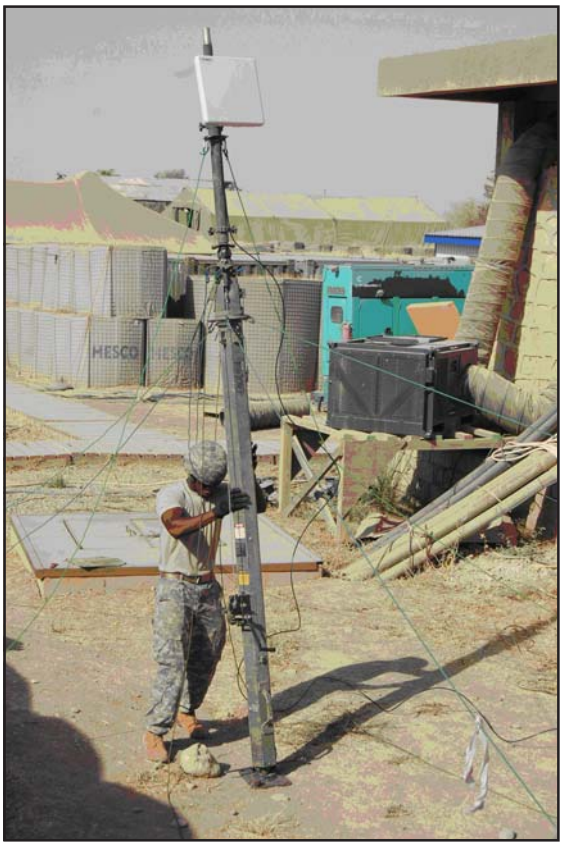
Currently 3IBCT has been fielded with the JNTCS and even though the JNTCS is proving itself to be a valuable C4I asset, it has limitations. The primary limitation is the amount of CPNs 3IBCT was fielded to support their operations. They simply do not have enough CPNs to maintain connectivity with the FOBs and also support the growing number of PBs and MiTTs in their AO. Another limitation is the growing need for faster access to larger amounts of data that is surpassing JNTC's bandwidth capabilities. These limitations have the 3IBCT S6 aggressively pursuing a flexible solution.

The solution came in the form of the Orthogon Systems: OS Spectra. These light weight and easily deployable terminals increased the network capabilities by providing secure voice and data connectivity to 3IBCT MiTTs and PBs; and alternate and redundant connectivity to the CPNs at the FOBs. After some optimization by the 3IBCT S6 and network integration by General Dynamics, the OS Spectra has been the flexible network solution for the 3IBCT AO.

The OS Spectra was procured by the 101st Infantry Division and transported to their MiTTs, PBs, and FOBs but was not setup or integrated into their network. It wasn't until 3IBCT, 25th ID assumed control of the 101st ID AO, that 3IBCT realized it needed to provide faster data and redundant connectivity to their MiTTs, PBs, and FOBs. In order to do this 3IBCT S6 ran a trial setup of the OS Spectra at 3IBCT S6 NOSC where it was configured, tested, and optimized, then deployed with an installation/training team to 3IBCT MiTTs, PBs, and FOBs where the OS Spectras have provided that data connectivity solution 3IBCT needed.

What makes the OS Spectra a flexible tool is its versatile configurations. The Antennae Section consists of an outdoor unit, mast, and powered indoor unit. The OS Spectra local area network section can be configured to meet the unique demands of the network. In the 3IBCT MiTT and PB configuration, where there is no CPN, the LAN section consists of a KG175 TACLANE, which tunnels Secure Internet Protocol Routing through Non-Secure IP Routing, and to two routers and two switches which control and distribute connectivity throughout the MiTT or PB. In the FOB configuration, where there is a CPN, the KG-175 TACLANE encrypts the signal coming from and to the distant end PIDU/ODU and sends it to the CPN where routing and signal distribution occur for the JNTCS and/or OS Spectra.

Compared to other network transport alternatives, the OS Spectra provides greater deployability. Depending upon how far you are from the distant end depends on how accurate your LOS shot must be. In distances under 100m the ODUs can be totally



(Left) SGT Karl Vinson, C BSTB/3IBCT/25ID, hoist an antenna mast with an OS Spectra: ODU mounted on it. SGT Daniel Thompson

obscured from each other and still provide connectivity. In distances over 100m to 200km (maximum range) your LOS shot must be more accurate. Once ODUs are aligned it takes 15 minutes for ODUs/PIDUs to exchange MAC addresses and for i_DFS to begin. i_DFS scans the 5.8Ghz spectrum to find the channel and co-channel with the lowest level interference and uses those channels to transmit. Control of i_DFS through Spectrum Management as well as installation and diagnostic software tools are built into the PIDU/ODU and can be accessed in HTML format through web browsing software programs like Internet Explorer.

The OS Spectra is fully scalable and modular frequency quasi LOS terminal approved for broadband transmission at the 5.8Ghz license exempt band. It has been tested and currently transmits in the 3IBCT AO at an Aggregate Data Rate4 of 150.1 Mbit/s. These data rates can be controlled by the system administrator through remote access using Simple Network Management Protocol /SNMP. With the KG-175 Tactical Local Area Network Encryptor /TACLANE, the OS Spectra is capable of operating at SIPR, RIPR, and NIPR or any combination of the three classification levels or all three classification levels simultaneously.

The OS Spectra has some limitations. The main limitations come from terrain. Since the system is LOS based, depending on distance, the more mountainous the terrain the harder to achieve an LOS shot. This is not the case for the 3IBCT AO that is predominately flat and also lacks abundant foliage to hinder connectivity. Another limitation is tying into the WAN backbone. Currently all OS Spectra in 3IBCT are integrated into the JNN for WAN backbone connectivity. A final limitation is the point-to-point configuration 3IBCT is using but this can be remedied with the employment of an OS MUX that will allow one ODU at the JNN to be used as a hub for other OS Spectra spokes.

In conclusion, with the ever growing demand for access to secure voice and data in the form of collaboration tools, real-time intelligence, and the COP; as well as a need to share this large amount of data with PBs, MiTTs, FOBs, and other specialized units; 3IBCT S6 and General Dynamics have employed the use of improved LOS technology to the unique problems of their AO. The OS Spectra had proven to be a solution as either a stand alone system allowing connectivity into the network or a redundant secondary link to supplement the JNTC. 3IBCT has plans to integrate more OS Spectra links into its network as more MiTTs and PBs open up to increase the "Bronco's Hoof print."

CW2 Schultze and SGT Stalvey are currently assigned to 3IBCT/25ID where they work in the S6 Network Operations Support Center based out of FOB Warrior and are part of the OS Spectra Installation Team. Schultze was previously assigned to the 2ID-G6 where he served as a Signal systems support technician. Stalvey was previously assigned to 1IBCT/82ABN where he served as a Signal systems support specialist.

Acronym QuickScan

3IBCT – 3rd Infantry Brigade Combat Team
AO – Area of Operation
C4I – command, control, communications, computers, and intelligence
COP – Common Operation Pictures
CPN – Command Post Network
FOB – Forward Operating Base
FTP – File Transfer Protocol
HTML – Hyper Text Markup Language
ID – Infantry Division
i_DFS – intelligent_Dynamic Frequency Selection
IP – Internet Protocol
JNN – Joint Node Network
JNTCS – Joint Network Transport Capabilities System
LAN – Local Area Network
LOS – Line Of Sight
MAC – Media Access Control
MCS – Maneuver Control System
MiTT – Multi-Training Team
MUX – multiplexer
NIPR – Non-Secure IP Routing
NOSC – Network Operations Support Center
ODU – Outdoor Unit
OIF – Operation Iraqi Freedom
PB – Patrol Base
PIDU – Powered Indoor Unit
RIPR – Releasable IP Routing
SIPR – Secure IP Routing
SNMP – Simple Network Management Protocol
TACLANE – Tactical Local Area Network Encryptor
UAV – Unmanned Aerial Vehicle
WAN – Wide Area Network

Circuit check

News and trends of interest to the Signal Regiment

Army Reserve activates new 4th Joint Communications Squadron

By LTC Richard DuBreuil

The Joint Communications Support Element in conjunction with United States Army Reserve Command recently activated the 4th Joint Communications Squadron at MacDill Air Force Base in Tampa, Fla.

MG Steve Read, commander of United States Army Reserve Readiness Command and COL Thomas G. Hopkins, commander of JCSE hosted the activation and assumption of command ceremony. USARRC CSM Posey Grier and 4th JCS CSM Robert Sims uncased the organization's colors as LTC Rich DuBreuil took the reins as 4th JCS commander.

This one-of-a-kind Army Reserve unit will be fully integrated into current deployment operations as part of the Joint Communications Support Element, which is composed of Army, Marine Corps, Navy, and Air Force servicemembers to include two Air National Guard units. Currently, JCSE has three active-duty communication squadrons, a headquarters squadron, one communications support detachment and two Air National Guard units.

The 4th JCS is also an airborne unit with a mission of providing Joint Task Force and Joint Special Operations Task Force C4 support for America's premier warfighting commands and the Joint Staff. The squadron is comprised of three troop units and one Headquarters Support Section.

The 1st Troop, 4th Squadron, commanded by CPT Maritza Garrigapadilla, also activated on Oct. 15, 2006. The 4th JCS will activate the 2nd and 3rd Troop units in September 2007 and 2008. The 4th Squadron was created as part of JCSE's transformation to expand its expertise and capabilities in the realm of state-of-the-art deployable communications throughout the Department of Defense.

(Above) COL Thomas Hopkins, JCSE commander, hands the 4th JCS guidon to LTC Richard DuBreuil, incoming 4th JCS commander, in assumption of command of the newly formed Army Reserve Element Squadron."

(Left) Troops of the newly formed 4th JCS don maroon berets, signifying their presence as an airborne unit.

The formation of the a 4th Squadron is both timely and prudent. It is timely from the standpoint of the Army's transformation efforts and the Army Reserve's direction toward building a joint expeditionary force and a "train-mobilize-deploy" philosophy.

It is also prudent in meeting the joint communications needs of the combatant commanders. The squadron is accepting applications for interested Soldiers, non-commissioned officers, and officers. For more information on the 4th Joint Communications Squadron, please contact Michael Papol, unit administrator, at 813-828-1697.

LTC DuBreuil is commander, USAR Element Joint Communications Support Element MacDill Air Force Base, Fla.

311th Reserve/Active Unit brings Signal expertise

311th Signal Command News Release

FORT SHAFTER, Hawaii – When a new combined active and reserve-component Signal unit

planted its flag in the sand Sept. 15, 2006, Hawaii got more than just a new Army patch.

The 311th Signal Command (Theater) is transforming into an operational Reserve unit, a combination of active duty Soldiers, Army Reserve Soldiers and civilians designed to become an integral part of the U.S. Army Pacific's round-the-clock, 365-day mission.

"We are here to enhance the USARPAC's ability to provide reliable networked communications to warfighters in the Pacific theater," said MG Donna L. Dacier, commander of the 311th.

The 311th's arrival marks another step in the transformation of USARPAC to a 21st century operational force. Since 1995, the 311th has been a Ready Reserve Theater Signal Command with the mission to deploy and provide command and control to signal units operating in a theater. As the 311th becomes an operational unit, USARPAC will be able to count on its support year-round.

The unit will eventually include almost 400 Soldiers and civilians. It is commanded by a Reserve major general; a brigadier general serves as deputy. While supporting USARPAC in Hawaii, the 311th will retain its mission to support contingency operations in Korea. A detachment of Reserve Soldiers will remain at Fort Meade, Md.

The multi-component configuration allows USARPAC to take advantage of the Reserve Soldiers' expertise in their civilian positions. Many work in the computer or communications industries.

For more information, contact LTC Louis Leto, 808-438-2546 or 571-749-8787 or email at louis.leto@us.army.mil.

422ND DESIGNATED ITSB IN ARMY WEST OF MISSISSIPPI

By CPT Brad Martino

The culmination of a year-long equipment transition within the Nevada Army National Guard's 422nd Signal Battalion was marked with a ceremony in August officially designating the organization as an Integrated Theatre Signal Battalion.

In August Army National Guard's 422nd Signal Battalion was designated as an Integrated Theatre Signal Battalion in ceremony.

The 422nd is now the only ITSB in the Army National Guard and the only ITSB in the Army west of the Mississippi. The primary mission of an ITSB is to provide battlefield communications including voice, data, and video to various operations centers, camps, and units.

The ceremony also marked a significant reorganization of the battalion. The main body of the battalion became 422nd Signal Battalion, Charlie Company. At the same time, the 422nd folded the flags of two of its subordinate companies, the 321st Signal Company and the 440th Cable and Wire Company, and those companies dissolved into the Headquarters and Headquarters Detachment and Charlie Company. The 422nd will remain headquartered in Reno, Nev., and will work in conjunction with its Bravo Company in Alabama and Alpha Company in Arizona.

"These changes move us onto the front lines of the new, net-centric battlefield," said battalion commander LTC Pete Menicucci. "We are the military equivalent to AT&T working on battlefield."

In the previous 422nd configuration, the main communication pipeline was received through a troposcattering antenna. Dependent on both line-of-sight and atmospheric bouncing, this equipment would transfer up to 4.6Mbps of service. Troposcatter radios will remain a part of the ITSB in the future, but unless upgrades take place, this means of communication will be confined to short haul communications in low-traffic areas.

The new pack mule of the signal battalion is the satellite receiving units. These units handle 1-4 separate streams of data with bandwidth up to 8Mbps, enough to service three major command points, six medium command points and seven small command points (15 total).

This is good news for the ground forces as new services such as Internet Protocol telephones, networked-databases and video teleconferences require higher bandwidths than previously provided.

Another core-equipment piece is the data package. Comprised of a router, a promina multiplexor, an intrusion-detection system and some switches, the data package handles the digital traffic sent and received

through the satellite. A separate data package exists for both the Secure and Non-secure Internet Protocol Router Nets (commonly known as the NIPR and SIPR nets).

The data packages act as a field Network Operations Center. Any IP-based traffic can be routed through the Satellite uplinks and to any location in the world. Recent experiments headed by 1st LT Dave Waller show that IP telephones can be attached to the call manager hanging off of the data package. The IP phones can be configured to act as an office extension and allows a Soldier to literally move his phone from the desk in garrison to the middle of the desert.

The 422nd Signal Battalion has not always had state-of-the-art equipment.

During the dawn of the digital age in 1981, the Dept. of the Army directed organization of the 321st Messenger Company. Battlefield commanders, hesitant to trust the new electronic messaging systems, relied on hand-delivered messages. Training exercises, such as "Golden Bear" and "Corps Defender", vigorously sought the services of 321st Signal Company.

Advances in technology resulted in a more dependable electronic communications. New technology and a new battlefield required a more serious approach to communications.

From 1989-1993, the 321st was converted to a light troposcatter signal company with the High Mobility Multi-purpose Wheeled Vehicle mounted AN/TRC-170 V3 tropospheric radio systems.

As the millennium came to a close, an additional company within the battalion – the 440th Cable and Wire – was formed with the 422nd becoming their higher headquarters company. The once-humble messenger company had become an entire battalion.

Since 1990, the 422nd Signal Battalion has participated in many exercises, including Grecian Firebolt, Joint Thunder, and exercises in Korea, Japan, Iceland, and the Global War on Terrorism. The battalion has also contributed humanitarian aid and relief both locally and nationally.

Since Sept. 11, 2001, the battalion has continually supported the Global War on Terror with volunteers and participation in the state's annual New Year's mission. In August and September 2005, the unit activated to support the citizens of Louisiana following the Hurricane Katrina and Rita catastrophes in New Orleans.

In March 2004, the 321st Signal Company deployed with the 143rd Signal Company (Heavy TROPO) from Colorado to relieve in place the 356th and 114th during Operation Iraqi Freedom.

CPT Martino is a training and operations officer in the Nevada Army Guard's 422nd Integrated Theater Signal Battalion. He is also a federal technician serving as the Nevada National Guard's Information Assurance Manager. He received his commission from the Indiana National Guard in 2001 and has lived in Northern Nevada for more than four years.

307th Integrated Theater Signal Battalion Joins USARPAC and 516th Signal Brigade

By Bill McPherson

SCHOFIELD BARRACKS, Hawaii — Marking a significant transformation initiative for the Signal Corps in the Pacific, the 307th Integrated Theater Signal Battalion re-stationed from its former location in South Korea to Hawaii and Alaska in October and November.

The 307th ITSB, a tactical unit with three line companies and a headquarters company, officially stood up as a subordinate command of the 516th Signal Brigade at a Schofield Barracks ceremony Nov. 17.

On.Oct. 13, the 307th "cased" its battalion colors at a ceremony at Camp Carroll, Korea, signifying the unit's move out of the Korean peninsula. The 307th had reported to the 1st Signal Brigade since March 16, 1988, supporting the United Nations Command, Combined Forces Command, U.S. Forces Korea, and Eighth Army.

The 307th's new mission is to "install, operate, maintain and defend tactical theater level communications systems in support of U.S. Army Pacific, combined and joint task forces, and combatant commanders to support the full range of military operations."

USARPAC is currently transforming into a theater warfighting command, and the re-stationing here of the 307th ITSB is only the latest of several new deployable commands to support modularity in USARPAC's future missions.

Other recent USARPAC activation ceremonies include the 311th Signal Command (Theater), 8th Theater Sustainment Command, and 94th Air and Missile Defense Command.

"The re-stationing of the 307th ITSB to USARPAC is a history-making event for our Army," said COL Edric A. Kirkman, commander, 516th Sig. Bde., at the Nov. 17 ceremony.

"As part of ongoing transformation efforts, the 307th became the Army's very first Integrated Theater Signal Battalion on Oct. 15, 2005. Today's re-stationing of the 307th ITSB adds a major warfighting command, control, communications, and computers capability in USARPAC's and the 516th Signal Brigade's future operations, whenever and wherever directed by our component commander."

Three of the 307th's companies are now located in Hawaii, with its fourth "Alpha" Company now stationed at Fort Richardson, Alaska.

The 307th's command team, battalion commander LTC Timothy W. Walrod and CSM Herman Badger, uncased the battalion colors signifying the battalion's transfer to the 516th and USARPAC.

"Moving from Korea to Hawaii and Alaska was a major feat for all concerned," Walrod observed. "Most of our personnel and equipment have now safely arrived at their respective new locations.

LTC Timothy W. Walrod and CSM Herman Badger of the 307th ITSB salute the national and battalion colors following the uncasing of the 307th's colors, signifying its transfer from 1st Signal Brigade (Korea) to 516th Signal Brigade (Hawaii and Alaska).

Officiating the 307th Integrated Theater Signal Battalion re-stationing ceremony were COL Edric A. Kirkman (left), commander, 516th Signal Brigade, and LTC Timothy W. Walrod, commander, 307th ITSB.

"It was always COL Kirkman's and my goal to reset and reconstitute the 307th with safety and taking care of Soldiers and their families during the transition as our very top priorities," Walrod added.

"We've had the full cooperation and proactive support by members of the 516th headquarters staff and our sister battalions in Hawaii (30th Sig. Bn.) and Alaska (59th Sig. Bn.), and I thank them for their commitment to this significant task," Walrod continued.

"We are now on track for reaching initial operational capability, situating materiel, training and certifying teams and crews, and assuming warrior tasks and battle drills as quickly as possible," Walrod said.

The 307th Signal Battalion was constituted on May 27, 1942, as the 313th Coastal Artillery Barrage Balloon Battalion, and activated June 15, 1942, at Fort Randolph, Canal Zone.

Its distinctive unit insignia refers to its service in the Rhineland during World War II and to service in Vietnam from 1970 to 1971. Its motto is "*Optime Merenti*," which translates to "Providing the Best."

Also participating at the re-stationing ceremony was the 307th's S-3/operations officer, MAJ Karl Muego, as commander of troops.

Soldiers from the 307th ITSB represented the battalion's four

Instructor of the Year Recognition

(Pictured left) SSG Amy Williams is the Signal Center and Fort Gordon Instructor of the Year FY 2006. She is assigned to Headquarters and Alpha Company, 551st Signal Battalion. Williams is an instructor/writer for the Information Systems Operator Analyst Course and the Telecommunications Operator Maintainer Course in the Information Technology Warfighter Division. (Pictured Right) Outgoing Instructor of the Year for FY2005 is SFC Michael January. He is currently an Instructor at the Tactical Single Channel Radio Operators Course at Fort Gordon. (Pictured center) SGM Ulysses W. Mays, Dean of Academics sergeant major for the 15th Signal Brigade stands with the honored instructors.

companies, which include Headquarters and Headquarters Company, commanded by CPT Eva Palacios, with SFC Valerie Kitchens as first sergeant; Alpha Company, commanded by CPT William Griffin, with 1SGT William West as first sergeant; Bravo Company, commanded by CPT Benjamin Afeku, with 1SGT Mark Frye as first sergeant; and Charlie Company, commanded by CPT Anthony Whitfield, with 1SGT Dexter Monroe as first sergeant.

Mr. McPherson is a public affairs officer with 516th Signal Brigade

Central Iraq Microwave System supports MNF-I communications missions

By Stephen Larsen

Luke Morgan, an engineer from the U. S. Army Information Systems Engineering Command, is high atop the Central Iraq Microwave System microwave tower at Taji, Iraq.

It's difficult enough managing telecommunications infrastructure projects under normal circumstances, trying to juggle cost, schedule and performance to provide the best possible system. When you're managing a managing telecommunications infrastructure projects in Iraq, though, you have to factor in the problems inherent in working in a war zone.

But with diligence and perseverance, you can overcome these obstacles and deliver a high-quality system, as MAJ Kevin Messer proved during his recently-ended year-long deployment to Iraq, where he led a team from the Project Manager, Defense Communications and Army Transmission Systems, part of the Army's Program Executive Office Enterprise Information Systems, in implementing the Central Iraq Microwave System, which provides near-real-time point-to-point, point-to-multipoint, and multipoint-to-multipoint data transmission services with multiple layers of redundancy for the Multi-National Force-Iraq.

CIMS, with SONET (synchronous optical network) communications links in the International Zone, Camp Victory, Camp Slayer, Taji and Camp Anaconda, provides OC-3 (155 Mbps) bandwidth to support warfighters' critical C4I (command, control, communications, computers and intelligence) missions.

Messer said that the links in the International Zone, Camp Victory and Camp Slayer became operational in December 2005, with the Taji and Camp Anaconda links becoming operational in April 2006.

CIMS allows MNF-I personnel to tap into NIPRNET (Nonsecure Internet Protocol Router Network), SIPRNET (Secret Internet Protocol Router Network), CENTRIXS (the Combined Enterprise Regional Information Exchange System), voice, VTC (video teleconferencing) and JWICS (the Joint Worldwide Intelligence Communications System).

"Because CIMS is a low-latency, high-speed, high-bandwidth system," said Messer, "it allows MNF-I personnel to transmit near-real-time data to support strategic or operational missions – whatever the user needs it for. CIMS will allow us to relieve one DKET (deployable KU-band earth terminal) and to re-deploy that DKET elsewhere."

"CIMS is a major asset to forces in Iraq for providing lower-cost and higher-speed interconnectivity versus traditional satellite deployments," added Luke Morgan, an engineer from the U. S. Army Information Systems Engineering Command, who worked on the CIMS project.

Overcoming engineering challenges plus the Rule of 3 and 6

Despite considerable pressure from the users to deliver CIMS, Messer steadfastly insisted on straightening out the kinks in the system before turning it over. He said a major engineering challenge was that CIMS – which includes microwave radios, ATM (asynchronous transfer mode) switches and high-speed encryption devices – couldn't be tested before being fielded. Instead, they had to install the system and then fine-tune it from end-to-end. After exhaustive testing, with participation from ISEC engineers, the gaining O&M (operations and maintenance) command and coordinated support from vendors

The CIMS microwave tower at Taji, Iraq rises 500 feet high.

and contractors, CIMS' performance far exceeded commercial standards.

"We had to learn on the ground," said Messer. "We could not assume conditions would be as they should be, or as we might expect they should be. We could not assume tech control facilities had stable power or grounding – sometimes they did, sometimes they didn't. We could not assume wiring was properly installed or insulated. We, as the PM (project manager), or the O&M folks, had to do the upgrades to fix the problems as we encountered them. Whatever it took, that's what we did."

"Everything is more difficult in Iraq," echoed SFC Arthur Lee of PM DCATS, who assisted on the project. "While managing your project in Iraq, the 'Rule of 3 and 6' governs operations – meaning, it takes three times longer to get anything done in Iraq on a 'normal' day, and six times longer when things get hot with increased insurgent activity."

Some 'normal day' challenges? The climate, for one. Messer said there were temperatures of 120 degrees-plus in the summer, and there were torrential deluges during the rainy season in the winter, when rainwater would fill the pits excavated for the concrete pads to support microwave towers – which the CIMS team then had to have pumped out.

"We also had three sandstorms when I was there," added Messer. "You would see a mountain of sand stretching across the horizon, hundreds of feet high, and watch as it approached you. The only thing you could do then was to wait it out until it passed over you."

Another challenge was getting Iraqi workers and vehicles on and off bases.

"You had to get the local nationals (Iraqi workers) badged," said Messer, "then it could take a couple of hours as they waited on line to get through the gate. Then you had to get them back off the base at the end of the day. This limited the number of hours they could work in a day."

Lee told of the adventure of getting a water truck onto a base – the water was needed to make the concrete pad for a microwave tower. After the truck waited in the queue for some hours and finally reached the gate, the checkpoint guards made the driver empty the water tank for a security inspection, to ensure there were no explosives, weapons or insurgents hidden in the tank.

"Luckily, we were able to refill the water tank from a stream near the work site," said Lee.

And then there was the problem of the height of some of the microwave towers, up to 500 feet at some locations – which was a problem when the Iraqi cranes went only 100 feet high, and sometimes bent when lifting sections of towers. The solution there, Messer said, was to get a gen pole and winch from the U.S. to do the heavy lifting.

And what about when things got hot with increased insurgent activity?

"We lost one local national to a terrorist attack," said Messer.

Morgan said that there were several incidents of small arms fire at the microwave tower sites during construction.

"One morning," Morgan added, "an unexploded rocket was found 60 feet from the base of one of the towers sites."

If it really got hot, Lee said the crew could get locked-down 'inside the wire,' behind the concrete walls and barbed wire of the base's security perimeter, as they waited for things to cool off.

"That could bring the project to a halt," said Lee, "until it became safe enough for the Iraqi workers to travel and get back to the base, or for us to get off the base to go to other bases."

Yet they made it work, they implemented the CIMS project despite these challenges. Messer gives high marks to the CIMS team, singling out ISEC engineers Morgan and Brock Tucker for kudos. "I had those guys working 18 hour days for almost three months straight," said Messer. "When we ran into problems, they'd stop, troubleshoot and fix the problems."

Messer also praised the performance of his contractor CIMS project coordinator on the ground in Iraq, Robert Delaski of CACI International, Inc.

"Robert Delaski was amazing,"

MAJ Kevin Messer (left) and SFC Arthur Lee (right) of the Project Manager, Defense Communications and Army Transmission Systems show some of the smaller components of the Central Iraq Microwave System. Messer holds an anchor bolt of the type used in a microwave tower and Lee holds a piece of fiber-optic cable. Note the Multi-National Force-Iraq patch on Messer's sleeve, which when BG Gary Connor, MNF-I's Deputy Chief of Staff, Communications and Information Systems (C6), presented to Messer, along with a commander's coin, in appreciation of Messer's work to implement CIMS.

said Messer, "he was my 'go-to' parts guy. If we needed material – fiber, antennas, whatever we needed to be successful – you would see Delaski driving a forklift across Victory base with it."

The bottom line? Despite the obstacles, they delivered CIMS just ahead of the mid-April date that they promised. The operation of the system exceeded expectations, and the customer was pleased with the result. This was evident on April 17, when BG Gary Connor, MNF-I's Deputy Chief of Staff, Communications and Information Systems (C6), stopped a high-level video teleconference meeting of officers representing MNF-I, the Multi-National Force-Iraq, the Coalition Forces Land Component Command, the 335th Theater Signal Command and the 160th Signal Brigade to publicly recognize Messer for his work on CIMS and other infrastructure projects in Iraq. Connor presented Messer with an MNF-I commander's coin and an MNF-I patch for his uniform.

"I felt appreciated – no, make that vindicated," said Messer. "I would not turn over the system to the customer unless it was right. Despite the challenges, we met the date and delivered what we promised."

Mr. Larsen is a public affairs officer with Program Executive Office for Enterprise Information Systems, Program Manager, Defense Communications and Army Transmission Systems at Fort Monmouth, N.J.

TOBYHANNA HELPS DEVELOP NEW COMMUNICATIONS SHELTER FOR MISSILE DEFENSE

by Anthony Ricchiazzi

TOBYHANNA ARMY DEPOT, Pa. — America's missile defense system got a boost from Tobyhanna Army Depot's ability to produce new satellite communications support systems.

In six months, engineers and technicians here designed and integrated an Auxiliary Communications Shelter valued at about $5 million that supports the homeland defense Ballistic Missile Defense System. It usually takes at least one or two years to produce a system of this complexity, says Mark Capitano, chief of the Satellite Communications Systems Engineering Division, Production Engineering Directorate.

"The shelter provides communications capability for the FBX-T (Forward Based X-Band Radar Transportable) radar system," he said. "The FBX radar system provides situational awareness to joint service (Army, Marines, Air Force) units manning missile defense sites."

The Missile Defense National Team is fielding the FBX-T. When integrated into the Ballistic Missile Defense System Network Interface, it provides forward-based sensor capability for early acquisition, tracking and identification information of intercontinental and intermediate range ballistic missiles in support of homeland and host nation defense.

"What is unique about the ACS is that it provides similar services as DOIM (the depot's Information Management Directorate) here," said Tom Terpak, lead electronics technician. "It has DISN (Defense Information Systems Network) services, which are Internet-related capabilities that include computer networking and worldwide e-mail. It also has DSN (Defense Switched Network for telephones), commercial and secure telephone services, and an uninterruptible power source."

The mission began in 2005 when the Missile Defense Agency, Washington, D.C., and the Defense Communications and Army Transmission Systems, Product Director Satellite Communications Systems, Fort Monmouth, N.J., began working with Tobyhanna to develop advanced capability based on a new concept of providing multiple communications capability in one shelter.

"Tobyhanna Army Depot really took the initiative on this short-fused mission and produced

Ken Stackhouse, left, and Stephen Koval, configure an Internet interface router rack in the Auxiliary Communications Shelter at Tobyhanna Army Depot. The shelter supports the homeland defense Ballistic Missile Defense System. Stackhouse and Koval are electronics technicians in the depot's Production Engineering Directorate.

outstanding results," said Scott Ervin, ACS project leader, PD SCS. "Everyone is extremely pleased with the quick turnaround and superior workmanship."

The shelter complements the FBX-T radar system, which is a transportable radar. "The sites are very remote," explained Tom Musso, chief of the Tactical Satellite Design and Support Division, PED. "This first shelter is now in Southeast Asia."

The shelter, a 40-foot trailer, was integrated by the Communications Systems Directorate's Satellite Communications Division. "Primarily by the Strategic Systems Branch," Capitano noted. "The van was completely rebuilt by the Systems Integration and Support Directorate. Contracting (Directorate) purchased the materials and Production Management (Directorate) coordinated the processes. DOIM provided guidance and technical expertise in the early stages of the design and development of the ACS. They helped identify hardware and software to be integrated into the shelter, and reduced project risk with their advice. We were also assisted by DDTP (Defense Distribution Depot Tobyhanna)."

There were several challenges for the depot during the fabrication and fielding phases.

"Once the shelter was designed, getting the material, making the usual customer changes and dealing with the technical problems became the most difficult issues," Capitano said. "But this is the kind of mission that Tobyhanna excels in. There are a lot of talented folks here and they deserve accolades for working under a very hectic schedule with a challenging production deadline."

The shelter was completed in April and tested by depot and U.S. Army Information Systems Engineering Command personnel from Fort Huachuca, Ariz., and Tobyhanna personnel. It was fielded in a very rural environment in Southeast Asia, which turned out to be the second main challenge.

"It's like a field environment; we had to match the area's infrastructure to the shelters electronics," Terpak said. "We had to figure out how to interface with their power cables and fiber optics systems."

The system went online June 30. Capitano said the system currently communicates with strategic sites and through the DISN Asynchronous Transfer Mode network, with built-in capability to connect to a tactical Defense Satellite Communications Systems terminal for redundant communications.

Tobyhanna Army Depot is the Defense Department's largest center for the repair, overhaul and fabrication of a wide variety of electronics systems and components, from tactical field radios to the ground terminals for the defense satellite communications network. Tobyhanna's missions support all branches of the Armed Forces.

Tobyhanna Army Depot is part of the U.S. Army Communications-Electronics Life Cycle Management Command. Headquartered at Fort Monmouth, N.J., C-E LCMC's mission is to research, develop, acquire, field and sustain communications, command, control computer, intelligence, electronic warfare and sensors capabilities for the Armed Forces.

Mr. Ricchiazzi is a writer with Tobyhanna Army Depot Public Affairs Office, Tobyhanna, Pa.

Acronym QuickScan

ACS – Auxiliary Communications Shelter
ARE – Army Reserve Element
AT&T – American Telephone and Telegraph
C4I – command, control, communications, computers and intelligence
C-E LCMC – Communications-Electronics Life Cycle Management Command
CENTRIXS – the Combined Enterprise Regional Information Exchange System
CFLCC – Coalition Forces Land Component Command
CIMF – Central Iraq Microwave System
HMMWV – High Mobility Multi-purpose Wheeled Vehicle
IP – Internet Protocol
ISEC – Information Systems Engineering Command
ITSB – an Integrated Theatre Signal Battalion
JCS –Joint Communications Squadron
JCSE – Joint Communications Support Element
JWICS -- Joint Worldwide Intelligence Communications System
MNF-1 – Multi-National Force-Iraq
NIPR – Non-secure Internet Protocol Router Nets
NIPRNET – Nonsecure Internet Protocol Router Network
PD SCS – Product Director Satellite Communications Systems
PED – Production Engineering Directorate
PEO EIS – Program Executive Office for Enterprise Information Systems
PM DCATS – Project Manager, Defense Communications and Army Transmission Systems
SIPR – Secure Internet Protocol Router Nets
SIPRNET – Secret Internet Protocol Router Network
TROPO – Troposphere
USARPAC – U.S. Army Pacific Command
USARRC – United States Army Reserve Readiness Command
VTC -- video teleconferencing

Chief of Signal Comments continued from Inside Front Cover

authorizations at brigade and division. To overcome this systemic shortfall, the Army is accessing candidates to fill Modified Table of Equipment requirements at the fourth and then again at the seventh year of service. Captains selected for FA24 and FA 53 will attend the Signal Captains Career Course followed by functional area qualification training and follow-on assignments to TOE units.

Fourth, is the implementation of a number of initiatives to improve the number and quality of warrant officers across all branches. Signal proactively initiated several of these initiatives four years ago allowing us to expand our accession pool significantly. This resulted in the average accession point for Signal warrant officers to move from the twelfth year to the ninth year of active federal service, with a target of the seventh year. In addition warrant officers now attend career courses earlier and Signal warrant officers receive more in-depth hands-on training and education tailored to their military occupational specialty. This coupled with the new compressed promotion timelines, promises to eliminate critical senior warrant officers shortages. Collectively, these initiatives provide the force with better qualified, more agile and adaptive Signal warrant officers able to serve longer.

The officers of the Regiment are adapting well to these changes and stepping up to the challenges of the Global War on Terrorism. We have a great leadership team and I'm proud of what you and your Soldiers accomplish every day.

In future editions, we will publish more information about our officers and will include changes to our enlisted force as well.

Thanks for all you do.
Army Strong.

BG Randolph P. Strong
Chief of Signal

Acronym QuickScan

HRC – Human Resources Command
OPMS – Officer Personnel Management System
MTOE – Modified Table of Organization and Equipment

United States Postal Service
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