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ARMY COMMUNICATOR

Voice of the Signal Regiment PB 11-11-8 2011 Vol. 36 No. 3

μCYBER

MICROCYBER

The New Signal Regiment

- A leaner organization with far greater reach
- Revamped MOS structure set to move from 13 to 7
- Signal Soldiers swayed pivotal Civil War battles

CHIEF OF SIGNAL

Alan R. Lynn

Signal Transformation--Micro-cyber

Leaders,

Eight months ago, the Signal Corps was given a problem: provide network connectivity to more command posts and to lower echelons without increasing the number of Signal Soldiers. The Regiment's answer is **µCyber**, (the "µ" being Greek for micro).

µCyber is the overarching term for our current effort that is revolutionizing Signal. It consists of six main tenets that will require the support of all Signal leaders to implement. They are: (1) change the way the Signal Regiment operates, (2) upgrade the types of equipment used, (3) increase the level of support provided, (4) update the process used to purchase equipment, (5) modernize the approach to educating Signal Soldiers, and (6) decrease the number of Signal military occupational specialties by combining some to make Soldiers more capable, while maintaining the same number of Soldiers.

The term *micro-cyber* or µCyber captures the continuing miniaturization of electronics, hence the "micro." Today we can buy smaller, lighter weight systems that are more capable than our current systems. For example, one of our current satellite systems provides a four megabit throughput, weighs 3,900 pounds and requires a truck for transport. A newer and equally capable satellite system only weighs 36 pounds and can be carried in a backpack. Our Soldiers demand this kind of change on the battlefield.

The new Army Operational Concept requires the Signal Regiment to support combined arms maneuver and wide area security operations, extend support to company level and below, support corps and divisions as the warfighting headquarters, and operate and defend a 24/7 Army single network enterprise. By 2014, we will leverage smaller teams with more capable communications packages to enable newly organized expeditionary Signal battalions- enhanced to engineer and manage more networks while providing support to headquarters at all levels.

This edition of the *Army Communicator* discusses some of our developing strategies, how we plan to merge the Signal military occupational specialties, and some of the very real challenges that we face as we begin to execute some daunting yet vital changes in how we do business.

µCyber is more than a conceptual construct; it is the blueprint for the future Signal Regiment. I'm honored to serve as Chief of Signal at a time when we are recruiting the best volunteers, making our Army the most capable Army in the world. I have the utmost confidence in each of you to execute the greatest transformation the Signal Corps has seen in its 151 years of service. The plan is approved by the Chief of Staff of the Army. We need to work together now, and be Signal Strong.

"µCyber is more than a conceptual construct; it is the blueprint for the future Signal Regiment."

For the Nation!

U.S. Army Signal Center of Excellence
Fort Gordon

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Voice of the Signal Regiment

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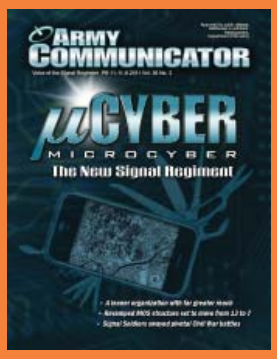
Cover: *This edition introduces the changes taking place as the Signal Regiment moves toward miniaturization of many systems and radical alterations in training.*



Cover by Billy Cheney

Join the Discussion: *This is an evolving landscape where your opinion and experiences can have an impact. At the end of articles where you see this icon, you can weigh in and comment on-line.*

Micro-cyber transformation is visionary

Signaleers,

There are some exciting articles in this edition of the ***Army Communicator***. We've come a long way in 151 years; and we're not done yet.

I can imagine a visionary conversation among some of our first Signaleers:

Signaleer One: "I see that one day we will have communications devices like telephones that have no wires and can fit in your pocket."

Signaleer Two: "You're crazy man. That'll never happen!"

S1: "One day we will have a tablet that you can write on, and then instantly send what you have written to someone else hundreds and maybe even thousands of miles away."

S2: "Wake up, sport. You're dreaming."

S1: "I also see a camera, part of that little un-wired phone, that you can use to take a picture and send it out to all of your friends at once. They can see your pictures on their un-wired phone."

S2: "Now that's just plain tomfoolery you're talking."

S1: "And I can see, a point in the future, when people will buy water in bottles."

S2: "Pay for water? Now I know you're hallucinating!"

Visions of the future often challenge us; especially when they are on the cusp of leaps in technology.

Micro-cyber isn't exactly a leap in technology, but it is a huge step ahead for the Regiment. Implementing the micro-cyber regimen will offer challenges. It is not a perfect scheme, but it is visionary. It is a huge step forward and it is necessary.

Information in this edition of the ***Army Communicator*** provides the broad framework of the micro-cyber transformation. The plans and concepts of micro-cyber will most certainly bring forward valid questions about the process of moving from where we are to where we must go.

We welcome your questions and covet the challenges. We have already recognized many and have answered some. We know that we still have a long way to go. We need every Signaleer actively assessing and addressing how this change will impact their career and job.

As I take a swig of my bottled water, complete this note on my DROID®, and look forward to our moving ahead with micro-cyber, I stop for a moment and wonder, "Could I make any money selling bagged air?"

Thank you again for your dedication and service in being ever Watchful for Our Country.

Pro Patria Vigilans!

REGIMENTAL CSM

Ronald Pflieger

Signaleers face exciting times as Regiment transforms

In my initial message to the Regiment, I will be very brief.

I stood on Barton Field 28 years ago, as so many of you have, to graduate from Signal Advanced Individual Instruction to serve as a multi-channel communications equipment operator--what was then a 31M. To be given the responsibility on that same field to serve as the Signal Regiment's Command Sergeant Major is a tremendous honor.

I am both humbled and definitely excited to serve in this position on behalf of our more than 50,000 Signal Soldiers--both Active and Reserve.

I look forward to working with MG Lynn to transform the Signal Regiment.

Micro-cyber will enable us to meet future requirements to provide communications support during Combined Arms Maneuver and Wide Area Security operations. We will change our Enlisted MOS structure and equipment sets and to meet these requirements. It is an exciting time to be in the Signal Regiment and I look forward to seeing you in action.

Our Army will continue to undergo significant changes in the coming years and it is our mission to enable that change.

My previous assignments have convinced me that each and every Signal Soldier plays a vital role in the operational success of our Army. Commanders can't put steel on target and maneuver their formations to close on and destroy the enemies of this great nation without the communications you provide.

So In my eyes, there is no greater combat multiplier than the men and women of the Signal Regiment. We must continue leading the way.

My immediate goal is to learn about the issues facing our Signal Regiment and especially those upon which our Signal NCOs can have the greatest impact.

The questions that I asked myself 28 years ago, I now ask you: Do you have what it takes to be an Army Signaleer? Will you get the message through when the time comes?

Again, it is my honor and privilege to serve with you as the Regimental Command Sergeant Major, and you can count on seeing me in your area soon!

Army Strong, Signal Proud!

MICRO-CYBER BRINGS SWEEPING CHANGES THROUGHOUT U.S. ARMY

By COL Robert Barker

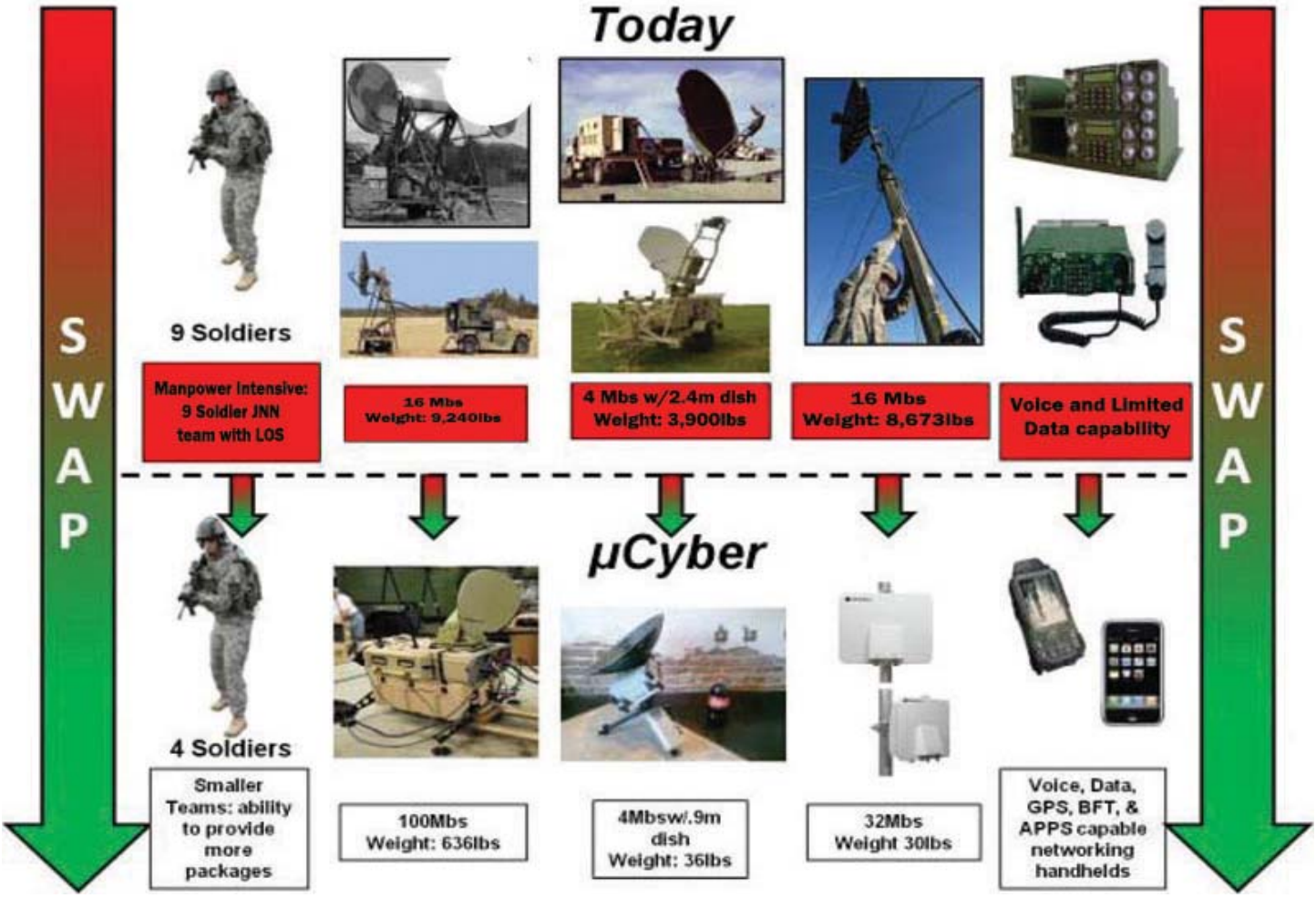
A massive transformation of the Signal Regiment has been cleared to move forward according to the Chief of Signal.

During an awards ceremony held 6 June 2011 in Alexander Hall recognizing individuals at the center of the recommended modifications, MG Alan R. Lynn explained the reason for the sweeping changes. "The Signal Regiment is addressing all of the issues identified in the Signal Tactical Functional Area Assessment by moving to what we call micro-cyber. We will train our Soldiers to be more flexible, to serve more people with smaller systems and to do all this with the same staffing levels and no funding increase."

His announcement came last week as nearly two years of intensive study and planning moved through a pivotal point when the U.S. Army deputy chief of staff approved the Signal Regiment's development plans.

"The FAA provided a top to bottom look at the challenges facing the regiment in supporting Army full spectrum operation in the future. The analysis showed that the Signal Regiment had perational gaps that must be addressed," said COL Robert A. Barker, Capabilities Development Integration Directorate director.

The critical services signal



Soldiers provide are needed at virtually every level of operations. The FAA indicated that current organizational structures do not provide adequate coverage to theater units, functional brigades and battalions, and maneuver companies unless signal assets are embedded. In addition the modular force structure does not provide the training and leader development of embedded Signal forces.

An even greater issue facing the Signal Regiment is the need for accessing and fielding rapidly evolving cyber technologies to war fighters at all levels.

COL Barker said, "The FAA analysis compared the regiment's current missions to its future requirements outlined in the Army Capstone Concept and Army Operational Concept. Today the regiment is organized to support combined arms maneuver, provide support to battalion level, support the ASCC as the warfighting headquarters, and provide theater centric network services. The new AOC requires the regiment to support combined arms maneuver and wide area security operations, extend support to company level and below, support corps and divisions as the warfighting headquarters, and operate and defend a 24/7 Army single network enterprise."

To meet this mandated call for expanding service delivery, the Signal Center of Excellence developed a course of action addressing the gaps identified in the FAA analysis and fulfilling the three immediate network capabilities required in the Army network modernization strategy: provide beyond line of sight, provide mission command on the move, and integrate the Soldier into the network.

The current Warfighter Information Network-Tactical and Joint Tactical Radio System provide the mission command

on the move capabilities and integration of the Soldier into the network, but do not provide the capabilities to fully network the force in support of the CSA's vision. To obtain the additional capabilities required to develop a fully networked force, the FAA focused on transforming the Expeditionary Signal Battalions to a more modular organization with increased deployable Signal capability without increasing the personnel end strength.

The ESB will be converted to an ESB – Enhanced consisting of smaller, more transportable, modular, scalable network support packages fielded with the most current commercial technologies available. The network support packages, termed micro-cyber, are the future of the Signal Regiment.

COL Marc D. Harris, U.S. Army Signal Center chief of staff said, "This is huge. It reshapes the way the Army trains and fights."

COL Barker said, "micro-cyber will provide mission command essential capabilities across all echelons. The regiment will transition the Signal military occupational specialties to develop the multi-disciplined Soldier required for micro-cyber."

The current 13 MOSs will be reduced to seven in the future. The micro-cyber institutional training will transition from pure assemblage training to an educational approach providing the knowledge to understand, and transition between, continuously changing commercial technologies.

Digital training applications will be developed to support the Soldier's learning of new equipment versions in support of their base education of network theory.

The ESB-E will consist of four separately deployable companies as the base elements for BOG:DWELL (deployed: home ratio) in the Army Force Generation cycle and are deployable down to team level in the Joint Operation Planning and Execution System process. The ESB-E will provide 70 network support packages, an increase of 40 from the current ESB's capability, and a deployable Network Operations Command and Control headquarters. The additional capability increases the available Signal assets from 34 percent to 98 percent in each phase of the supply based ARFORGEN cycle.

The FAA addresses additional operational gaps supporting the Army Operational Concept and the modernization of the

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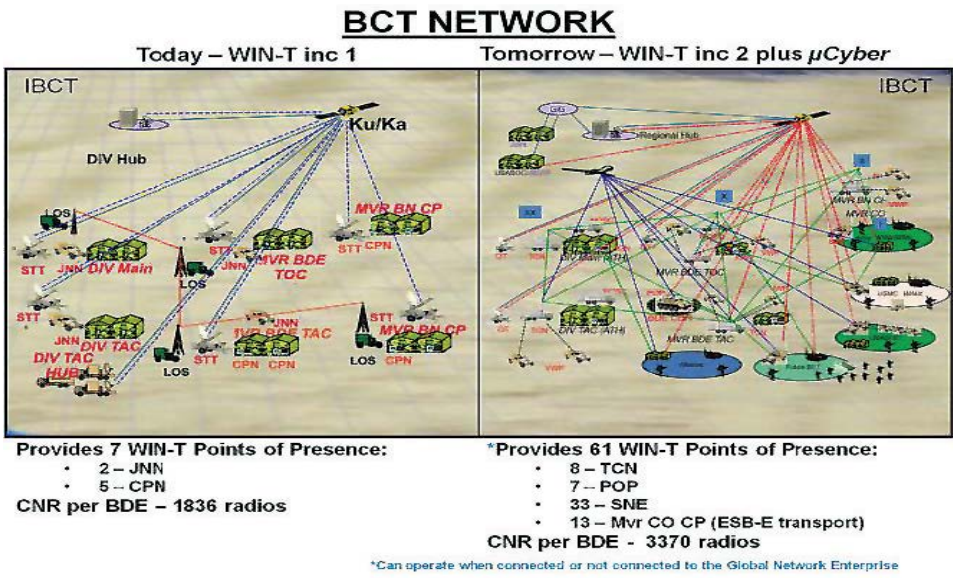
Army network. The FAA defines new doctrinal and support concepts to address the transition to the corps and division as the war fighting headquarters by assigning OPCON of theater tactical Signal brigades and ESB-Es to corps and divisions during the RESET phase of the ARFORGEN cycle. The C2 relationship allows the organizations to coordinate network planning, develop standard operating procedures, and train during the train ready phase of ARFORGEN producing a fully developed relationship before deployment in the available phase.

The TTSB or ESB-E will provide additional NETOPS support to the supported command and become the core element of a Joint Network Control Center if transition to a JTF is required. The relationships will allow the TTSB and ESB-E to provide training readiness oversight and leader development of embedded signal organizations within the supported units reducing the shortfalls identified today in numerous after action reports from the Combat Training Centers. The fielding of JTRS produces a NETOPS shortfall across all echelons. Each waveform of the JTRS family of radios requires a NETOPS control terminal for mission planning. To meet this requirement, under the condition of no personnel growth, the FAA provided an acceptable risk strategy to provide one Soldier at maneuver companies, two at battalion, and one at brigade by converting the Wireless Extension Teams to JTRS network managers.

The FAA was presented as Decision Point 160 in the Army Campaign Plan and approved by the Army chief of staff. The plan is to implement the force design update and fund the implementation through the Army Network Modernization Strategy



using modernization and technology insertion without creating an additional funding requirement for the Army.

The 86th Expeditionary Signal Battalion has been identified to support the proof of concept for the FAA. The 86th will have two companies fielded with the new network support packages and will conduct the proof of concept during the Network Integration Evaluation at Fort Bliss, Texas. The final company, upon release from HLD requirements, will be fielded prior to the battalion being returned to ARFORGEN support. The 11th Signal Brigade will serve as the senior Signal commander and provide TRO support to all Brigade Modernization Command Signal units, completing the full concept validation of all FAA operational concepts. These fundamental transformations will allow the Signal Regiment to provide network capabilities across the full spectrum of operations at all echelons. The capabilities provided fully support the operational network with TS/SCI, coalition network, command and control VTC , full motion video, and deployable network operations planning and engineering in support of Army, JIIM, and HLD/CS missions. The ESB-E micro-cyber is the transition of the Signal Regiment into the future and allows continuous integration of emerging cyber technologies into the force through capability set fielding in synchronization with the ARFORGEN cycle.

Acronym QuickScan

ARFORGEN – Army Force Generation Cycle
ASCC – Army Signal Capstone Concept
AOC – Army Operational Concept
C2 – Command and Control
CTC – Combat Training Centers
ESB – Expeditionary Signal Battalion
ESB-E – Expeditionary Signal Battalion-Enhanced
FAA – Functional Area Assessment
JOPES – Joint Operation Planning and Execution System
JNCC – Joint Network Control Center
NETOPS – Network Operations
VTC – Video Teleconferencing
WIN-T – Warfighter Information Network-Tactical

µCyber implementation will bring challenges

By CW5 Todd M. Boudreau

This article calls your attention to some of the challenges we will face implementing micro-cyber and solicits your support and assistance as we move ahead.

As I sat listening to the 37th Army chief of staff speak at the Army Training and Leader Development Conference, one of the areas he addressed was the triad: Ways, Means, and Ends.

One of his points was that the ends, regardless of our thoughts, desires, and opinions, remains; when called upon by our Commander in Chief - we will answer, we will engage, and we will prevail. In other words, we will not be turning down any missions. We will continue the four Ps-- prepare, prevent, prevail and preserve.

What will not be the same is the means. Our resources will decrease. We can fight for all the resources we can grab, but in the end, we will have less tomorrow than we had yesterday.

Therefore, we must focus the greatest amount of our effort on our plan to transform the ways. Our ways must transition to smaller and more capable systems. Micro-cyber is a strategy that addresses ways. Micro-cyber capitalizes on miniaturization of communications electronics equipment and the convergence of multiple technologies which result in a reduction of size, weight and power; and sometimes unbelievably, cost (SWAP-C). More is said on this throughout this journal, so I will not delve into the future adjustments of MOS, organizations, and training.

In TRADOC there is an acronym that ensures we look at all capabilities holistically: DOTMLPF (Doctrine, Organizations, Training, Materiel, Leader development, Personnel, and Facilities). If viewed quickly, micro-cyber looks very M-centric (i.e., materiel only). That is because much that has been discussed so far has focused on the materiel aspects. However, if that were true, we would be running full steam into some fairly significant challenges.

Micro-cyber is not a materiel solution. It is a holistic and synergistic approach addressing the ways in face of diminishing means to ensure we can accomplish our ends.

It is also important to understand that we do not have all the answers. In fact, I am fairly confident that we don't even know all the questions!

The questions should come fast and furious. If we took a legacy approach to this, we would have every question listed and matched with the appropriate answer--both available in five-eight years. The problem would be, however, that the questions would now be OBE (overcome by events) and several iterations of technology would have rolled out with a myriad of ONS, JUONS and associated ad hoc adjustments out in the field. In other words, our five-eight year ways plan would not be linked to the ends five-eight years from now.

"We need your help. Each of you has awesome ability and the responsibility to step up and contribute your best to this effort."

Therefore, we are taking an extraordinarily different approach to ensure that we accomplish our objectives in a timely and mostly right fashion. This will take the effort of the entire Regimental leadership--noncommissioned, W-grade and O-grade officers.

Here are some of the challenges that exist in a few of the DOT_LPF areas. Some have been addressed. Some have been solved. Some have been mitigated, and with some we continue to struggle. We need your help, as Signal leaders, to ensure we set ourselves up for successfully meeting our required ends.

We have certainly not identified all of the challenges. I am only covering a few of the issues and not identifying all that we have discussed. We need your help to ensure that we do identify all of the hurdles before we get blindsided. We need to identify, analyze, and solve the issues prior to encountering them during collective training; absolutely before they are encountered on the battlefield.

We must address our organizations. Smaller teams are part of the micro-cyber paradigm. The smaller collective capabilities required to deploy, install, operate, administer, defend, and maintain small, medium, and large equipment sets must be accurately determined. Soldier-led technology teams require that both the technical capabilities and leadership for these quasi-autonomous teams be addressed. We must maintain centralized governance, decentralized authority, and autonomous execution – under the commander's intent by teams of individuals inculcated with the Army values

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and following current rules of engagement and laws of war. Finally, decentralized network execution must be appropriately coupled with centralized NetOps control.

Because technologies will be converged and more complexity pushed down to lower echelons, Soldier training and education must be addressed. Additionally, according to the micro-cyber paradigm, as technology advances and efficiencies and effectiveness dictates, devices will be replaced more often to take advantage of the newest technologies and technological advances. This means that the device a Soldier works with today might be replaced by a different (and more capable) device tomorrow. Such an environment begs for more systems theory education and less (though balanced) hands-on, button pushing and knob training.

These alterations offer critical challenges to our current training strategy. Digital training applications must be developed to support the Soldiers' learning of new equipment versions in support of their base education of network theory.

Smaller teams equate to fewer people per team which affects the ability to meet more of our Regiment's ARFORGEN requirements (Ends), but it also begs for multi-functional disciplined Soldiers (Ways). This will no doubt be one of the biggest challenges we face. Our Signal W-grade officer cohort is already in the midst of a personnel transformation.

We must now look at our Signal O-grade officer cohort as well as our Signal enlisted MOS to determine the right skills and functions to be grouped under each AOC/MOS. What will make this a success is addressing similar skill levels, career paths, as well as detailed and strategically overlapping functions to ensure a holistic and seamless development of personnel capabilities amongst all three cohorts while still taking into consideration organizations and positions that do not employ all three.

These few challenges represent just the tip of the µCyber iceberg. These challenges only scratch the uppermost crust of the surface. While the enormity of the iceberg is enough to elicit the response of terror in the most stable of us, the sheer scale of intellectual capability of our Signaleers (in my opinion) is sufficient to melt it down to an ice cube. But we need your input. We need your help. Each of you has awesome ability and the responsibility to step up and contribute your best to this effort.

This is one of the greatest opportunities to influence the direction of our Regiment that I have witnessed in over 28 years of Army service.

Now is the time to remain watchful for our country.

Join the Discussion
https://signallink.army.mil

Acronym QuickScan

ARFORGEN – Army Force Generation
AOC – Area of Concentration
CSA – Chief of Staff of the Army
DOTMLPF – Doctrine, Organizations, Training, Materiel, Leader development, Personnel, and Facilities
JUONS – Joint Operational Needs Statement
MOS – Military Occupational Specialty
NetOps – Network operations
OBE – Overcome By Events
ONS – Operational Needs Statement
SWAP-C – Size, Weight, and Power – Cost

Signal Military Occupational Specialty structure set to change

By Office Chief of Signal Staff

Since 9/11, we have witnessed historic changes brought about by 10 years at war in addition to the tremendous advances in technology across many disciplines. Virtually every aspect of warfighting relies on the network provided by the Signal Regiment.

The network now even makes up part of the new cyberspace domain analogous with land, sea, air, and space; and it is the Regiment's job to install, operate, maintain, manage, and defend the infrastructure that ensures Army, joint, and coalition commanders the use of cyberspace, while denying the enemy use of the same.

In order to provide the best support, we must change our Area of Concentration structure for our officers and the Military Occupational Specialty structures for our warrants and enlisted. The intent is to provide commanders with a more flexible workforce that possesses greater depth in knowledge and skills. A solid human capital plan will be the game changer that ensures the Signal Regiment meets the requirement of the Army to conduct warfare in a global arena radically transformed by the

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information revolution.

The information technology being fielded today all the way down to the Soldier level demands more technical expertise for our basic branch Signal Officer (BR25). The plan for our BR25 officer is to establish and then require a more in-depth network operations course at the captain through lieutenant colonel level. These officers will attend a course in Cyber Networks Integration that will provide them much more in depth education in order to execute their mission as a battalion S6, brigade S6, G6 NETOPS officer, or a Signal battalion S3. Because these positions are Key Developmental for a Signal officer, the goal is to get all of our officers thru this training prior to them being considered for lieutenant colonel. At the executive level, all colonel positions may be coded so as to provide maximum flexibility in their assginement. Our functional area officers will also be restructured.
Our FA24 (Telecommunications Systems Engineer) and our FA53 (Information Systems Manager) will be merged into a single functional areas (FA26 – Cyberspace Systems Engineering) and then classified into AOC 26A (Cyberspace Networks Engineer), AOC 26B (Information Systems Engineer), and AOC 26C (Cyberspace Defense Engineer). AOC 26A and B will reflect the majority of the skill sets currently possessed by FA24 and FA53 respectively; AOC 26B education will also address knowledge systems engineering requirements. AOC 26C will begin at the senior CPT level, be relatively small in number, and specialize in all aspects of network assurance (Information Assurance/ Computer Network Defense). At the executive level, colonel authorizations will all be coded 26Z (Cyberspace Engineer) and is AOC immaterial. This structure will enable us to better develop and assign our functional area officers. It will also develop a needed specialist in cyberspace defense. Finally, it will allow for more interchangeability based on acquired skills especially at the colonel level.

The Signal Center of Excellence (SIGCoE) already has an approved warrant officer restructure. This restructure will place one of our warrants in each area of the NETOPs construct: Enterprise Management, Network Assurance, and Content Management. Vol 36 of our Army Communicator published earlier in 2011 describes the Signal Regiment warrant officers in depth.

Our enlisted MOSs have continually evolved over the Regiment's history to support commanders. We currently have two Military Occupational Classification and Structure actions submitted for TRADOC and DA staffing. One of those is to delete MOS 25F.

The Army is fully transitioning to IP-based switching equipment. Air Defense Artillery will require MOS 25N for its future switching systems. The Soldiers currently in 25F will be retrained into the 25N MOS. We also have a MOCS action submitted to delete MOS 25P and merge our 25P and 25S Soldiers. With the attrition of many 25P positions in our tactical force, it only makes sense to bring these two MOSs together at the strategic level – many work side by side already. However more MOCS actions are needed to leverage the tremendous technology advances in order to provide commanders maximum flexibility in the use of their Soldiers. At a meeting of a significant number of the Regiment's CSM/SGMs, the number of and the particular skill sets required in each of these MOSs was determined. We are going to collapse the number of MOSs we have now. Setting aside our Visual Information Operations we have nine initial entry MOSs operating Signal equipment. We will take those nine down to three. These future MOSs will be structured into Network Operations, Network

Signal training will have the nine current initial entry military occupational specialties reduced to three, with heavier emphasis on systems theory.

Support, and Transmission. The VI accession MOSs will reduce from three to two. Moreover, along with the "in-service" accession MOS 25E (Electromagnetic Spectrum Manager), we create an additional "in-service" MOS 25D (Network Defense Specialist) to better counter the threats living on the network 24/7/365. Ultimately, the manner by which we recruit and train must change in order to accomplish this transformation.

The Army's MOS system is used primarily to access, assign, and provide overall management of Soldiers in an MOS. The value of any Soldier is knowledge, skills, and abilities he/she brings to the fight. To enable the radical change in MOS structure, the Regiment is addressing several key factors. To reduce the amount of time spent in Advanced Individual Training, which is significantly increased with each merger, recruiting candidates who already have a certain demonstrated skill level, either academically or experiential is required.

The next step in this process will be to change our training methodology. Although our Soldiers already receive a portion of "theory-based" training within their MOS AIT, this must increase and shift to an education-based methodology. Understanding the concept behind why something works will provide an increased ability to operate any number of "boxes" within that family of equipment. To provide for this additional education, only select systems will be used in AIT. The systems chosen will be the ones that can provide a more universal understanding of the technology. All of our Soldiers will also receive up to three weeks of common core training. Regardless of MOS there are certain abilities every one of our Soldiers must acquire to prepare them for combat.

These changes in institutional training are in concert with the Army Learning Concept 2015, TRADOC Pam 525-8-2, which directs many changes to the way we train and educate our workforce. The document requires that we consider such factors as: generational and learner differences; technology opportunities; inputs to the Army; learning science; and lifelong learning.

We are expected to instill 21st Century Soldier Competencies into our newest members: character and accountability; comprehensive fitness; adaptability and initiative; lifelong learner (including digital literacy); teamwork and collaboration; communication and engagement; critical thinking and problem solving; cultural and JIIM competence; and tactical and technical competence. Many different techniques to get at these and other 21st century training and education challenges are presented in this document. All TRADOC schools are working to modernize how they train as well as what they train. The transformation of Signal training dovetails quite well with this concept.

Other doctrine, which helps to drive changes in training include: FM 7-0, Training for Full Spectrum Operations; The Army Leader Development Strategy; and the Army Training Concept 2012-2020. Together with the ALC 2015, these documents provide a framework for our efforts and a roadmap for achieving the desired end state. They should be required reading for all Army leaders.

The next step to this transformation is to enable the units to provide targeted instruction to the Soldiers they receive on specific systems that will be used in their mission. The SIGCoE must provide the training material used for those systems and the units must devote the necessary time required to fully train their Soldiers on their specific equipment sets.

The Regiment will also be working with Signal and Army leadership to provide for the ability for Soldiers to work in their assigned positions. Today, for any number of reasons, our Soldiers may be called upon to work in a different area. In many cases, the prolific use of contractors may be at the root of this problem. The result is that for a number of reasons, our Soldiers are working outside of their skill set so that their primary skills will atrophy.

This will take a number of years; but, we are vigorously working the groundwork to accomplish these objectives. As the Regiment continues to transform, its personnel structure will be changing as well to ensure success in all of our endeavors.

Acronym QuickScan

AIT – Advance Individual Training
ALDS – Army Leader Development Strategy
AOC – Area of Concentration
FA – Functional Area
MOS – Military Occupational Specialty
MOCS – Military Occupational Classification and Structure
NETOPS – Network Operations
SIGCoE – U.S. Army Signal Center of Excellence
VI – Visual Information

New expeditionary Signal battalion model provides greater capabilities

CPT Corris L. Bullock and SFC (Ret) Patrick Marshall

On 2 March 2011, the Army chief of staff approved a plan redesigning the expeditionary Signal battalion.

The redesign came as a result of an intensive assessment of the Signal Regiment. The purpose of the assessment was to identify weaknesses in the ESB design and provide solutions giving maneuver commanders and joint task force headquarters required network services for mission accomplishment.

One critical objective of the redesign is to leverage the success of the highly deployable small-team model created by the joint communications support element. This means that each ESB will be capable of expanding command post coverage from 30 to 69 points of presence.

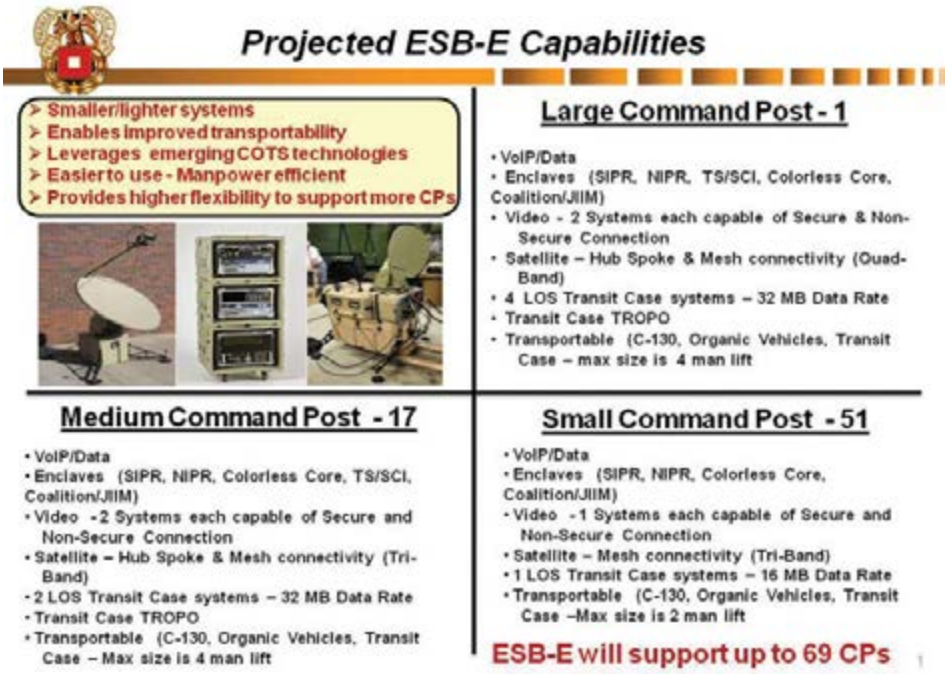
Leaders at the U.S. Army Signal Center of Excellence are developing a force design update to document the improved battalion design to support deploying forces that do not have organic Signal capabilities. These systems will also support both homeland defense and civil support missions in response to national emergencies.

The Expeditionary Signal Battalion-Enhanced model will provide a more modular expeditionary capability to commanders across all echelons, equipping them with a full range of network services utilizing an everything-over-Internet protocol network architecture. The primary objective of the ESB-E is to leverage emerging commercial technologies to improve transportability by employing communication systems that are smaller, lighter and more user-friendly. This approach makes the ESB-E more "manpower efficient" and allows increased flexibility to support more CPs than today's ESB.

These new enhanced systems will provide: non-secure and secure internet protocol router data, video teleconferencing, voice over internet protocol, secure voice over internet protocol, global broadcast system, top secret/sensitive compartmentalized information, coalition data, wireless access points, military and commercial radio bridging, defense red switch network, and defense switch network.

ESB-E will incorporate a team methodology to support this new concept. Commanders will have the ability to deploy their teams in three distinct packages to provide communication support; large, medium or small. The ESB-E will have modular TOEs developed for the team level, allowing unit type codes to be assigned for each type of team. These team level UTCs used in the Joint Planning and Execution System will allow request for forces to be specific to the capability required, instead of having to request whole companies or a whole battalion.

The large package will provide connectivity for subscribers in a JTF-HQ or may supplement a corps or division HQs. It will utilize quad-band satellite reach-back capability



operating in both the military and commercial bands (C, X, Ka, and Ku). In addition, this package will have a lighter, modernized commercial-off-the-shelf version of tropospheric scatter radio systems capable of operating in the Ku and C bands. The TROPO assets can be task organized to provide beyond-line-of-site network extension for small POPs, or for other organizations as required. The large package will also be capable of leveraging aerial layer communications as well as LOS connectivity to support stationary CPs.

A medium package will provide communications support for brigade CP-sized elements. The medium's primary focus will be functional brigades which include: Air Defense Artillery, Chemical, Medical, Military Police, etc. The transit cased configuration will make the system easier to transport and keep pace with frequently displacing brigade size headquarters.

The medium package will have terrestrial capabilities to access an at-the-halt network. It will utilize COTs based tri-band satellite communication capability supporting X, Ka, and Ku bands. The SATCOM technology will be interoperable with standard theater entry point, TELEPORTs and regional hub nodes, leveraging existing gateways to access services. The medium package will also deploy the same COTS based TROPO radio systems capable of extended range operation in the Ku and C bands.

The small package will provide communications support for a battalion CP-size elements. A small package will have the flexibility of supporting a huge range of missions through its ability to scale up network capabilities needed to support forward operating bases, maneuver company CPs, and non-maneuver CPs. The primary transport of the small package will be COTs transit-cased tri-band SATCOM terminal supporting X, Ka, or Ku bands as well as a transit-cased terrestrial LOS transmission system.

The Army approved an "ESB-E Proof of Concept" be conducted in fiscal year 2012 at Fort Bliss, TX, and the 86th ESB has been identified as the unit to support this effort. During this process the TRADOC Capability Manager –Network and Services will work with the user-community, the materiel developer, and Headquarters Department of the Army to ensure the requirements and materiel solution are developed to support this concept.

The ESB-E concept will transform the Signal Regiment and present opportunities for the Regiment to incorporate emerging technologies needed to support our nation during peacetime and in wartime operations.

CPT Corris L. Bullock *serves as the Warfighter Information Network-Tactical Increment 1 Lead for TRADOC Capability Manager – Network and Services, Fort Gordon, Ga. Prior to his selection as a FA 51 (Acquisition Corps Officer), he served as the Battalion S6 for 716th MP Battalion (101st Airborne Division), Fort Campbell, Ky from December 2007 to March 2009. CPT Bullock's education includes an executive Master of Business Administration in information systems and a Bachelor of Science in information systems.*

SFC (R) Patrick Marshall *served more than 22 years in the U.S. Army as a telecommunications chief. In his last assignment with the 63D Signal Battalion, he served as the S3 NCOIC and network planner during Operation Iraqi Freedom in 2003-2004. He is currently a network analyst for the Signal Center of Excellence, Fort Gordon, Ga. TRADOC Capabilities Manager - Network and Services. He holds a Bachelor of Science degree in electronic systems management from Southern Illinois University.*

Acronym QuickScan

ATH - At-The-Halt
BLOS - Beyond Line of Site
COT - Commercial off the Shelf
DRSN - Defense Red Switch Network
DSN - Defense Switch Network
EOIP - Everything-Over-Internet Protocol
ESB - Expeditionary Signal Battalion
ESB-E - Expeditionary Signal Battalion-Enhanced
FDU - Force Design Update
FOB - Forward Operating Base
GBS - Global Broadcast System
HD - Homeland Defense
JCSE - Joint Communications Support Element
JTF-HQ - Joint Task force Headquarters
NIPR/SIPR - Non-Secure and Secure Internet Protocol Router
POP - Points of Presence
RHN - Regional Hub Node
SATCOM - Satellite Communication
SVOIP - Secure Voice Over Internet Protocol
SIGCoE - Signal Center of Excellence
STEP - Standard Theater Entry Point
TS/SCI - Top Secret/Sensitive Compartmentalized Information
TROPO - Tropospheric
VTC - Video Teleconferencing
VOIP - Voice Over Internet Protocol
WIN-T - Warfighter Information Network-Tactical
WAP - Wireless Access Point

Successful mission command requires fully integrated tactical operations center

By MAJ Phil Burns

At the 2011 Tactical C4 Conference, the National Training Center Signal Training Support Team reported that brigade combat team S6 sections are falling short of successful rotations at NTC.

Only three of 32 BCT S6 sections were recently evaluated as "successful" in systems validation and integration of mission command applications throughout the tactical operations center environment.

In other words, 91% of the BCT S6 sections were not successful.

Commanders hold S6 sections responsible for the successful integration of the transport layer with mission command applications, so Signal practitioners must organize to support commanders' demand for an integrated TOC.

While this statement may shock a few, this is hardly the first time that we have heard of this trend. The first integration crisis reached its peak in December of 2007. According to the 2007 CAC Tasking Order, "Officers and NCOs are not currently trained either in the institutional domain or during new equipment training to use battle command systems in an integrated fashion."

When MCS 6.4 testing with 4th Infantry Division occurred in 2004, units procured their own servers. Every unit had a different set of hardware and software for the TOC server. In 2005, clients for the command post of the future were fielded without a supporting server infrastructure at unit-level. This led to ad hoc, unit-level server acquisition, which led to initial integration challenges. This prompted the product manager for tactical battle command to take matters into their own hands in order to develop and standardize server support packages, which were fielded under the monogram of Battle Command Common Services. While this intervention by PM TBC was timely and necessary, overall integration training shortfalls were not addressed until 2008 after the Combined Arms Center issued a formal task order, calling for the development of digital master gunner and battle command integrator courses.

This integration void has not improved significantly over the past four years. Recently, the FORSCOM Commander, GEN James D. Thurman, witnessed 83 field service representatives supporting 1st Armor Division's 4th Brigade, during its rotation at NTC. GEN Thurman remarked that this level of FSR support is unacceptable and unaffordable.

It was clear during General Thurman's visit that Soldiers could not adequately operate, integrate, and maintain their CPOF, Blue Force Tracker, and Army Battle Command Systems. Skill atrophy appeared to be an issue given that units are in the habit of plugging into or falling in on fixed infrastructures in theater with FSRs providing skilled technical support. One JRTC observer affirmed this trend by stating that for some units, the configuring of BCCS server stacks at JRTC grinds to a halt when FSRs depart for the day.

The current integration crisis is a lot deeper than the issues discussed at the outset. The issues mentioned above are not the problems in themselves but rather symptoms of the overall problem. During a meeting with the Program Executive Office for Command, Control and Communications – Tactical, GEN Thurman began to address the problem by asking the question of who is the "gatekeeper" that validates capabilities to ensure network interoperability. To get at this question, the CAC Commanding General, LTG Robert Caslen, stated that Signal is in the best technical position to integrate the transport layer with mission command applications.

On 22 April 2011, MG Alan Lynn, the 35th Chief of Signal, accepted Signal's new mission to integrate the transport layer with mission command applications.

Outlining clear lines of responsibility is the first critical success factor that supports Signal's new mission. Signal owns the infrastructure of servers and networks that integrate Mission Command applications. Mission Command owns Mission Command applications that run on Signal's infrastructure. The synchronization of key stakeholder requirements is a dual responsibility of Signal and mission command,

and Figure 1 illustrates this dual responsibility (see acronym list for clarification of Figure 1's acronyms).

Ensuring the integration of mission command application data on Signal's infrastructure is a critical subset of Signal's new mission. This goes beyond just connecting the CAT-5 cable to the client system. Mission command application users are responsible for the installation, operation, and user-level troubleshooting of their respective applications. This new direction does not mean that Signal will write mission command applications. Instead, Signal will ensure coordinated helpdesk support to mission command applications to troubleshoot mission command application data integration problems. Signal provides service and support to mission command application integration throughout the TOC.

Training Signal Soldiers and leaders is the second critical success factor that supports Signal's new mission. The identification of potential training challenges impacting this new mission is critical. Training challenges fall into three categories: operational, individual and institutional. A training challenge at the operational level occurs when units do not train their Signal team throughout the ARFORGEN cycle. S6 sections must garner command support for their training to include mission command application users deploying their respective systems to digital training exercises. Establishing a leader or an organization with the responsibility of training, readiness and oversight is critical for this success.

Figure 2 provides an excellent example to program unit-level Signal training from the reset phase of a reset/train force pool to the available phase. In a perfect world, this would allow sufficient time to establish training and facilitate team development. As we generally do not live in a perfect world, developing a command supported Signal training plan is a significant challenge.

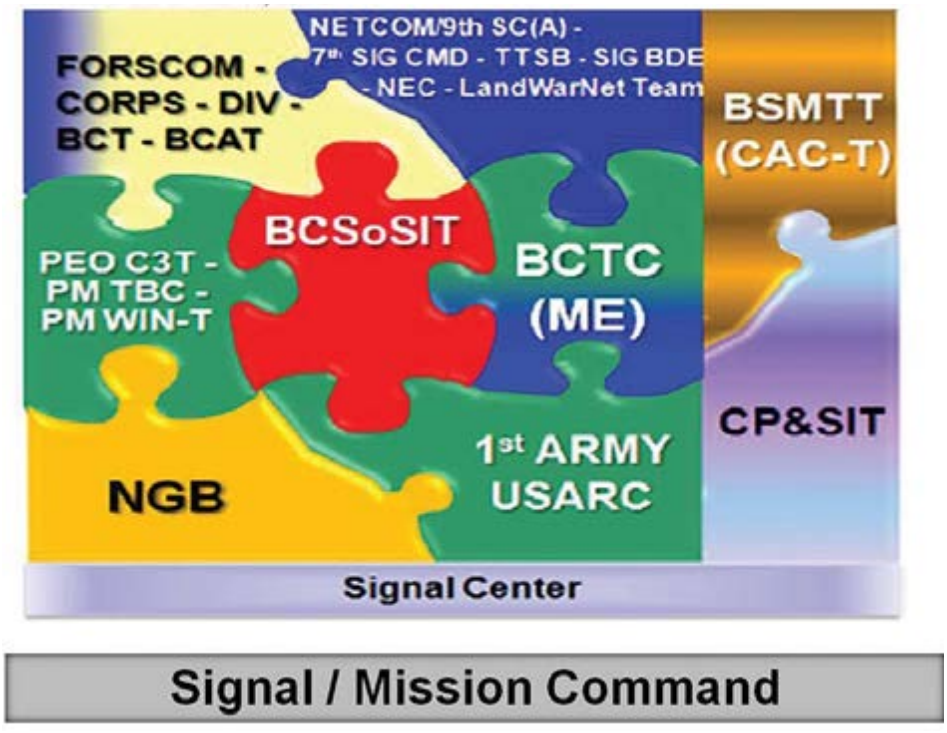


Figure 1 - Synchronization of Resources

What is not discussed in Figure 2 is the need for mission command application users to deploy their systems at all brigade field training exercises and other digital exercises, and faults must be introduced in order to teach advanced troubleshooting techniques.

Implementing Signal training allows Signal leaders to discover equipment shortfalls. A rotation at NTC is not the time to learn advanced troubleshooting techniques, to discover equipment shortfalls, or to learn how to configure BCCS server stacks.

S6 sections must train their Signal team prior to a rotation at NTC or JRTC. Measurable success metrics must be established, such as a timed metric for the establishment of common services supporting mission command applications. Metrics must be command supported and enforced. As a supporting effort in improving this training challenge, the installation campus network must be improved. The network enterprise centers must support and understand Signal team training objectives. This has been a recent focus of NETCOM and FORSCOM G6. This is a key enabler to success in Signal team training at homestation. Finally, S6 sections must ensure systems are IA-compliant.

An individual training challenge occurs when Signal Soldiers and Leaders do not

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conduct self-proficiency training. AR 350-32, Army Foundry Intelligence Training Program, is a regulatory process that shapes a Soldier into the Army intelligence mold. AR 350-32 states that the purpose of the foundry program is to enable, "... select Army personnel to learn new intelligence skills and sustain and improve their technical, analytical, and foreign language skills to execute intelligence missions successfully."

While LandWarNet eUniversity hosts online training, it is not the authoritative source for all Signal training. The S6 Community of Purpose website hosts Signal training, and certification requirements are spelled out in DoD 8570.01-M, Information Assurance Workforce Improvement Program. While efforts are ongoing to get at individual sustainment training, Signal would do well to establish a truly centralized individual sustainment training program that is leader enforced.

An institutional training challenge arises when schoolhouses are not scheduled or funded to receive new equipment that coincides with operational fielding of new equipment as required by AR 350-1. Often there is a large gap between the operational fielding of new equipment and the corresponding new equipment issuance at proponent schoolhouses.

If the Army's force stabilization system is factored into the equation, the above gap grows considerably. According to AR 600-35, personnel replacement ensures that "Soldiers will remain with the unit for the duration of the unit's lifecycle, arriving during a Reset Phase of a Reset/Train Force Pool and departing during the next Reset Phase or later." This policy allows for a 36-month personnel assignment window goal; however, a 24-month personnel assignment window is generally the norm. This creates a one-year gap, because TRADOC Regulation 350-70 states that the development of institutional training must coincide with the new equipment fielding in order to provide trained replacements for units first equipped with the new system. If programs of instruction require revamping due to changes in NET, it is conceivable that schoolhouses would graduate Soldiers who can install, operate and maintain the new system at the end of a 36-month cycle. Because iterative changes to systems are expected, it is anticipated that Soldiers will arrive to units "out-of-date," causing an additional training burden at the unit. Resourcing must be

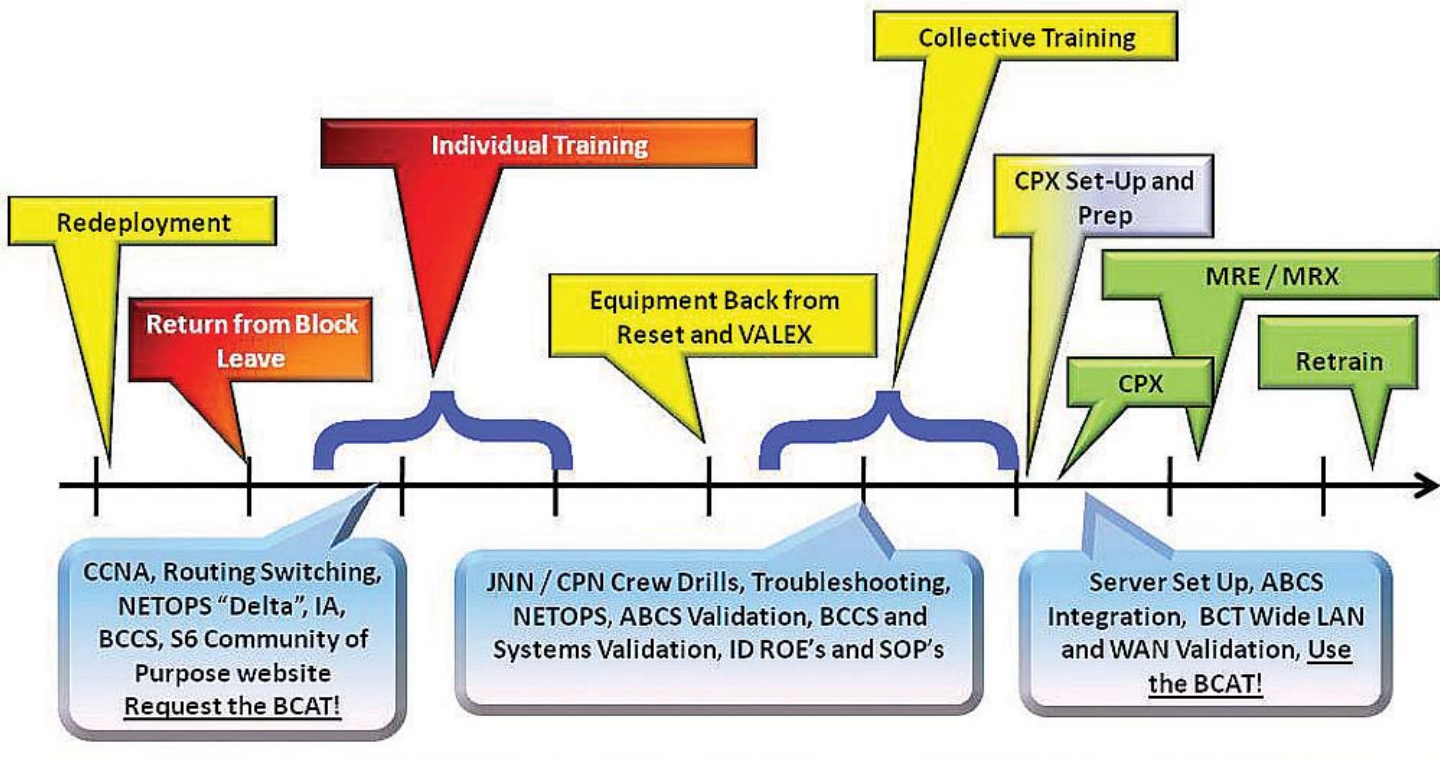

Figure 2 - Training Your Signal Team

revised to ensure timely fielding of new equipment to proponent schoolhouses.

A related institutional training challenge occurs when the basis-of-issue plan feeder data doesn't accurately reflect integrating training requirements. The BOIPFD may be a new term for some, and it is often underrated.

The significance of the BOIPFD should not be overlooked, because the BOIPFD impacts doctrine, organization, training, material and personnel portions of the DOTMLPF. The BOIPFD forms the basis of developing new equipment training, technical manuals, and troubleshooting guides, which ultimately inform system training plans and POIs. This is where operator and maintainer decision points are made as well. Tables of organization and equipment eventually reflect duty positions and new equipment placement based off the BOIPFD. The BOIPFD can also be used to inform critical task/site selection boards, establishing MOS responsibility for that piece of equipment.

Incomplete BOIPFD adversely impacts training when NET requirements are not clearly defined. Corresponding shortfalls in institutional training generally does not lag to far behind. For these very reasons, the BOIPFD for the next generation server consolidation initiative known as BCCS (AN/TYQ-155(V)1) is being reviewed by Signal Center of Excellence's Force Requirements Branch (FRB), TRADOC Capability Manager for Global Network Enterprise, TCM for Network and Services, and Office Chief of Signal with help from TRADOC Capability Manager for Mission Command's C2 cell. Currently the BOIPFD for the AN/TYQ-155(V)1 does not identify NET or sustainment training. An initial DOTMLPF assessment indicates that this omission obscured who should receive BCCS training. Recipients of NET must be clearly identified to ensure the right population receives the right training.

Providing timely solutions is the third critical success factor. The SIGCoE has set events in motion. An initial DOTMLPF assessment was conducted on 21-22 June 2011 at Fort Gordon. As stated earlier, SIGCoE's FRB and OCOS in coordination with Mission Command Center of Excellence's FRB have begun to analyze BOIPFD for BCCS servers supporting Mission Command application integration. SIGCoE's FRB in coordination with OCOS and the Maneuver Center of Excellence developed and staffed with ARCIC FDD, a Force Design Update, redesigning the BCT and Multi-Functional brigade S6 sections IAW the NETOPS Construct. Under this Construct, S6 sections will have well-staffed Network Assurance and Content Management cells. The FDU will authorize one CW3 Network Defense Tech (255S) within the S6 Network Assurance cell, which will provide senior leadership to ensure Mission Command applications are integrated in a secure manner.

A recent Functional Area Assessment at SIGCoE has identified a solution to bring back TRO to Signal elements across the force, earmarking Expeditionary Signal Battalions - Enhanced and Tactical Theater Signal Brigades to perform this function. Along with ESBs - Enhanced and TTSBs, division G6 sections will have "Battle Command Assistance Team" capabilities to provide additional TRO support. This will help to reverse the loss of TRO support provided by divisional Signal battalions as the Army moved to a modular force and Signal companies were parsed out to BCTs and M-F brigades. FORSCOM's BCATs are critical to provide training and readiness support to BCTs and M-F brigades until the TRO concept is realized.

An initial review of POIs is underway by the 15th Regimental Signal Brigade, training developers, and SIGCoE Quality Assurance Office in order to ensure courses support the mission to integrate Mission Command applications with the transport layer. The goal is to develop skills-based POIs with a clear end state to truly integrate the transport layer and MC applications. Two courses – the Brigade S6 Staff Course and the Signal Digital Master Gunner Course – have yet to be fully entered into the Army Training Requirements and Resources System, but both courses begin to get at the heart of training the technical and leadership skills necessary to manage Mission Command application integration. Work is underway to evaluate the feasibility of establishing an ASI for graduates of the Signal DMG Course, which could facilitate personnel assignments decisions of this trained workforce.

Additional initiatives are ongoing with the Signal DMG. In August, the Signal DMG Course instructors will conduct verification and validation with PM TBC. Version 4 of the BCCS server stack is the focus of the V&V. This initiative by 442d Signal Battalion will allow SIGCoE to begin to get at validating requirements and tasks that impact Signal's new mission.

Senior Signal warrant officers have begun

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a holistic review of integration tasks. The Combined Arms Training Strategy must reflect Mission Command integration tasks to include BCCS. Clear metrics must be provided. Along with lessons learned, NET requirements must be reviewed and fed into the CT/SSB. The holistic review by Senior Warrant Officers is critical to inform the Signal Regiment and to clear up blurred lines of understanding. The conduct of CT/SSBs must be predictable and consistent. Developing clear standards is the first logical step.

The SIGCoE's Accelerated Capabilities Division is looking into the development of cellular applications that will aid the BCT S6 section's mission from network operations to Mission Command application integration. Imagine phone applications that provide one-touch access to technical manuals, troubleshooting guides, and checklists via an intuitive GUI or through liberal use of Quick Response code attached to clients and servers. Building these applications would mean validating existing technical manuals, troubleshooting guides, checklists, online training material, etc. This is worthwhile if it aids the S6.

Having an eye to the future is the fourth critical success factor. We must first focus on impacts of technological change to how we train to perform our mission, such as the 2001 Network Synchronization Workgroup II identified a critical need to collapse multiple server infrastructures within operational forces. Currently, the distributed server infrastructures for BCCS, the Distributed Common Ground System – Army, and the Warfighter Information Network – Tactical provide a level of complexity, which requires significant integration and training post-fielding. Figure 3 demonstrates an initiative to converge intelligence and informational server infrastructures into a common, scalable server infrastructure, improving operational effectiveness with an added benefit in reducing hardware fielding and replacement costs as well as reducing training requirements. Efforts by DoD to reduce contractor levels are the next future event to track. The use of contractors throughout DoD has undergone increased scrutiny lately. According to a recent Congressional Research Service report titled ***Department of Defense Contractors in Afghanistan and Iraq: Background and Analysis***, 52% of DoD's workforce in Afghanistan and Iraq

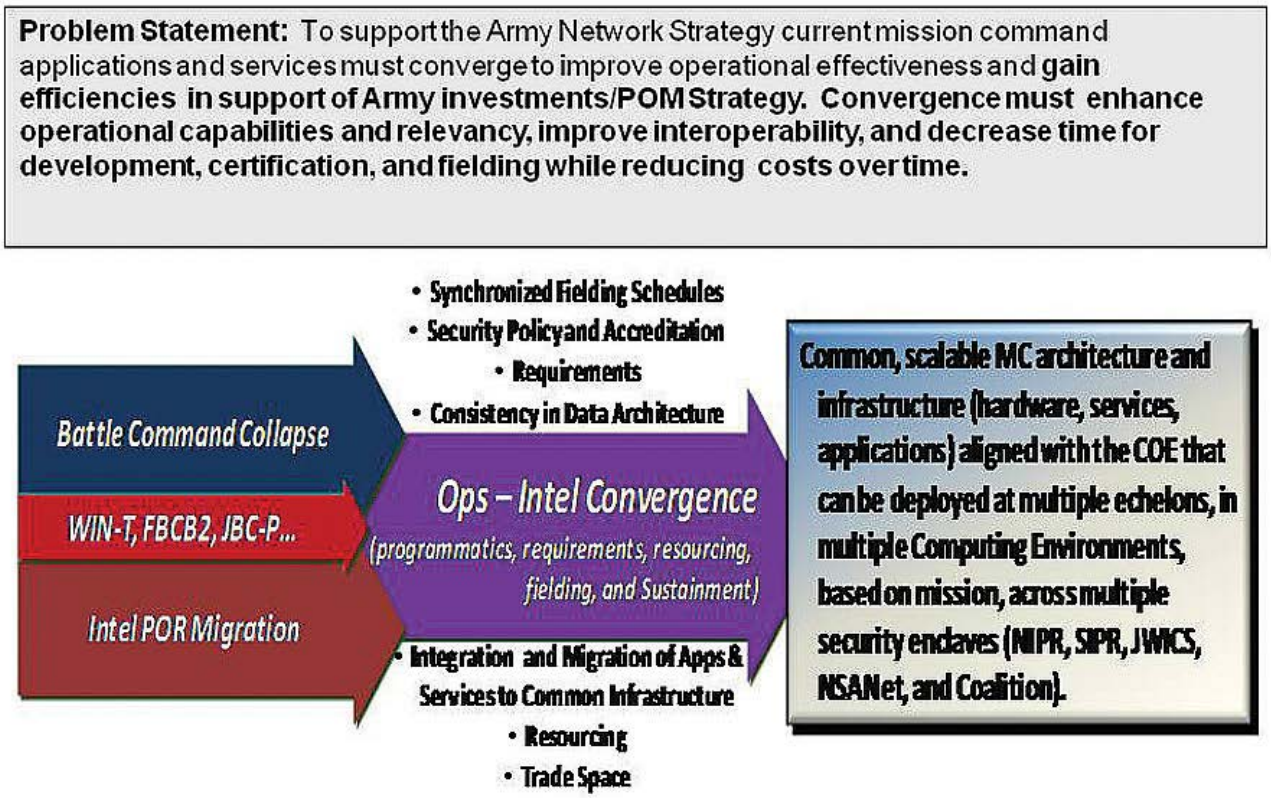

Figure 3 - Intel/Ops Convergence

consists of contractors. The same researchers contend that "Many analysts now believe that DoD is unable to successfully execute large missions without contractor support."

If FSR support is reduced, impacts to Signal's new mission must be evaluated to include any shortfalls in training that may exist.

Changes to the Signal Regiment human capital is the third area of focus. OCOS proposed a Signal Regiment human capital strategy. The strategy details a plan to recruit, develop, and utilize Signal leaders and Soldiers. The numbers of officers with technical degrees will increase at the frontend of recruitment.

For the first time, some key enlisted military occupational specialties will require an associate or bachelor degree to fill select technical fields. OCOS leaders are evaluating the structure of Signal officer Branch 25 and merging Functional Area 53 and 24 into a new Functional Area 26. Also under consideration is the restructuring of nine enlisted Signal MOSs into three new MOSs: network support, network operations and transmission systems. These actions are geared to ensure Signal supports the requirement of the Army to conduct warfare in a global arena in an integrated fashion.

Conclusion

MG Lynn has taken the bold step to accept the mission to integrate the network with mission command applications, challenging us with the task to support this new mission. This will be a partnership with mission command and key stakeholders. Synchronization of capabilities is critical, and doctrine must reflect this new mission. Individual sustainment training, operational training at units and institutional training at Fort Gordon must be relevant and support this new mission. Signal must remain flexible to anticipate changes to the mission or capabilities. Signal must organize to support commanders' demand for an integrated TOC. In short, the work has just begun.

MAJ Phillip G. Burns
currently assigned to TCM GNE, SIGCoE. He served as 2d Infantry Divisions Information Assurance Manager. He received a Master's degree in Computer Information Systems at Georgia State University and served as the Graduate Business Association's vice president of technology. In 2007, MAJ Burns graduated from the Information Systems Officer course at the U.S. Army School of Technology at Fort Gordon, Ga.

Join the Discussion
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Acronym QuickScan

BCAT - Battle Command Assistant Team
BCCS - Battle Command Common Services
BCSoSIT - Battle Command Systems of Systems Integration Training
BCT - Brigade Combat Team
BCTC - Battle Command Training Center
BOIP - Basis-of-issue plan
BOIPFD - Basis-of-issue plan feeder data
BSMTT - Battle Staff Mobile Training Team
CAC - Combined Arms Center
CP&SIT - Command Post and Staff Integration Team
CPOF - Command Post of the Future
CT/SSB - Critical Task / Site Selection Board
DOTMLPF - Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities
FORSCOM - Army Forces Command
FSR - Field Service Representative
JRTC - Joint Readiness Training Center
MCS - Maneuver Control System
M-F - Multi-Functional
NET - New Equipment Training
NGB - National Guard Bureau
NTC - National Training Center
PEO C3T - Program Executive Office for Command, Control, and Communications - Tactical
PM - Product Manager
PM TBC - Product Manager for Tactical Battle Command
PM WIN-T - Program Manager for Warfighter Information Network – Tactical
SIGCoE - Signal Center of Excellence
TCM GNE - TRADOC Capability Manager for the Global Network Enterprise
TCM N&S - TRADOC Capability Manager for Network and Services
TOC - Tactical Operations Center
TRO - Training, Readiness, and Oversight
USARC - United States Army Reserve Command
V&V - Verification and Validation

Signal Link Knowledge Network offers award-winning tools online

By Patricia M. Rimbey

The Signal Link Knowledge Network is designed to keep members of the Signal Regiment aware of current and emerging solutions that enhance training, readiness and mission accomplishment at all levels.

Consider it a concierge service for Signal professionals. It provides information specific to those operating in Army information and network technology positions and their supported communities. It is an online community for Signal professionals tailored for Soldiers, civilians and others serving or supporting all Signal operations. It contains or directs users to forums, training, and links to Signal organizations, collaborative tools and much more.

The SLKN mission is to implement a comprehensive strategy to streamline processes and leverage collaboration tools to share and transfer knowledge from within the Signal Center of Excellence throughout the Signal Regiment and back. It was established to act as a gateway for the Signal professional at every level, guiding them to information specific to the organizations in which they operate. As we explore all the ways to help better prepare and support Soldiers in all of their assignments, we hope to improve and enhance training, providing greater access to resources such as equipment simulations, as well as enabling mobile training teams visiting deploying units. We're working to create a collaborative environment in which we share experiences and collective knowledge better across the Signal Regiment.

SLKN is accessible with CAC or AKO Login credentials at www.slkn.Army.mil. This site provides a collection of various tools such as collaborations, lessons learned, training information, and other information provided by soldiers and agencies involved in service to the Regiment. Our goal is to continue to collect and post relevant and current information.

Using our SLKN Widget, you can quickly access other sites sponsored by the SIGCoE, such as; the SIGCoE Home Page for information about the Signal Center of Excellence, LandWarNet for online simulations and training material, the Signal

Link professional forums, the S6 Community of Purpose for those serving in or as G6/S6 positions and Doctrine Lessons Learned to submit and review observations and insights collected from units pre/during and post deployment.

SLKN will continue to be a work in progress, to ensure information remains useful and current. There is great synergy in our shared experiences. Using the comments and suggestion sections are imperative to our mission success, and to providing what you need from knowledge network. We ask for your comments, feedback and recommendations as we continue to support the Warfighter on the battlefield.

Annually, AKO proudly recognizes the innovation and creativity many administrators bring to their portal pages. The U.S. Army Signal Center of Excellence was among the 2010 winners of the Second Annual

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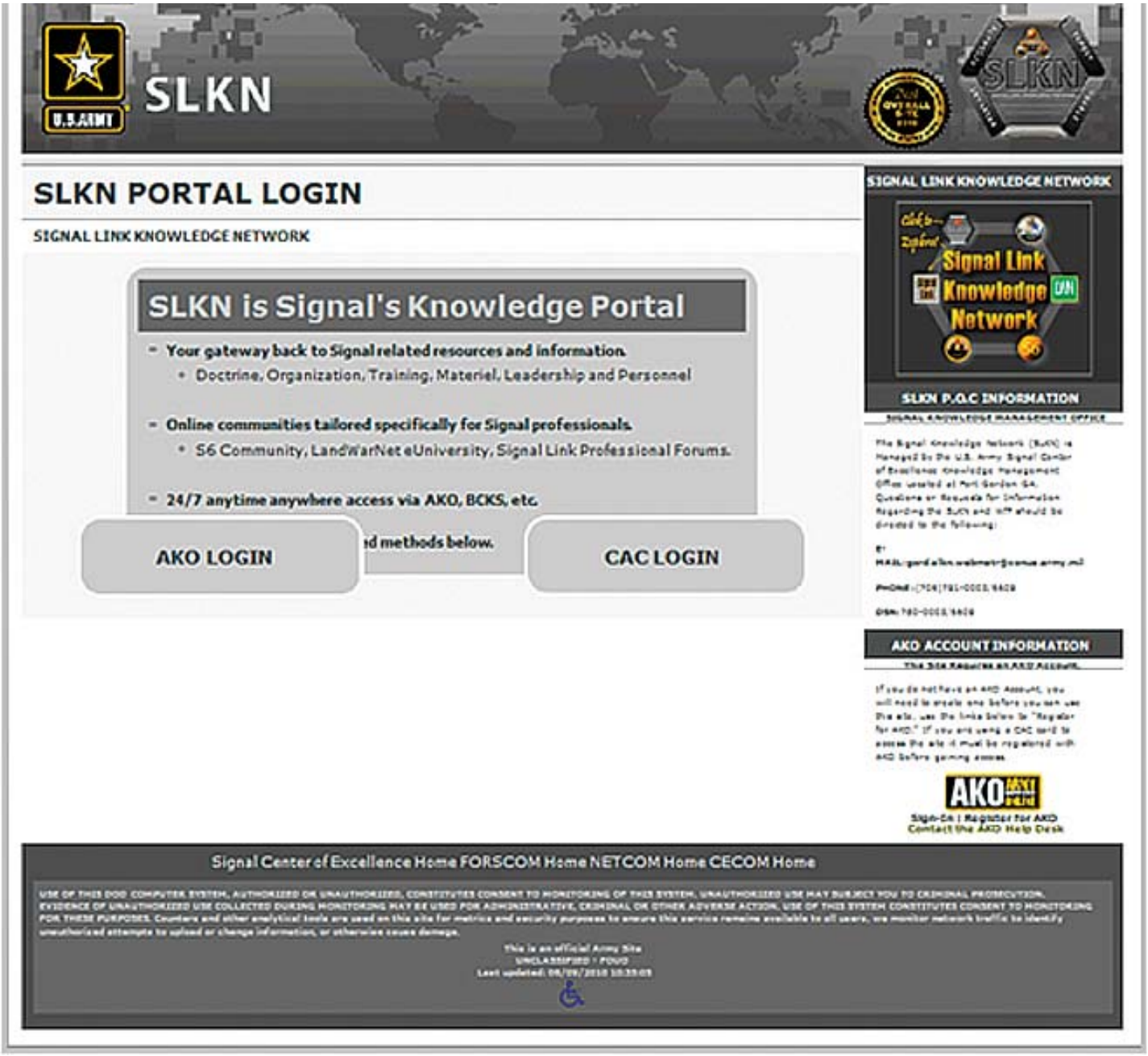

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Best of AKO Content in the category of Best Overall Site.

Patricia M. Rimbey *is a software systems engineer contractor supporting the G6 Office, U.S. Army Signal Center of Excellence, Knowledge Management Section. She retired from the U.S. Army after 20 years of service as a Signal officer.*

Acronym QuickScan

SLKN - Signal Link Knowledge Network
SIGCoE - Signal Center of Excellence
CAC - Common Access Card
AKO - Army Knowledge Online

New generators assure major fuel savings

By Josh Davidson

The U.S. Army will soon produce and deploy its next generation of tactical generators to Afghanistan, a move expected to save 300,000 gallons of fuel each month.

The green light for the Advanced Medium Mobile Power Sources program came in a July 20 full rate production decision by BG N. Lee S. Price, program executive officer for Command, Control and Communications-Tactical coupled with a full materiel release decision by MG Randolph P. Strong, commanding general of the Communications-Electronics Command. Production began immediately, with the first units expected to arrive in Afghanistan in November.

Consuming less fuel on the battlefield will require fewer supply convoys to transport fuel to remote areas. Because these convoys are a frequent target for roadside bombs and other enemy attacks, fewer tankers and fewer trips could reduce the risk faced by Soldiers transporting that fuel.

"Power is the lifeblood of the networked systems our Soldiers rely on to communicate critical information across the battlefield," BG Price said. "As those systems multiply in number and capability, the demand for power follows -- increasing the need for more efficient ways of generating, storing and distributing energy. The AMMPS family of generators answers that call. The most important factor is the number of Soldiers who will not be placed in harm's way having to transport that fuel."

Ranging in size from 5 kilowatts to 60 kW, AMMPS are 21 percent more fuel-efficient on average than the tactical quiet generators currently deployed to Afghanistan. They also feature size and weight reductions. During a wartime operations tempo, a 15 kW AMMPS generator pays for itself in fuel savings alone in nine months.

The new generators, fielded by the Project Manager for Mobile Electric Power, enter the production and deployment phase at a key moment for the Army's operational energy strategy. The service, which accounts for 21 percent of the Department of Defense's fuel and power consumption, is aggressively pursuing ways to reduce its energy footprint while ensuring Soldiers' power needs are met.

The AMMPS program is a highlight of these efforts, Chiarelli said, along with the implementation of microgrids that more efficiently distribute power. The service is also leveraging energy from fuel cells, wind, solar and other renewable energy sources.

"This is a great day for PM MEP, the Army and our Soldiers," said Paul Richard, acting project manager for Mobile Electric Power. "Not only will AMMPS provide a significant monthly fuel savings, they will also reduce the exposure of our Soldiers to the dangers of improvised explosive device attacks on supply convoys."

AMMPS also feature digital control screens in place of dials, extra cooling fans, and standardization between units of different sizes to simplify maintenance.

"These power sources will significantly improve the quality of life for our Soldiers in the field, as well as the Army's ability to successfully conduct its missions," said LTC Michael E. Foster, PM MEP's product manager for Medium Power Sources.

PM MEP, part of the Army's Program Executive Office Command, Control and Communications - Tactical, provides standardized tactical electric power capabilities to the Department of Defense and environmental control capabilities to the Army. Therefore, Soldiers, Sailors, Airmen and Marines deployed worldwide will also receive the fuel and manpower savings associated with the AMMPS generators as they are procured and fielded throughout the other services. In 2009, PM MEP was awarded the David Packard Award for Acquisition Excellence, the highest acquisition award in the DoD.

The PEO C3T provides Soldiers with the computer systems, radios and communications networks they require to succeed in full-spectrum operations. The organization develops, acquires and fields to all Army units a range of products including specialized software applications, generators, radios, computers, servers and communications systems; and integrates these and other systems together so they function seamlessly; while providing on-site training and support for these systems deployed worldwide.

Josh Davidson *is a graduate of The College of New Jersey (formerly Trenton State College), in Ewing, N.J. Prior to becoming a government civilian strategic communications representative with PEO C3T, he was an investigative, music, sports and municipal journalist with numerous publications including Gannett Newspapers. He has interviewed GEN (Ret) David Petraeus, GEN Kevin Chilton, and GEN Ann Dunwoody. He has covered numerous tests, exercises and events related to Army satellite communications systems and applications.*

Joint IP modem providing efficient on-demand bandwidth for robust networks

By Stephen Larsen

The requirements of net-centric warfare and operations for robust networks, information sharing and collaboration has led the U.S. military to increasingly transition to using Internet Protocol-based products over both government and commercial satellites.

To date, U.S. military satellite communications systems utilizing IP over SATCOM include, among others, the Army's Warfighter Information Network-Tactical Increment 1and Combat Service Support SATCOM; the Marine Corps' Support Wide Area Network; the Air Force's Global Broadcast Service; and the Navy's Commercial Broadband Satellite Program.

However, these and other similar systems, all utilize different proprietary modems. According to officials at the Defense Information Systems Agency, there are many different modems in the DoD inventory, each requiring its own logistics support. The proliferation of non-standard modems also presents issues regarding interoperability, efficient use of bandwidth and transmission security.

Help is on the way, through the Joint IP Modem, which will soon become the DoD's standard IP modem, based on the widely-adopted Digital Video Broadcasting-Satellite 2nd Generation and Digital Video Broadcast-Return Channel Satellite standards. Managed by the JIPM Program Office of the DISA with the Defense Communications and Army Transmission Systems project office, part of the Army's Program Executive Office Enterprise Information Systems, serving as the acquisition agent, JIPM underwent qualification testing from 7 - 17 Dec. 2010 at the Joint SATCOM Engineering Center at Fort Monmouth, N.J.

JIPM passes qualification testing

According to Johnny Ng, DCATS' JIPM project leader, testers utilizing JIPM successfully passed network traffic via Defense Satellite Communications System and Wideband Global SATCOM military satellites and a Telstar 14 commercial satellite in the X, Ka, and Ku bands. Also, he said, the JIPM Network Control Center, a two-rack hub, successfully broadcasted and received traffic from multiple remote modems (RMs), each of which are housed in a 1U-sized (1.719 inches or 43.7 mm) chassis.

"JIPM works in a hub-spoke configuration, similar to Direct TV," said Ng. "With JIPM, one signal goes up from the hub to the satellite and spreads to many other remote modems (the spokes) around the world."

Ng said JIPM testers demonstrated both unicast (host to host) and multicast (one host to a specific set of hosts) operations utilizing 11.58-meter AN/GSC-39 terminals and 2.4-meter tactical very small aperture terminals to transmit at X-band, the 9-meter Ka Satellite Transmit and Receive Systems (KaSTARS) AN/GSC-70 terminal to transmit at Ka-band and a satellite simulator to transmit at C-band.

Art Reiff, a SATCOM consultant with DCATS, said JIPM uses satellite bandwidth much more efficiently than prior types of modems.
"Prior modems would stream data over a channel, and had a slot on a satellite whether they needed it or not, which is very inefficient," said Reiff. "Now, JIPM only requests use of satellite bandwidth when it needs it and otherwise it gives up the slot for others to use, which is very efficient."

"In addition to much more efficiently utilizing costly satellite resources, JIPM will extend the 'everything-over-internet-protocol' paradigm to users throughout the Global Information Grid," said COL Jeff Mockensturm, project ,anager, DCATS.

Ng said that JIPM is unique among modems in that it employs internal TRANSEC that has been certified to comply with the National Institute of Standards and Technology Federal Information Processing Standard 140-2.
DCATS is acquiring JIPM, said Ng, via an $87 million delivery order awarded in Oct. 2007 on the World Wide Satellite Systems ID/IQ contract from prime contractor Globecomm Systems Inc. of Savage, Md., with ViaSat Inc. of Carlsbad, Calif. serving as the major subcontractor. The

first deliveries, said Ng, will be of JIPM Network Control Centers in early 2011 to various DoD Teleport and Standardized Tactical Entry Point sites.
The first deliveries of remote modems, he said, will be in April 2011 to Hanscom Air Force Base, Mass., followed by deliveries in June 2011 and July 2011to the Navy in Charleston, S.C. and Norfolk, Va..
Ng said that the version of JIPM that just completed qualification testing could only be the first stage of an evolving standard IP infrastructure that will continually grow to serve future warfighter needs.
"The project team is considering future JIPM enhancements such as dynamic routing, improved encapsulation and mesh network architectures and exploring remote modem packaging options to accommodate ground-mobile, shipboard, and airborne platforms," said Ng.

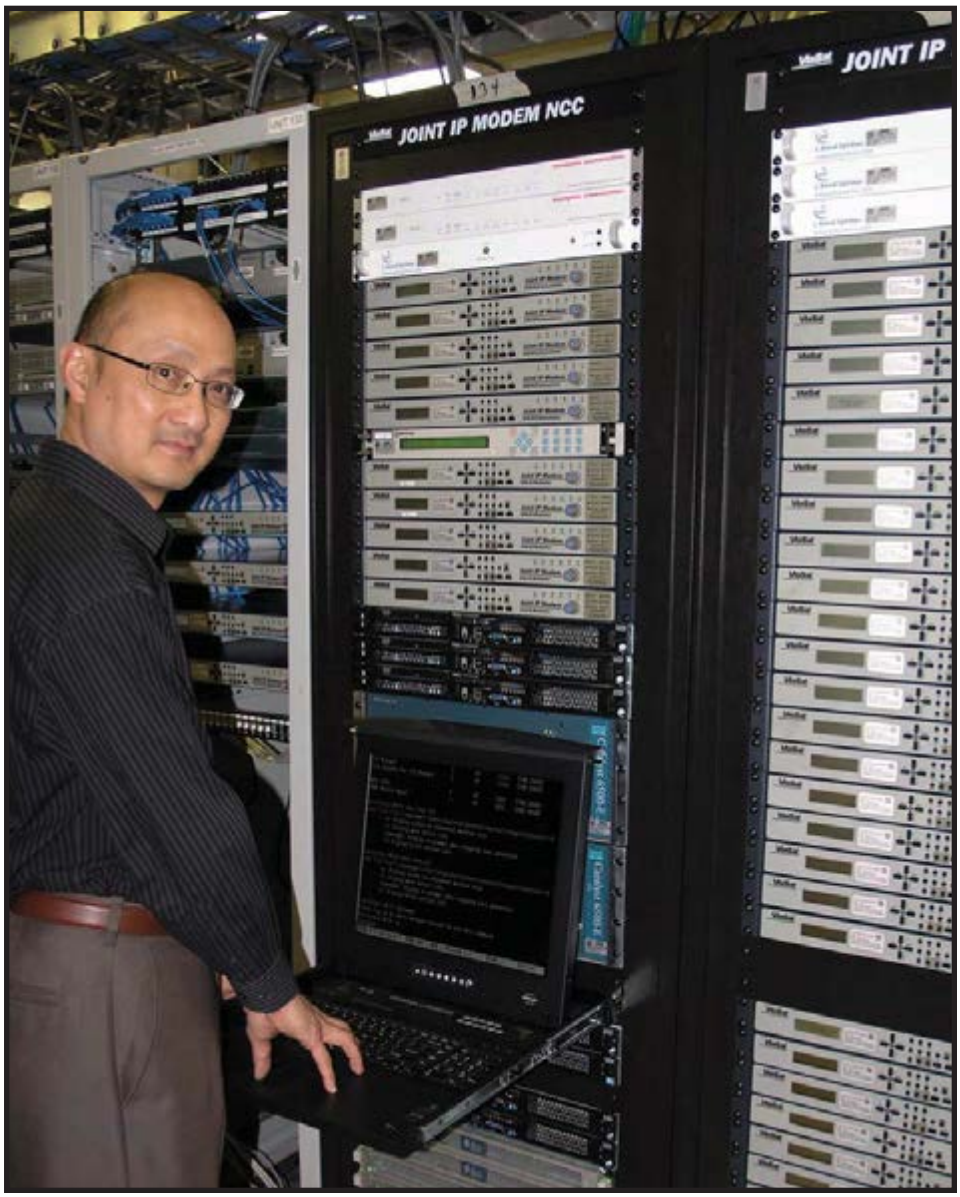

Photo by Stephen Larsen

Johnny Ng, Joint Internet Protocol Modem product leader with the Defense Communications and Army Transmission Systems Project Office, checks out JIPM Network Control Center during recent qualification at the Joint SATCOM Engineering Center at Fort Monmouth, N.J.

Acronym QuickScan

CBSP - Commercial Broadband Satellite Program
CSS - Combat Service Support
DCATS - Defense Communications and Army Transmission Systems
DISA - Defense Information Systems Agency
DVB-S2 - Digital Video Broadcasting-Satellite 2nd Generation
DVB/RCS - Digital Video Broadcast-Return Channel Satellite
EOIP - Everything-over-internet-protocol
FIPS - Federal Information Processing Standard
GBS - Global Broadcast Service
GIG - Global Information Grid
GSI - Globecomm Systems Inc
IP - Internet Protocol
JSEC - Joint SATCOM Engineering Center
JIPM - Joint IP Modem
KaSTARS - Ka Satellite Transmit and Receive Systems
NIST - National Institute of Standards and Technology
SATCOM - Satellite Communications
STEP - Standardized Tactical Entry Point
SWAN - Support Wide Area Network
TRANSEC - transmission security
VSAT - Very small aperture terminal
WIN-T - Warfighter Information Network-Tactical
WWSS - World Wide Satellite Systems

Edward P. Alexander versus Albert J. Myer

Success and failure at the Battle of Bull Run 21 July 1861

By Steven J. Rauch

(This is the first of a series of articles commemorating the 150th anniversary of the U.S. Army Signal Corps during the American Civil War. Future articles will feature key events at or near the 150th anniversary of the event.)

On 21 July 1861 the first great battle of the Civil War occurred near Manassas Junction and Bull Run Creek in Northern Virginia. There a 35,000 man Union Army commanded by BG Irvin McDowell fought two Confederate armies of about 33,000 men under BG Pierre G.T. Beauregard and GEN Joseph E. Johnston. Both sides anticipated the battle to be decisive and perhaps end the war quickly.

The United States Civil War pitted former comrades and close allies against one another; as was the case with Albert J. Myer and Edward P. Alexander who were early practitioners of the wig-wag signaling system that transformed battlefront communications.

What neither side anticipated however, was that the application of a new communications system would prove decisive in determining the outcome of the battle in favor of the Confederates.

Ironically, it was during this battle that two of the most prominent figures in Signal Corps history found themselves on opposing sides, having once been close colleagues in developing the visual communications system known as "wig-wag." Both MAJ Albert J. Myer, serving as the signal officer of the U.S. Army, and CPT Edward Porter Alexander, serving in the same capacity in the Confederate Army, experienced the excitement of the first major battle of the Civil War. However, both had very different experiences and it was Myer's Army that suffered a major defeat because of the successful employment of the wig-wag system by his former colleague Alexander. The result was that both armies, north and south, understood the usefulness of Myer's system which could change the tide of battle as it did that day at Bull Run 150 years ago.

Pre-war Signaling Experiments

Albert J. Myer was an imaginative and enterprising military leader, who conceived, equipped, trained, organized, and directed the U.S. Army Signal Corps during the Civil War. Initially studying as a physician, in January 1854 Myer passed the Army medical board examination and received an appointment as an assistant surgeon in the Regular Army a year later. He was assigned to various frontier posts in Texas where he supported Army units engaged in operations on the frontier. Myer often accompanied the patrol columns where he had many opportunities to observe Indian scouts and their methods of signaling by means of crude flags, which inspired him to create a signal system of his own.

Myer spent almost two years devising a visual signal alphabet that could be taught quickly and be easily understood. He used flags in a system called "Wig-Wag" based on using motion where "one" was indicated by waving the flag to the left and "two" by a motion to the right and "three" with a wave to the front. This system could transmit about three words a minute during daylight hours up to a distance of 15 miles. The system could also be employed at night by using torches.

In 1859 Secretary of War John B. Floyd arranged

Albert J. Myer, father of the U.S. Army Signal Corps.

for Myer to present his ideas before an Army board. LTC Robert E. Lee presided during the evaluation of Myer's system and he concluded it would be a useful supplement for the current methods of sound and messenger. Floyd eventually granted Myer an absence from his medical duties to conduct further study of the wig-wag. Myer spent considerable time in the combat development process experimenting with flag and torch devices, working with various manufacturers, and perfecting operations techniques.

To assist Myer, Floyd assigned engineer officer LT Edward Porter Alexander, who had graduated third in the West Point class of 1857. Alexander and Myer traveled to New York City where they worked constantly to determine the feasibility of the wig-wag system. As a result, Alexander became an expert in the Use of the wig-wag and wrote in his memoirs: "We spent the whole fall [1859] and until Christmas about N.Y. experimenting. Usually I would go down to Sandy Hook on Mondays and he would go to Fort Hamilton. I would board in the light hoUse with the keeper and Myer and I would signal to each other, 15 miles apart, all day and until near midnight every night – experimenting with different devises and methods – until Saturdays, when we would meet at St. Nicholas Hotel in N.Y. and compare notes."

This illustration depicts Albert J. Myer's ill-fated balloon expedition as the craft became entangled in trees along the road to Bull Run. Myer abandoned the balloon effort and served the rest of the battle as a mounted courier while Edward P. Alexander successfully employed Myer's wig-wag system.

The Signal Corps celebrated its 150th anniversary in 2010. The Corps proved its worth in the midst of the Civil War.

In November 1859 Myer asked Alexander to prepare a report for Adjutant General of the Army Samuel Cooper. In the report, Alexander pointed out the speed with which he had learned Myer's system and the success they had "far exceeded our expectations and is conclusive evidence to myself of the absolute perfection, as well as … simplicity of the system." Alexander discussed both day and night testing that occurred, "In ordinary weather over a distance of 15 ¼ miles" using an apparatus that was "very light and simple and so portable that one man, mounted or on foot," could transport and use it.

Alexander concluded, "In short, it is capable of mathematical demonstration that the System is the most perfect, comprehensive and simple that can possibly be devised."

On 29 November 1859, Myer reported to Cooper that the system had not been "sufficiently elaborated to be sent into the

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field." Both Myer and Alexander were directed to continue their experiments and during the period just before Christmas, they carried out a final series of trials with Myer stationed on the New Jersey Highlands and Alexander 15 miles away at Fort Tomkins on Staten Island. They continued to learn through trial and error about the visibility of daytime signals under differing conditions of light, shadow, background and the color of their flag. They also concluded that the four foot flag should be the standard size because it became the one they Used the most in the experiments. Alexander commented that he could read signals made with a four-foot flag on a 12-foot pole "with [only] a small and weak glass." If no one else, at least two people in the Army were convinced of the value of Myer's system.

Myer's vision was realized on 21 June 1860 when Congress established the position of signal officer on the Army staff and Myer was appointed to that position as a major. He was also authorized to purchase $2,000 worth of signal equipment for use by the U.S. Army.

The Battle of Bull Run--July 1861

This illustration shows BG Thomas J. Jackson at the battle of Bull Run on 21 July 1861. It was here he attained the sobriquet of "Stonewall," from a comment made by BG Bernard Bee, for his units' firm stand during the battle.

On 16 July 1861 the people of Washington D.C. cheered as BG Irvin McDowell's 35,000-man Army marched out of town to heed the cry of "On to Richmond" and to put a quick end to the rebellion started in April at Charleston, S.C. McDowell's Army consisted of raw volunteers, none of whom had the faintest idea of the nature of combat. The inevitable victory was an attraction which enticed many men, women, children and even congressmen, to follow the Army, with many carrying picnic baskets filled with refreshments for consumption during what all expected would be a wonderful show.

McDowell's slow-moving columns were aimed at the vital railroad junction at Manassas, Va. If McDowell could seize that junction, he would control the best overland approach to Richmond. On 18 July McDowell's Army reached Centreville. Five miles ahead a meandering stream named Bull Run lay across the route of advance, and there, guarding the fords, were 22,000 Confederate troops under command of GEN Pierre G.T. Beauregard. McDowell spent the next two days scouting the Confederate left flank looking for a way to avoid the main enemy defenses. In the meantime, Beauregard asked Richmond for help. GEN Joseph E. Johnston, stationed in the Shenandoah Valley with 11,000 Confederate troops, was ordered to support Beauregard. Johnston did so, starting his brigades toward Bull Run quickly, and to some, unexpectedly by Using the Manassas Gap Railroad, one of the first examples of operational movement in that manner.

On the morning of 21 July, McDowell sent his columns in a long march northwest towards Sudley Springs Ford where he correctly determined the Confederate left flank was weakest. He planned for a diversionary attack on the Confederate right flank where the Warrenton Turnpike crossed Bull Run at the Stone Bridge. At 0530 hours the bark of a Union 30-pounder Parrott rifle shattered the morning calm, signifying that the first major battle of the Civil War had begun. For McDowell's plan to succeed, he needed to achieve speed and surprise, both difficult with inexperienced troops.

GEN Beauregard decided to use economy of force by positioning several brigades on his left flank to guard key crossing points south of Bull Run creek while he massed the main force on the right to attack north toward Centreville. What he did not know was that BG McDowell had much the same plan and as a result both were strongest where their enemy was weakest. The winner

would be determined by which Army could most quickly identify the enemy actions and cope with the resulting chaos that followed.

CPT E.P. Alexander Confederate States of America

During the 1861 secession crisis, Georgia native Alexander resigned his U.S. Army commission and sought appointment in the Confederate Army to fight for his state and new country. Ironically, President Jefferson Davis, who had been a staunch opponent of Myer and his system of signals prior to the war, assigned Alexander

Monument to E.P. Alexander and his actions at Bull Run erected on Signal Hill by the Signal Corps Regimental Association. The monument is inscribed with Alexander's warning message to Evans as the first battlefield telecommunication in U.S. history.

CPT E. P. Alexander
Confederate States of America

to Beauregard's staff to provide a wig-wag signal capability. Alexander quickly trained a detachment of infantry soldiers as signalmen and located four signal stations on hilltop positions behind Bull Run from where activities within the area of operations could be easily observed.

On the morning of 21 July, Alexander was at the Signal station on the Wilcoxen farm, east of Manassas. At about 0830 as he was looking towards his Signal station near the Van Ness house on the left flank, the sun behind him reflected a bright light on objects several miles west of that position.

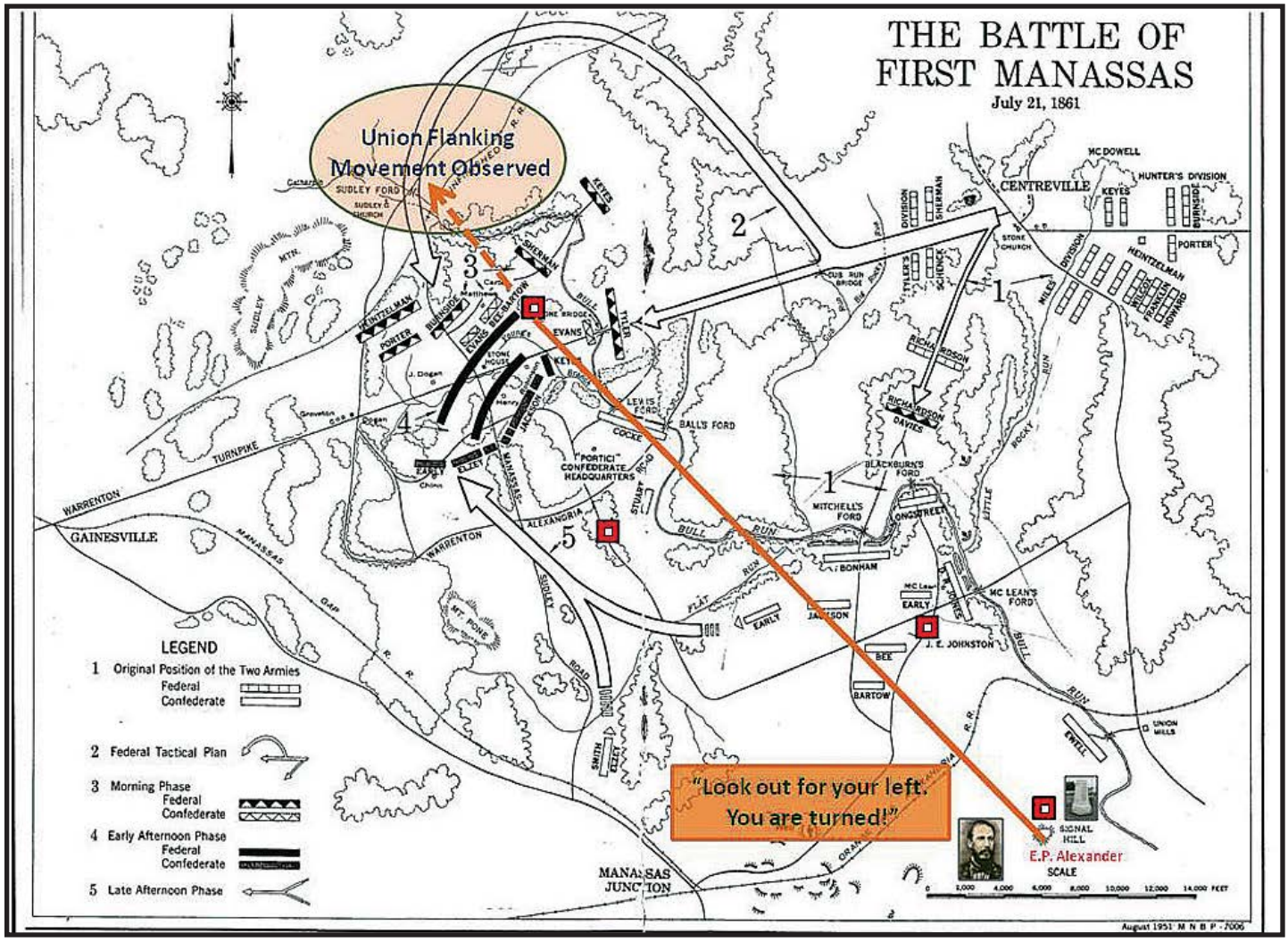
Alexander recalled, "It was about eight miles from me…a faint gleam, but I had a fine glass and well trained eyes, and I knew at once what it was. And careful observation also detected the glitter of bayonets all along a road crossing the valley, and I felt sure that I was 'on to' McDowell's plan." What he saw was McDowell's movement to cross Bull Run at Sudley Springs Ford. Alexander had discovered the Union flanking maneuver! He quickly wig-wagged the Van Ness station which was collocated with COL Nathan G. Evans' brigade, the closest CSA unit at the far left of the line, with a warning that said, "Look out for your left You are turned." Receiving this information, Evans moved his 1,100 man brigade northwest to Matthews Hill where he formed a blocking position until reinforcements could arrive. Alexander then sent a written message to Beauregard who was not near a signal station. Alexander's note read: "I see a column crossing Bull Run about 2 miles above Stone Bridge. Head of it is in woods on this side; tail of it in woods on other side. About a quarter mile length of column visible in the opening. Artillery forms part of it."

After receiving Alexander's warning, Beauregard ordered several infantry brigades to the threatened flank, thus parrying what would have been a surprise attack on his left. Speed and surprise was what McDowell needed, however Alexander snatched those elements away from him becaUse he effectively employed Myer's wig-wag in a tactical network.

Meanwhile, Alexander continued his observations throughout the battle space and he noticed on the right flank, "Where I was watching its gradual development from my high hill and getting messages from my Stone Bridge station until the Federal advance, after driving back the Hampton Legion and the Georgians, compelled everything to quit the west side of the pike."

He then turned back to the left where he witnessed first-hand how effective railroads would become during the war relating: "Something else began to attract my attention. I could overlook the country to the west – out left – and now I began to notice clouds of dust begin to form. . . I of course sent prompt messages to the

(Continued on page 30)



This map depicts Alexander's wig-wag information network on 21 July 1861 during the battle of Bull Run/First Manassas. From his position on Signal Hill, he detected the Union flanking maneuver over eight miles away. His wig-wag message was relayed to the station nearest Evans' brigade which then moved to block the enemy movement, thus saving the Confederate left flank.

(Continued from page 29)

generals by my couriers, and by signals to all points, and I reported too what I could see of the fight, which was making more and more noise on the left . . And as the sun got higher the dust clouds in the west also grew denser and taller, until they became veritable pillars in the air….It turned out to be made by the trains of GEN Johnston's Army."

The CSA delaying forces swelled to about 2,800 men who held Mathews Hill for about one and a half hours until a stronger defense was established at Henry House hill. Soon the CSA brigades of BG Barnard Bee and COL Francis Bartow marched to Evans' assistance.

Attempting to rally his men on Henry House hill, Bee looked to GEN Thomas J. Jackson's newly arrived brigade as an anchor to stem the tide. Pointing to Jackson's position, Bee shouted to his men, "There stands Jackson like a stone wall! Rally behind the Virginians!" GEN Johnston and GEN Beauregard then arrived to assist and rally the brigades. Johnston would write in his 22 July report: "About 8 o'clock GEN Beauregard and I placed ourselves on a commanding hill in rear of GEN Bonham's left Near 9 o'clock the signal officer, CPT Alexander, reported that a large body of troops was crossing the valley of Bull Run some two miles above the bridge. GEN Bee, who had been placed near COL Cocke's position, COL Hampton, with his Legion, and COL Jackson, from a point near GEN Bonham's left, were ordered to hasten to the left flank. The signal officer soon called our attention to a heavy cloud of dstt to the northwest and about 10 miles off, such as the march of an Army would raise." (OR Series I, Vol. II p.474)

What had happened during that hour at Bull Run was an astounding event - for the first time in military history tactical information had been transmitted by wig-wag network more rapidly

than a courier could ride and led directly to the Confederate victory. Alexander had used his training with the wig-wag to save the day, but where and what was Myer doing while his wig-wag system was being used against his own Army?

MAJ Albert J. Myer United States Army

Ironically, while Alexander was proving the value of the wig-wag information network, Myer was attempting to incorporate new technology into the fight. Myer involved himself with an observation balloon operated by civilian contractor John Wise, which he hoped to use for reconnaissance and communication at McDowell's headquarters. Wise had brought the balloon to Washington D.C. on 20 July, inflating the balloon just before midnight. The balloon party consisted of Myer, who took command, 20 men from the 26th Pennsylvania Volunteer Infantry Regiment who served as the ground crew holding the ropes (much as a parade balloon is today), Wise, his son Charles and civilian wagon teams carrying various equipment.

At about 0200 hours on 21 July, the group walked the balloon up Pennsylvania Avenue to Georgetown, arriving there about dawn. Then they moved along the Chesapeake and Ohio Canal, crossed the Potomac and arrived about at Fairfax road around noon. By this time the sound of battle could be heard from Manassas, the effect of which quickly lead to the abandonment of all patience and care. Myer, anxious to get to the battle, ordered the balloon tethered to one of the

(Continued on page 32)

On the morning of 21 July 1861, Confederate BG Bernard Bee, having recently resigned from the United States Army and still wearing his blue uniform, realized that the army's left flank was seriously exposed. Bee ordered the Fourth Alabama to advance rapidly in order to plug the gap in the Confederate line. Along with Evans' brigade, Bee and his brigade held their positions for over an hour and repulsed several Union regiments, stalled the Union advance and gave the Confederate forces more time to regroup.

(Continued from page 31)

wagons for faster movement. The inflated balloon subsequently became entangled in the trees along Fairfax road and could not move. When Myer tried to force it out of the snare by whipping the horses, the action tore large holes in the bag and in a few minutes it had deflated into a pile of torn shreds. Myer ordered the group to return to Washington, asked Wise to repair the balloon and bring it back to Manassas, thinking the battle would continue for several days. Abandoning the balloon idea, Myer sped to McDowell's headquarters, arriving at about 1500 hours just as the Union Army began to collapse. Myer then served as a mounted messenger for the remainder of the battle. Thus Myer found himself without a wig-wag information network or any other unique Signal capability for the first major battle of the Civil War.

Battle of Bull Run Outcome

The battle continued until just after 1600 hours when fresh Southern units crashed into the Union right flank on Chinn Ridge, causing McDowell's tired and demoralized Soldiers to withdraw. At first the withdrawal was orderly but then turned to panic as the road to Washington was jammed with the carriages of civilians who had come out to watch the fight. The retreat quickly became a rout and the Confederates would celebrate a decisive victory.

The Union lost about 460 killed, 1,124 wounded, and 1,312 missing for 2,896 casualties. The Confederate loss was 387 killed, 1,582 wounded, and 13 missing for a total loss of 1,982 men. By dawn the next day, the Union Army was back behind its defensive positions of Washington D.C., no longer a threat to Richmond.

The battle at Bull Run demonstrated that the Civil War would not be decided by a decisive battle in the style of Napoleon. In the North, President Lincoln called for an additional 500,000 volunteers for three-year enlistments. In the South, once the euphoria of victory had worn off, Jefferson Davis called for 400,000 additional volunteers. Both sides thus began preparing for a long and bloody conflict – the most deadly in American history.

Illustration depicts a charge by Soldiers engaged in the Battle of Bull Run on 21 July 1861.

A Triumph for the Wig-Wag System

The Confederate victory at Bull Run can be directly attributed to Alexander and his network of wig-wag signal stations. After Bull Run, Alexander maintained control of CSA signal operations but also assumed the duties as Johnston's chief of ordnance.

In April 1862 the Confederate Signal Corps was formally established as a separate branch, but Alexander turned down the position of chief signal officer. He did however take charge of the short-lived Confederate air force, consisting of an observation balloon tethered to a river boat on the James River from which he reconnoitered the enemy line. In effect, Alexander had used the first aircraft carrier in military operations. Alexander would achieve everlasting fame at Gettysburg where he commanded all First Corps artillery and conducted the intense bombardment of Union positions on Cemetery Ridge to prepare the way for 15,000 CSA infantry to attack the Union line on 3 July 1863.

Alexander would be promoted to brigadier general on 26 February 1864 and in June wounded in the shoulder by a sharpshooter during the siege at Petersburg, Va. He continued with the Army until the surrender at Appomattox in April 1865.

Many years later, on 28 April 1910, he died in Savannah, Ga. and was buried in Magnolia Cemetery in Augusta, Ga. Edward Porter Alexander is remembered daily by Soldiers at the U.S. Army Signal Center of Excellence when they use the auditorium in Alexander Hall, named in his honor.

Myer must have felt a bitter satisfaction that he had been absolutely correct about the capability of the wig-wag system that was employed so successfully against his own Army.

It was just a beginning. During the course of the Civil War, Signal Soldiers from both sides deployed on high ground, in tree tops, on roof tops and on signal towers to locate enemy troop movements and help adjust artillery fire. They served as intelligence gatherers who could often intercept and read each other's messages. Both also employed their Signal personnel and systems in joint operations with the navy. In the Union Army it became routine to station Signal officers and men aboard naval vessels operating along the rivers and coasts in support of ground operations.

By the end of the Civil War, commanders on both sides and at all levels had grown to depend upon the wig-wag information network. The war had proven that specially trained Signal Soldiers were required to harness the ever growing communications technology which allowed commanders to effectively control armies over vast distances and react to unexpected developments in a timely manner.
Pro Patria Vigilans!

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Mr. Steven J. Rauch *has served as the historian for the U.S. Army Signal Center of Excellence since 2002. He is a retired Army officer and has taught military history at the University of Michigan and the U.S. Army Command and General Staff College. He holds a Master of Arts degree in history from Eastern Michigan University and a Master of Arts degree in adult education from Kansas State University.*

A Biographical Sketch

ROBERT GILBERT BRINGS SIGNAL CORPS HISTORY TO LIFE

By Steven J. Rauch

Generosity, enthusiasm, and commitment are words that only begin to describe Robert "Bob" Gilbert, a true friend to the U.S. Army Signal Corps.

For several years, Gilbert has been researching his interest in the history of US meteorology, of which the founder of the Signal corps, Albert J. Myer, played a central role. His focus on Myer and his weather studies has lead Gilbert to acquire a complete replica uniform so that he can portray Myer and promote Signal Corps history at various educational and commemorative events.

Three years ago Gilbert traveled to Fort Gordon for one of his most memorable events, the official induction of Myer onto the rolls of the Distinguished Member of the Regiment during the 2008 Signal Conference. Myer (Gilbert) received his honor and gave a thank you speech to the assembled audience. He posed for a photo with other signal general officers dressed in his uniform.

Albert J. Myer

Robert 'Bob' Gilbert

Family Connections

Often asked why he does this, Bob will respond with the story which begins with his late mother, Mary, who passed away 4 years ago. From her interest in genealogy and the American Revolution, Bob developed his own love of family history and U.S. history. "She never needed to work, thanks to a trust from her parents. After my parents divorced, we moved into her family's old brick house in Virginia." The house, which was named Ben Lomond, was built around 1755 in Essex County in the Tidewater region. Gilbert saw daily reminders of his ancestors who fought in the Civil War and relatives of the previous owners of Ben Lomond who were buried in the yard. These headstones, photos of relatives who served during the Civil War, the extensive library in the house, and trips to nearby Civil War sites are what piqued Gilbert's interest in the American Civil War.

Gilbert's association with the signal corps developed later, when he learned about a connection between his family and that of GEN Adolphus Greely who had served as chief signal officer. "My maternal grandfather was Charles Baird, who served as a volunteer WWI ambulance driver before the U.S. entered the war and then became a captain in the 6th Field Artillery, 1st Division and Army of Occupation, Rhine River. Charles' parents owned Hebekah Farm on Baird Hill near Conway Lake, New Hampshire. GEN Greely owned land adjacent to Hebekah Farm and their friendship with him was indicated by his daughter, Rose Greely, who often mailed Charles, my grandfather, care packages during WWI. Also, my grandfather's cousin was COL Alvin Coe Voris, Chief Signal Officer, 3d Army AEF and later post commander of Fort Monmouth in 1938."

Gilbert's mother used to talk about GEN Greely's missing finger, result of frostbite from the Arctic expedition. Gilbert discovered proof of this in a photo he received from his uncle. "Something stood out on the photo of the Greely and Henrietta's picture with the dogs at my grandfather's farm in New Hampshire. I noticed the right hand...the middle finger was missing." That detail of the photo and his mother's account further

GEN Adolphus Greely, one of the pivotal leaders of the U.S. Army Signal Corps, spends time with the family of Robert 'Bob' Gilbert on the family farm in New Hampshire. Gilbert noticed the missing finger on Greeley's hand, a result of frostbite from the Greeley Arctic expedition.

illustrated his family connection to one of the great Signal Corps leaders.

Military Service

Although he never served in the Signal Corps, Gilbert's military career was connected to similar functions historically associated with the branch. His military service began in the US Air Force where he trained in Morse Code School, Teleprinter Operator School, and then Non-Morse Signals Analyst Course. He then spent 18 months at Misawa Air Base, Japan followed by a tour at the National Security Agency, Fort Meade, Maryland. Of the changing technology of those years, Gilbert stated, "The computer modem's debut in 1985 made all my training and experience obsolete." When the Air Force would not send him to Russian Language training at the Defense Language Institute, he decided to ETS after 4 years.

He later continued his service, this time in the U.S. Army as a Russian Voice Interceptor (98G), having succeeded in attending the Defense Language Institute in 1989. According to Gilbert his timing and choice of career field was impacted by unexpected events, "I graduated from a follow-on school at Goodfellow AFB, TX only two days after the Berlin Wall began to be dismantled. That meant no $25,000 reenlistment bonus and promotion points frozen after serving two years in Augsburg, Germany and four months in Riyadh, Saudi Arabia for Operation Desert Storm. Instead of another ETS, I decided to transfer to the Army Reserve in 1992."

Now a citizen Soldier, Bob attended college at the University of Maryland, where he obtained a Bachelor of Arts degree in history and a minor in Russian Language, in 1994. When the Army Reserve failed to honor a $5,000 bonus in his contract, he was allowed to transfer to the Maryland Air National Guard, which paid for 16 months 'school and On-The-Job Training for Meteorology. He recalled, "I'd hoped to become a permanent, full-time National Weather Service employee, but military training and experience were no longer accepted by the NWS as a substitute for a civilian college degree in Meteorology." When active duty tours were hard to find in the Air National Guard, Gilbert transferred back to the Army Reserve for an intelligence assignment at Fort Dix, N.J., which is where he was on 9/11. He then volunteered for mobilization and was reassigned to the National Security Agency at Fort Meade, Md. for two years, which included 4 months in Africa supporting GWOT.

Portraying BG Albert J. Myer

During the summer of 2005 Gilbert retired from the Army Reserve and began work as a weather observer at Rochester International Airport. This occurred fortuitously at the time National Oceanic and Atmospheric Administration was preparing for its Bicentennial and he was asked to portray Albert J. Myer because of his physical resemblance and background in meteorology and history.

When he portrayed Myer at the 2008 Signal Corps Conference he experienced what he called a life changing event, both for him, and the Signal Corps. "BG Jeffrey W. Foley invited me to his office for an interview and asked how I got interested in the history of the Signal Corps. I told him how special Myer was for starting a weather service and expanding it into 50 countries and territories in less than a decade despite limitations in the technology of the 1870s."

Bob admits being awed by all of the attention and explained, "General Foley impressed me beyond words. As busy as he was, he not only took the time to meet me, but then he also sent me a hand-written thank you letter, which will always mean a lot to me. He epitomized what I was taught about leadership from PLDC and ANCOC."

This recognition lead Gilbert to expand his research about the Signal Corps role in meteorology, and thus began what can be described as a one man campaign to tell the story of Myer, military

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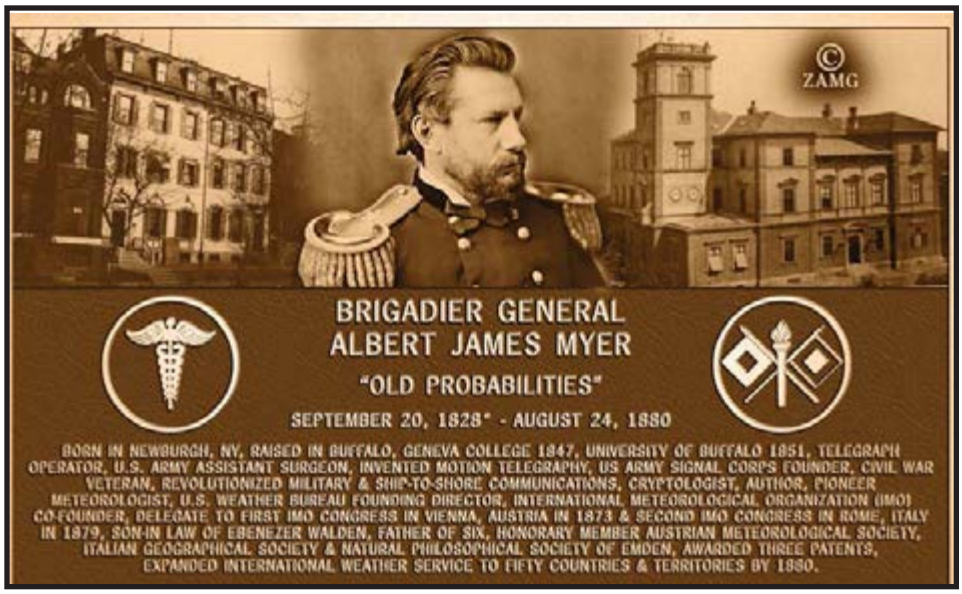

This bronze plaque was commissioned by Robert 'Bob' Gilbert to be placed in front of the Myer mausoleum at Forest Lawn Cemetery, Buffalo, NY.

(Continued on page 35)

meteorology, and the Signal Corps. Among many of his projects, perhaps his most generous was funding a scholastic achievement award in Myer's name at the University at Buffalo. This scholarship was awarded for the first time in 2010 to Chuck Baynes, a USMC radio operator who had deployed to Fallujah in 2003. In 2010 he wrote a 3,800-word article published in the winter 2010 issue of Western New York Heritage magazine about Myer and the weather service.

Two of his biggest and most expensive projects involved elaborate physical reminders of Myer in the Buffalo/Niagara area. Gilbert connected with Carvings for a Cause, a non-profit group in Buffalo that repurposed fallen trees from an October 2006 surprise snowstorm and carves images of historical figures from them. Gilbert sponsored one for Myer, mainly because of the "ironic connection - bad snowstorm, in Buffalo, founding director of the Weather Bureau, it was too good to pass up." The final Myer statue weighs over 1,000 pounds and Gilbert posed as the model wearing his uniform.

The other project was Gilbert's desire to have a proper historical marker located at the site of Myer's grave site, a granite mausoleum located in Forest Lawn Cemetery in Buffalo, New York. Gilbert worked with many agencies to design and produce this marker, along with one for Myer's father-in-law, former Buffalo mayor Ebenezer Walden. To ensure accurate information, Gilbert traveled at his own expense to Vienna Austria to the location where the first International Meteorological Congress was organized to obtain photos of the building where weather reports from the Austrian Empire were collected and telegraphed to General Myer's headquarters in Washington D.C. The finished plaque honoring Myer recognizes his service as both an Army doctor and the founder of the Signal Corps. In smaller type below the historical information is the statement, "Placed by an anonymous benefactor and friend of Forest Lawn 2010" demonstrating that Bob did not seek credit for this project.

150-year Commemoration - 2010

During the Signal Corps 150th anniversary commemoration in 2010, Bob Gilbert was a very busy man. On 27 May 2011 at Fort Myer, Va, Gilbert (portraying Myer); LTG Jeffrey Sorenson, the Army G-6; and COL (Ret) Joseph 'Tom' Catudal participated in a wreath laying at the granite monument to Myer which stands directly in front of the quarters of the Army chief of staff.

On Memorial Day weekend 2011, Gilbert saw his dream of having the plaque to Myer dedicated during observances and ceremonies at Forest Lawn Cemetery. For these ceremonies, the 34th Chief of Signal, BG Jeffrey W. Foley, was the key note speaker. BG Foley was

Robert 'Bob' Gilbert *(right)* **participated in many events commemorating BG Albert J. Myer, including this wreath laying ceremony 27 May 2011 at Fort Myer, Va. With Gilbert, are the CIO/G-6 of the Army, LTG Jeffrey Sorenson, U.S. Army CIO/G-6** *(center)* **and COL (Ret) Joseph 'Tom' Catudal** *(left).*

accompanied by CSM Thomas J. Clark and the Signal Center historian, Steve Rauch, who visited the final resting place of the founder of the U.S. Army Signal Corps.

Here, at the home of the Signal Corps, Gilbert spent the anniversary week participating in many events, most importantly, a ceremonial cake cutting ceremony on 21 June 2010 with the serving Signal leadership, BG Foley, CSM Clark and others.

During the 150th Birthday Ball at the Gordon Club, Gilbert was recognized for his role as a portrayer of Myer and his commitment and dedication to the history of the U.S. Army Signal Corps. Of that night Gilbert remembers, "I was stunned. The Ball was great, I was treated very, very well and most important is that I was always referred to as Bob Gilbert portraying BG Albert Myer, never as "the Myer guy."" In addition, Gilbert was able to meet the Army Chief of Staff, GEN George W. Casey and many officers, noncommissioned officers and Soldiers of the regiment who thanked him for his contributions.

On-going Projects

Since 2010, Bob Gilbert has returned to his research efforts, of which the signal historians have benefited greatly as he never fails to provide copies of documents, photos, and other pieces of information that is inaccessible due to distance, time and funding.

As an independent researcher, Bob is among the best, and his generosity has added to the knowledge of Signal history. One example was an image of the first weather map that was printed in an American newspaper, a feature still seen today in newspapers. All of this research however is aimed at his goal of a book, tentatively titled, "To the Benefit of All," about the Signal Corps' role in starting the U.S. Weather Bureau and today's World Meteorological Organization based in Geneva, Switzerland.

Most recently, Bob Gilbert has been recognized by the national leadership of the Signal Corps Regimental Association with a life-time membership for his devotion and dedication to Signal Corps history. In return, Gilbert has included SCRA as a beneficiary of his estate, along with an endowment for the Myer Scholastic Achievement Award for Veterans at the University of Buffalo.

Gilbert sums his relationship best stating, "Because of the unique ways the Signal Corps has benefited the world, and not just the United States, I believe in perpetuating Signal Corps history, providing financial assistance for veterans attending college, and special tributes for its fallen Soldiers. It's also closure because this is my grandparents' estate ultimately, and now, more than ever before, I can appreciate how special my grandfather's friendship with General A. W. Greely really was."

Robert 'Bob' Gilbert is shown after the mausoleum and marker ceremony honoring BG Albert J. Myer on 30 May 2010 in Forest Lawn Cemetery Buffalo, N.Y.

The friendship between the Baird and Greely families perpetuates today in the life of Bob Gilbert, a great American and dedicated friend of the U.S. Army Signal Corps.

Mr. Steven J. Rauch *has served as the historian for the U.S. Army Signal Center of Excellence since 2002. He is a retired Army officer and has taught military history at the University of Michigan and the U.S. Army Command and General Staff College. He holds a Master of Arts degree in history from Eastern Michigan University and a Master of Arts degree in adult education from Kansas State University.*

C4I BEST PRACTICES

By LTC Thomas Mackey and MAJ Ernest Tornabell

As communication systems and capabilities have changed significantly during the Army's transformation, commanders at all levels are requiring command and control support throughout their battle space. Signal Soldiers are getting the job done.

This ubiquitous communications network does not happen by magic.

Brigade combat teams transitioned from old school Mobile Subscriber Equipment to an interim solution joint network transport capability – spiral and will eventually field the long awaited Warfighter Information Network-Tactical. These newer systems were designed for reliable, secure, and seamless video, data, imagery, and voice services enabling full spectrum operations. (See Figure 1)

Leaders cannot rely solely on their Signal military occupational specialty Soldiers to make the entire network systems function effectively. Commanders at troop/company/battery up to brigade combat team level must be knowledgeable and involved in establishing and managing the "network" that exists in their own organizations. Commanders must understand that the lines of manning, training and equipping in the Army Forces Generation model seldom perfectly align allowing units on the ground to have a seamless glide path to complete deployment readiness.

Many times, BCTs field personnel and equipment late in the model and have limited experience setting

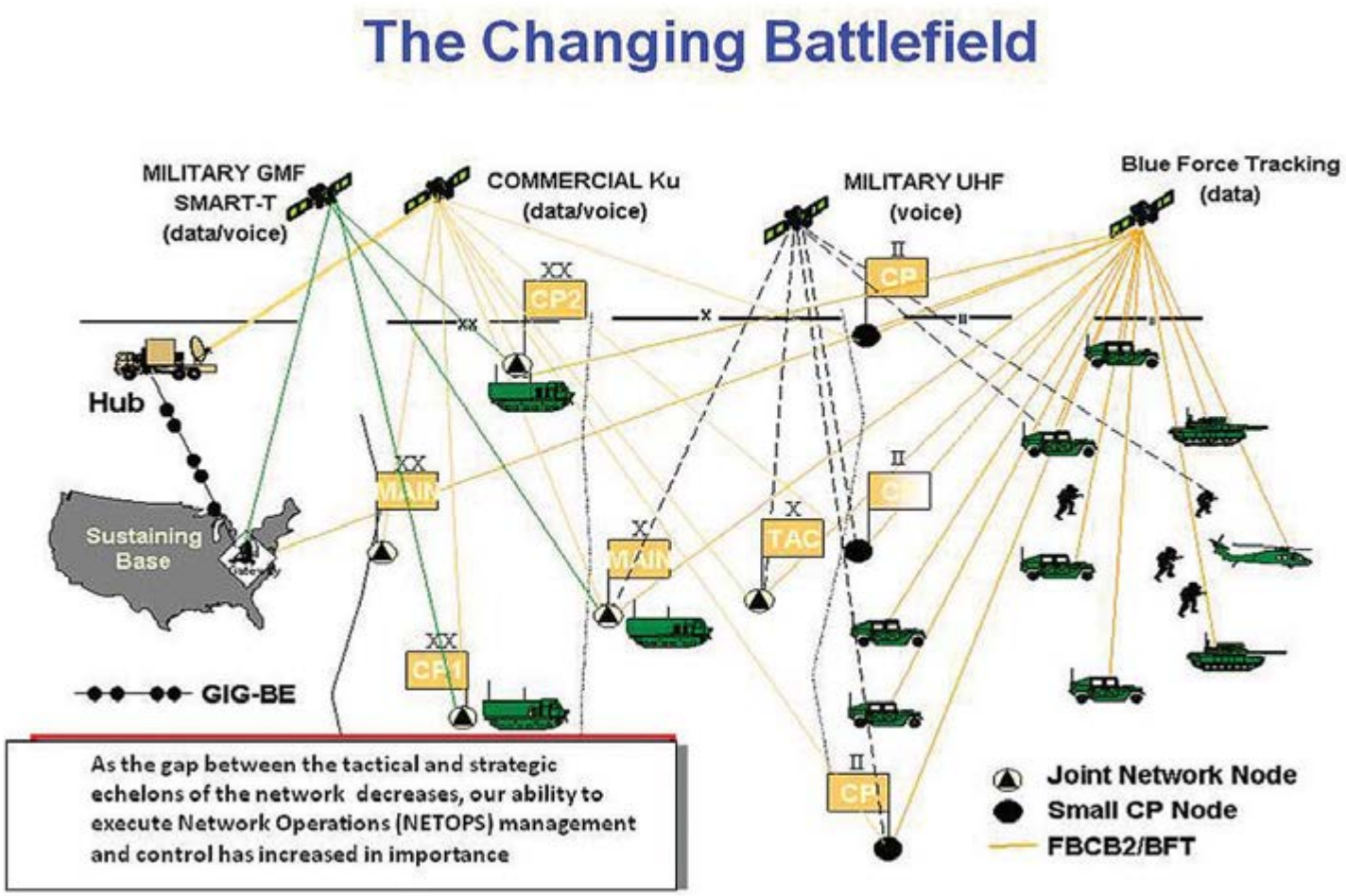

Figure 1 -- Network Operations ISO G6/S6 LTC Douglas Babb, April 2008)

up and running their network. Most BCTs come to the National Training Center not having fully run all of their communications systems at home station. They have great difficulty in doing it for the first time at their last major collective training event prior to deployment under the current paradigm.

With the addition of computer networks integral to communications within our formation, commanders need to know what they have plugging into that network and that their anti-virus and Windows System Update Servers are functioning and protecting the entire network from attack. The company intelligence support team (generally referred to as CoIST) has the capability of accessing NIPR and SIPR systems. Poor business practices or lack of training and understanding can easily result in information assurance violations at a minimum by spillages from a SIPR to a NIPR system or the CoIST team could inadvertently introduce a virus into a SIPR system and cripple the entire network. Business rules and training are of paramount importance across a BCT to protect our network as access to SIPR is now at lower levels than ever.

Leader checks of these "business rules" are critical to the protection of the entire network as we have now pushed SIPR down to troop/company/battery level. At the BCT and below level, the statuses of our command, control, communications, computers, information, surveillance and reconnaissance systems now drive the drafting of friendly forces information requirements so that commanders are informed of issues with their network. (See Figure 2)

Units now have the ability to talk further, faster, and with greater data throughput than ever with robust voice communication platforms, full motion video capabilities and Blue Force Tracking systems. Commanders now have the ability to conduct 'face to face' meetings with subordinate commanders through video teleconferencing means enabling immediate feedback during ongoing operations. With all these systems being integrated into a single network, the Signal community has become more important than ever before in ensuring the commander's ability to command and control all units across full spectrum operations. As newer C4I systems are fielded, the brigade combat team's challenges are numerous but can be easily mitigated through proper planning and training during home station operations. At the NTC, five "NTC Best Practices" have been identified to ensure successful Signal teams:

1) Signal Team and Systems Training
2) Network Tools and Bandwidth Management
3) Battle Tracking
4) Military Decision Making Process / Troop Leading Procedure Process
5) Synchronization between BDE / BN S6 Teams and the Signal Company

Signal Team and Systems Training

Each Signal team must conduct tough, realistic and relevant training prior to arriving at the NTC. Signal training and maintenance should be incorporated into every training schedule for a BCT at home station. Weekly command maintenance should include pushing out retransmission systems and conducting radio checks with all vehicles and TOC kits. Additionally, units should conduct communications and electronic Maintenance with all JNN/CPN crews standing up their respective systems for training and testing with the BCT NETOPS cells and Network Tech leading the training and maintenance efforts. Quarterly signal team crew drill certifications (similar to Bradley/Tank table 8) should also be integrated into collective training plans.

Finally, commanders won't really know their weak links in their network until they place a "load" on these systems. BCT leaders at echelon can assist in this process by implementing communications exercises as part of regularly scheduled maintenance periods and collective training events in order to "stress test" their network and gain proficiency over

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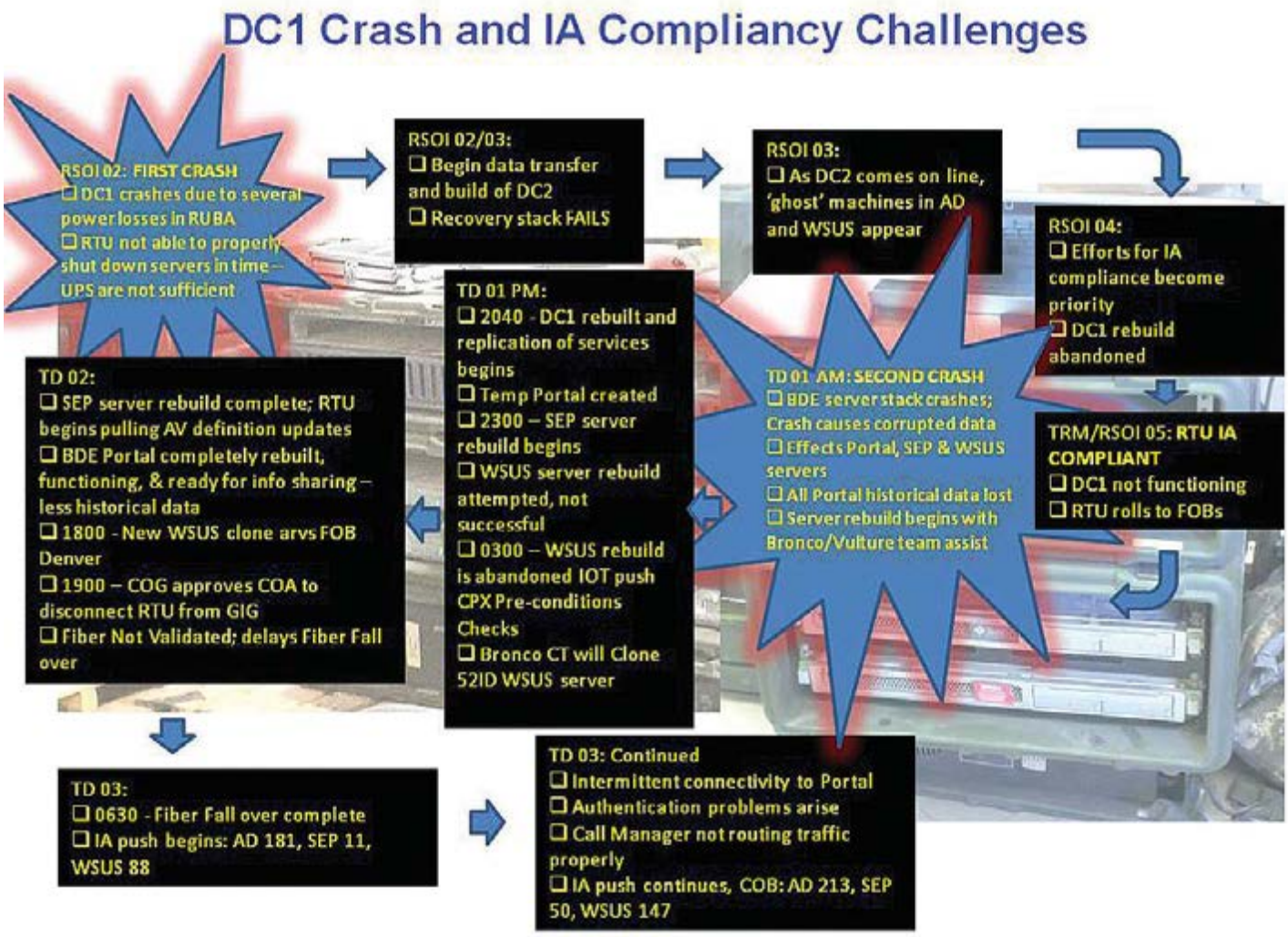
Figure 2 -- Brigade and Battalion Commander Signal Tactics, Techniques, and Procedures, MAJ Manning, Lou, RSOI Teach, 2009



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repetitions. We should execute the load on these systems tactically so that we do not become reliant on something we may not have in a tactical environment such as a fiber network. No roll out from the motor pool should occur without a digital command and control exercise rehearsal so we start training with a functional network that we can stretch out in training.

The BCT must stand up its entire "enterprise network" in order to validate network registration, advertisement, functionality, and information security posture prior to arrival at the NTC. This should not be accomplished during the units final FTX, but rather in progressive phases. Dismounting non-classified internet protocol routing / secure internet protocol routing stacks from shelters while conducting cable exercises and data exercises can be a huge benefit to units that are unfamiliar with the systems or lacking in their skill sets.

The S6 needs to be involved with the tactical operation center design alongside the S3 team in order to develop a cable plan for wiring in the TOC. This will help reduce the time needed to wire the TOC during subsequent setups and help the S6 team estimate how much cable will be needed for future FTXs. Additionally, units are encouraged to conduct full scale staff integration exercises where all ABCS systems are integrated into an exercise no matter how small or seemingly insignificant. Soldiers become more proficient on ABCS when they are 'put in play' and not an afterthought.

Information assurance has become a major hurdle that affects rotational units' ability to transition from RSOI to STX/FSO. The focus on warfighter planning and training is disrupted when BCT S6 teams do not take proper precautions regarding IA; meeting regulatory compliance for all systems prior to movement from the LSA is non-negotiable. RTUs that fail to meet compliance standards lose valuable training time in the box. This is clearly commanders' business as the inability to establish IA for the BCT and below network may lead to that network failing when we need it most for battle command.

Commanders must be actively involved.

Trained and disciplined signal teams include FM RTXs, JNNs, and CPNs that can react successfully to "time sensitive operations" and adjust effectively to contingency missions. The key to successfully trained Signal teams and systems takes extensive planning at the BCT S6 level along with network Signal company support and greater amounts of emphasis from commanders. If the command teams are not supportive of Signal team training, failure is right around the corner.

Network Tools and Bandwidth Management

Every commander feels the need to have massive amounts of bandwidth to push/pull products and C2 subordinate units in their battle space. Commander's at echelon and below must be able to effectively monitor the status of all links/systems higher and lower in their network with all systems in your network: JNN/CPN/SNAP/AN-50, fiber network...). A commander must be able to know/understand the health of their links in terms of data loss (what links are losing packets and why/where?) Typical systems to monitor network health at the brigade level are Network MRI and Solar Winds which reside in the brigade S6 shop. Commanders must be aware of their network at all times due to its importance in providing essential battle command.

The NETOPS section is the digital quick reaction force for the network and will typically monitor the health of the brigade network. It is important for the NETOPS team to baseline the network so they can track all computer/ABCS systems on the brigade network. The NETOPS team should be asking themselves; are network tools set up to tell us how much bandwidth is being utilized on any given link at any given moment, and what is consuming our bandwidth? Is any staff section trying to email

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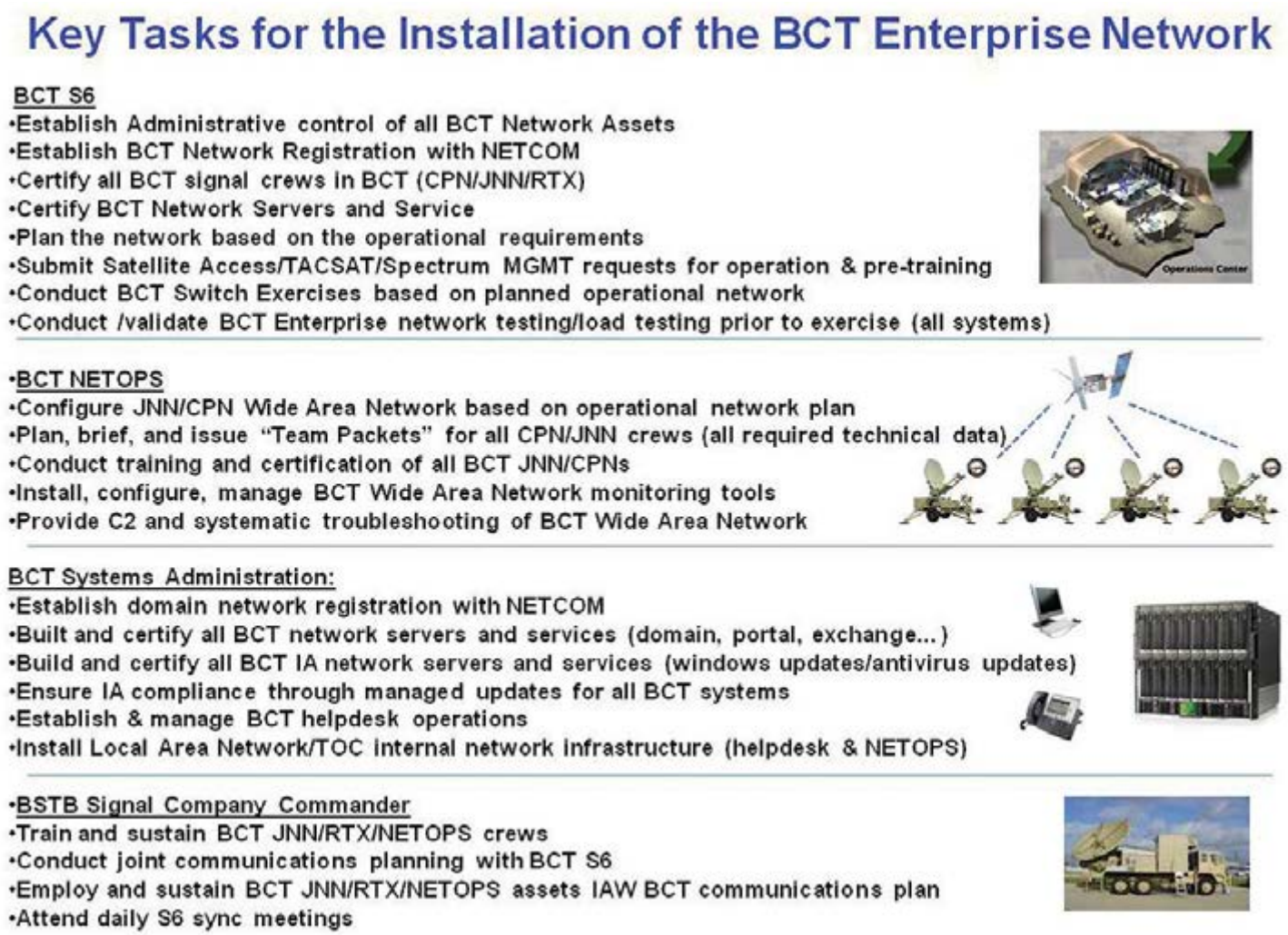

Figure 3 -- Key Tasks, Nichols, James, Technical Working Group Teach, 2009

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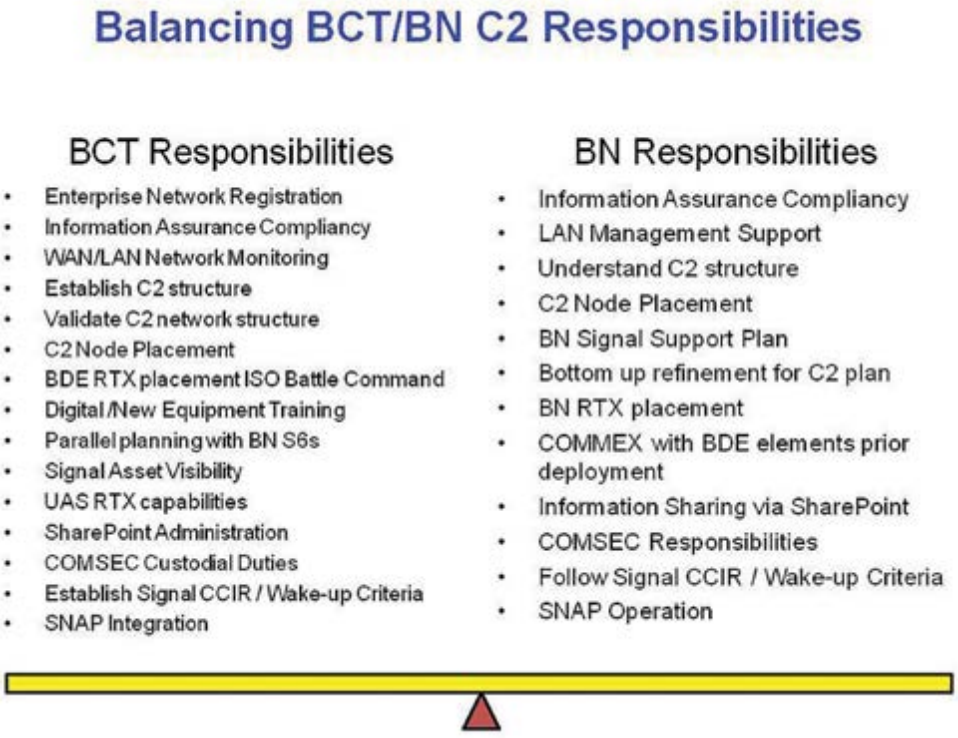
CONOPS and OPORDs that are 30 MBs and higher instead of 3 MBs or lower? These large files can adversely impact a network and slow down the transfer of critical information between higher, lower, and adjacent units.

More than likely units may need to implement procedures to control bandwidth usage, especially at critical times such as during commander update assessments, battle update briefs, and CONOP briefs. Determinations will need to be made on when to shut off the portal (SharePoint) and email exchange systems during these events; possibly placing them on the battle rhythm so that commanders and staff shops are aware. Understanding limitations of the network need to be realized by all staff sections along with the ability to train the brigade staff and provide them the tools to use our network effectively (NXP Lite, other compression capabilities, etc). Managing the network properly will enable all users' effective, efficient command and control capabilities. (See Figure 3)



Battle Tracking: "Seeing ourselves" and understanding system statuses within the brigade at all times is crucial. Unfortunately, "seeing ourselves" seems to be the last thing on any BCTs mind, when it should be their initial mindset. This applies to commanders and signal Soldiers at each echelon. Three important questions arise with "seeing ourselves:" What systems do we have? What systems can we use for missions? When is each system fully mission capable vice non-mission capable, and how soon we can get any system back 'into the fight?

All S6 teams need to have a tracking board displayed with all C2 systems (SVoIP, JABBER, CPOF, FM, TACSAT, HF…etc). Track this in the S6 shop by unit and use it to keep on top of your network priorities based on your Commander's C2 Intent. Have this tracking system board displayed prominently so that anyone in the S6 shop or a commander can quickly ascertain the status of any system and its inherent capabilities. Tracking systems in Brigade and Battalion TOCs alike that include critical information will provide the commander a visual representation of their network and its functionality.

Going one step further is to post this 'live update' to the unit's SharePoint portal so that the Battle CPT or CHOPs can routinely visit this tracker when operations are forthcoming. Proper battle tracking can also focus your S6 shop priorities. Another important battle tracking tool is a "Horse Blanket Tracker" as well as a COMMO PLL tracker that shows all of the brigade's digital C2 assets and their status. Considering the statuses of our 30-60-90 day load for COMMO prescribed load list is imperative in keeping any system FMC or possibly being able to quickly repair any system that is NMC. Digital C2 systems are critical assets that enable BCT staffs the ability to C2 their formations across full spectrum operations. Key questions to ask yourself and your team are; Does the person on the late shift know what is going on? What are our next priorities? Do we have a separate tracking board that we brief internal in our S6 shops showing the priorities of work by section?

Commanders that understand their network will require the BCT/BN S6 to brief this daily at various update briefs. Daily shift change briefs that cover battle tracking will ensure smooth transitions during any shift change and build confidence in your subordinates and other staff sections.

One under-trained critical task seems to be participation

of Signal officers in the MDMP/TLP Process. "Staying glued to the hip of your S3," understanding C2 requirements and the commander's intent for C2 activities in the battle space are an absolute necessity. Falling behind in the planning process and not fully understanding the commander's digital C2 needs can adversely impact operations. Asking these simple questions can make you successful; do I have a product that will allow me to rapidly communicate a simple Signal Support Plan to the Brigade? Keeping a Concept of Signal Support simple is always important and can be illustrated via a one page Annex H that looks like a PPT slide or CPOF pasteboard that clearly articulates how you plan to support any mission. Ensure that all the pertinent information is included and verbalized clearly and concisely; identify all pertinent C2 node locations, RTX locations/ FREQS, FA gun locations/FREQS, Air weapons team/FREQS, TACSAT FREQS, PACE Plan, task and purpose of RTX teams, frequency information, etc… Ensure the S6 keeps it simple and gets the product to the future / current operations staff in a timely manner so that if any adjustments are needed, they can be done sooner rather than later. If the mission will be conducted on a compressed timeline, ensure you follow up the FRAGO with phone calls, teleconferences, and the like with other S6 elements. Always ensure that the Concept of Signal Support is understood down to the lowest level and could be considered an enhanced vehicle drivers commo card. (See Figure 4)

Lastly, synchronization between the BDE and BN S6 Signal teams and Signal company must occur frequently. A fundamental flaw within the Signal community is the inability to communicate a clear and concise concept of Signal support. BDE, BN S6 teams and the SICO need to talk to each other daily through a synchronization meeting that is ideally published on the BCT Battle Rhythm. Communication and synchronizing signal support planning does not begin 24 hours prior to any operation. It begins much earlier once the BCT S6 understands the current mission and provides their plans on supporting that mission while incorporating the brigade's full signal capability package. BDE/ BN S6 and SICO elements must talk and synchronize their efforts ensuring seamless communications for all warfighters. The BCT S6 Concept of Signal Support should incorporate BN S6 concepts and vice versa.

During sustainment operations, there should be no less than bi-weekly phone conferences or Adobe Connect Pro meetings between the BCT / BN S6 teams and the SICO in which critical information and ideas are exchanged. At echelon and below

(Continued on page 44)

[Classification]

Include heading if annex distributed separately from base OPLAN/OPORD.
ANNEX H (COMMAND, CONTROL, COMMUNICATION, and COMPUTER OPERATIONS) TO OPERATION ORDER NO ## [code name]—[issuing headquarters]
1. SITUATION.
a. Enemy forces. Refer to annex B, appendix 1-Intelligence estimate. Also provide enemy capability and activity by describing enemy capabilities that may affect communications systems.
b. Friendly forces.
• Primary communications gateways providing connectivity to higher, lower, and adjacent units.
• Critical communications security measures required to counter expected enemy EW capabilities and protect C2 systems.
• External communications assets that augment signal support unit capabilities.
c. Environment. In separate subparagraphs list all critical terrain, weather, and civil considerations that would impact C4 operations. Refer to appropriate annexes as required.
d. Attachments and detachments.
2. MISSION. State the computers and information systems operations mission in support of this operation.
3. EXECUTION.
a. Scheme of signal support operations.
(1) Describe the concept of signal operations, including primary and back-up systems supporting critical C2 networks.
(2) Outline the plan for extending C2 systems by each phase of the operation.
(3) List critical links between tactical and strategic communications systems.
(4) Identify critical limitations of organic signal support assets. Define limitations of assets from higher headquarters.
(5) State signal support tasks that all non-signal units must perform to accomplish missions and tasks beyond normal requirements.
(6) State signal support priorities.
b. Tasks to subordinate units.
• Signal support tasks that maneuver elements must accomplish that the base OPLAN/OPORD does not contain.
• Signal support tasks that signal units supporting maneuver elements are to accomplish only as necessary to ensure unity of effort.
c. Coordinating instructions.
• Critical signal support instructions not already covered in the base OPLAN/OPORD.
• Key times or events critical to information systems and network control procedures.
• Army Battle Command System control procedures.
4. SERVICE SUPPORT.
5. COMMAND AND SIGNAL.
a. Identify C2 systems control hierarchy for the common user network.
b. Identify local area network control procedures for network administration and management.
c. Use appendixes to diagram any changes to standard communications networks.
ACKNOWLEDGE: (if distributed separately from base order).

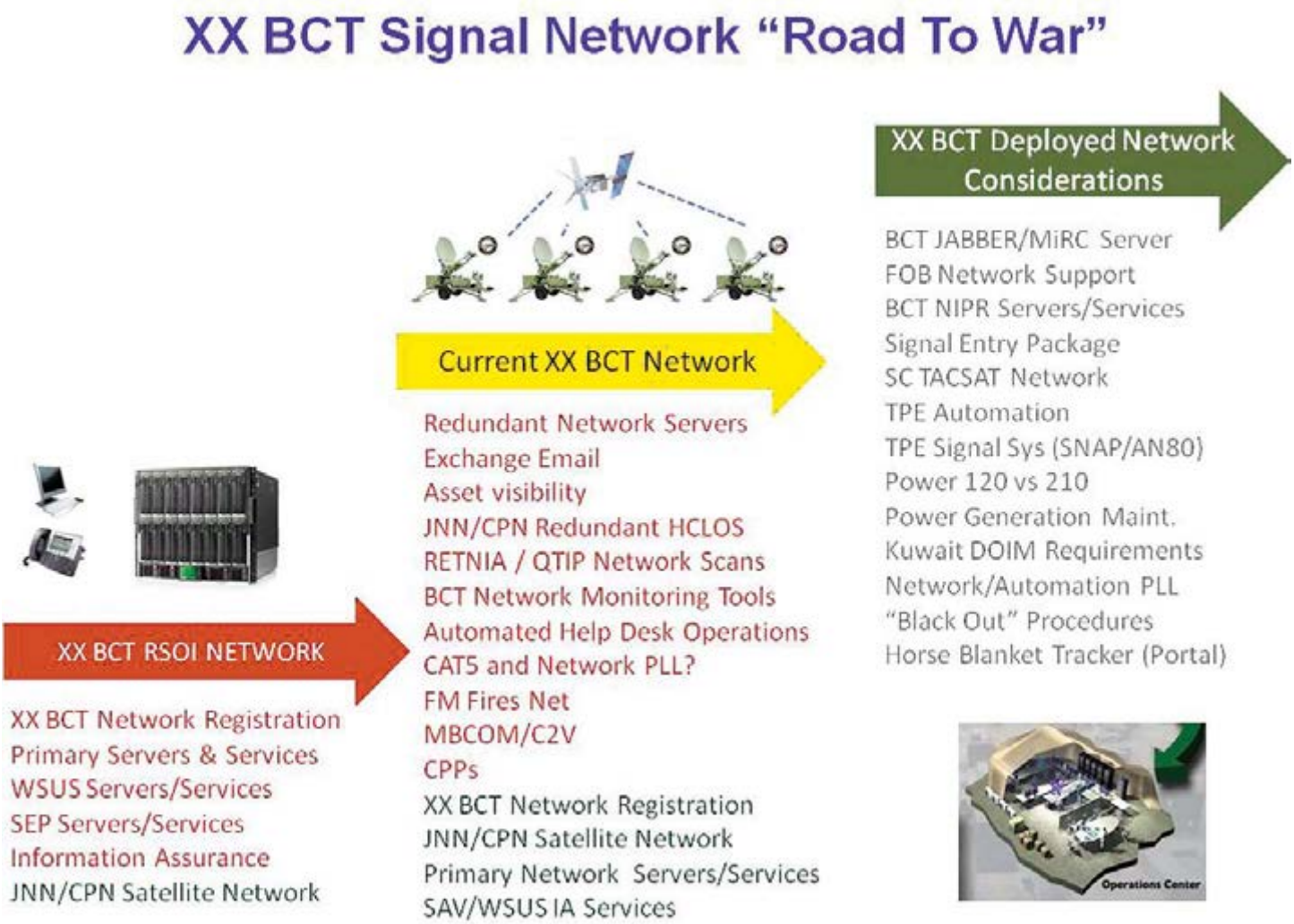
[Authenticator's last name]

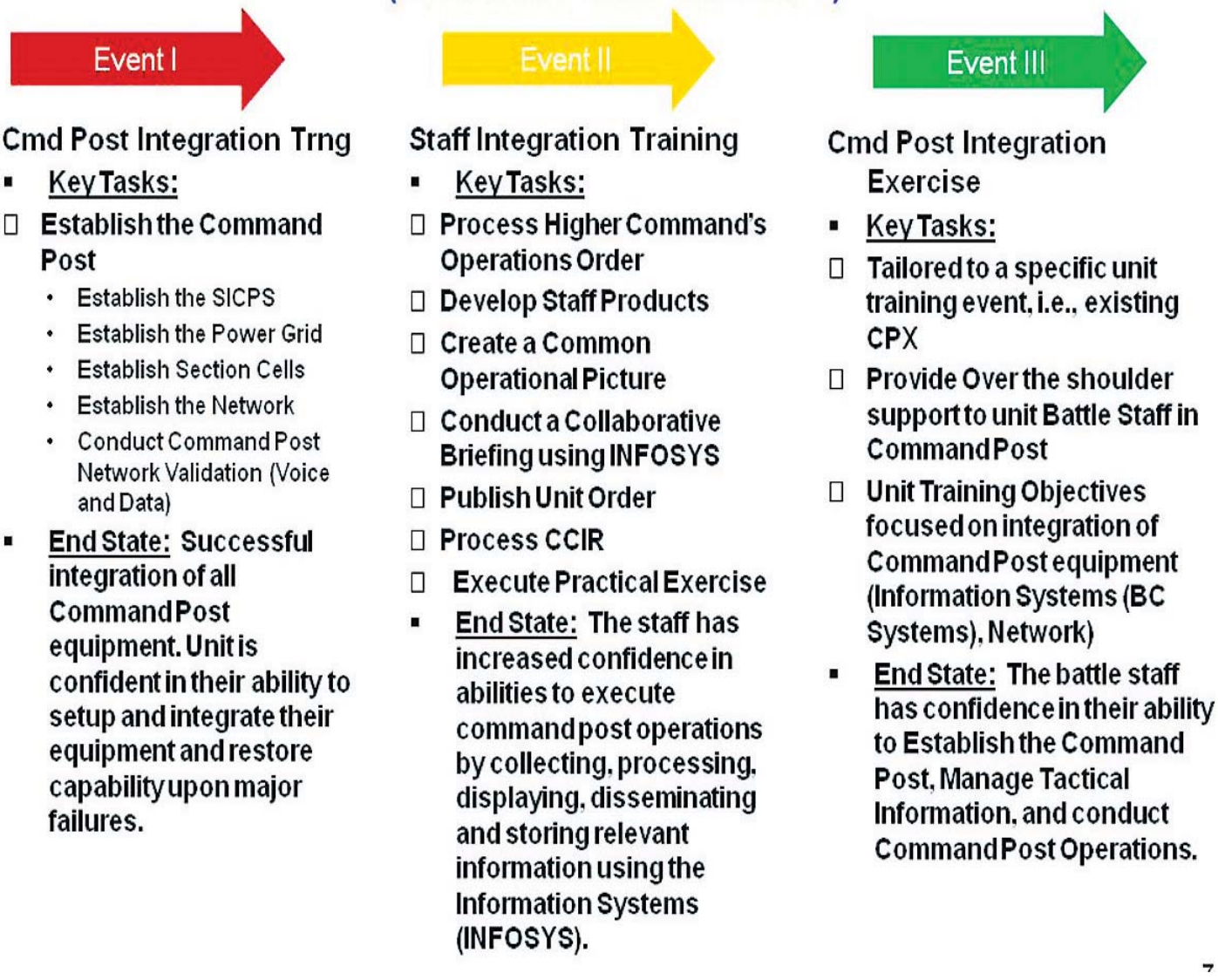
Figure 4. Signal Annex H, FM 6-02.43 Signal Soldiers Guide

(Continued from page 43)

all teams need to understand signal concepts and be able to react to shortcomings and friction points in order to meet the commanders C2 intent. With the number of multiple subordinate headquarters continually increasing due to the amount of C2 systems in formations, both in garrison and deployed environments, there is a amplified need for BCT level oversight. At the end of the day, the BCT S6 team is in charge of all C2 systems ensuring their ability to provide the brigade commander ready and reliable battle command. There is a misconception that the Signal company or battalion owns the JNN/CPNs. This is untrue. The brigade commander owns all Signal systems. It is the responsibility of the BCT S6 to properly manage those assets to meet the brigade commander's intent and guidance for digital C2 communications. This relationship between commanders and their S6 or communications personnel continues to be true at echelon.

Depending on how the SICO is arrayed and their location on the battlefield, they play a vital role in supporting the brigade staff with WAN connectivity as well as VTC suites and full motion video support. The SICO must know and understand what missions the brigade needs to accomplish in order to fully support FSO. Being able to plan without formal orders is a key component for conducting synchronization meetings. With all teams on the same sheet of music, signal assets can be surged or redirected to support the BCT. The Signal Company executes all signal missions as dictated by the BCT S6; therefore it is imperative they understand all Signal Concepts of Support. Synchronization between higher and lower Signal teams is a key function that will ensure concepts of signal support are capable of providing reliable communications. A few critical questions that should be asked to limit these friction points can be: What issues do the battalions have? What resources do they





have (if there are shortcomings), what can the brigade commo team provide? How can we better support our subordinate warfighters with digital C2 systems?

The Army's battle command systems and capabilities will continue changing dramatically as modularity effectively extends the battlefield. For brigade signal teams, being able to effectively manage and meet the commanders C2 requirements are contingent on following the five "Best Practices" described above. Leaders must also take an active part in providing training guidance to build the skills to enable battle command within their organization as well as they must understand the capabilities of their network and what checks they need to make to ensure that the organization's C4ISR systems are available and reliable. Units with leaders who wash their hands of the details and leave it all to the signal MOS Soldiers will either knowingly or unknowingly assume risk to their ability to command their organization.

LTC Thomas Mackey *is brigade senior combat trainer at the National Training Center OPS GRP, Fort Irwin, Ca. He holds a Bachelor of Arts degree from California State University, San Berdardino and a Master of Arts degree from Webster University. Previous assignments include 2nd Squadron 14th Calvary commander, Schofield Barracks Hawaii and Operation Iraqi Freedom 07-09; 1st Brigade, 25th Infantry*

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Division commander, Fort Lewis, Wash., and 3rd Battalion 21st Infantry XO and BN S3, Fort Lewis.

***MAJ Ernest Tornabell IV** is brigade senioir Signal combat trainer, National Training Center OPS GRP, Fort Irwin, Ca. He holds a Bachelor of Science degree from the University of Central Florida and a Master of Education degree from American InterContinental University. Previous assignments include 4th Brigade 101st Airborne Division (Air Assault) S6, Fort Campbell, Ky and Operation Enduring Freedom IX; Allied Forces North Battalion, U.S. Army NATO Joint Forces Command S3; 1st Company 1st NATO Signal Battalion commander, Maastricht, the Netherlands and ISAFI; and Company B commander, 40th Signal Battalion, 11th Signal Brigade, Fort Huachuca, Ariz., and Operation Iraqi Freedom I and II.*

Join the Discussion
https://signallink.army.mil

Acronym QuickScan

ABCS – Army Battle Command System
AFATDS – Advanced Field Artillery Tactical Data System
AN-50 – Line of Sight Radio Platform
ARFORGEN – Army Forces Generation
BCCS – Battle Command Common Services
BCS3 – Battle Command Sustainment Support System
BCSoSIT – Battle Command System of Systems Integration Training
BCT – Brigade Combat Team
BDE – Brigade
BN – Battalion
BUB – Battle Update Brief
C&E – Communications and Electronic
C2 – Command and Control
C4ISR – Command, Control, Communications, Computers, Information, Surveillance and Reconnaissance
CCIR – Commander's Critical Information Requirements
CoIST – Company Intelligence Support Team
COMMEX – Communications Exercise
COMSEC – Communication Security
CPN – Command Post Node
CPOF – Command Post of the Future
CUA – Commander's Update Assessment
DC1 – Domain Controller #1
DC2 – Domain Controller #2
DC2R – Digital command and Control Exercise Rehearsal
DCGS-A – Distributed Common Ground System – Army
DISA – Defense Information Security Agency
FBCB2 – Force XXI Battle Command, Brigade and Below
FFIR – Friendly Forces Information Requirements
FMC – Fully Mission Capable
FOB – Forward Operating Base
FREQS – Frequencies
FSO – Full spectrum Operations
IA – Information Assurance
ISO – In Support Of
JABBER – Internet Relay Chat Platform
JNTC-S – Joint Network Transport Capability – Spiral
LAN – Local Area Network
MDMP – Military Decision Making Process
MOS – Military Occupation Specialty
MOSS – Microsoft Office SharePoint Services
NETCOM – Network Enterprise and Technical Command
NETOPS – Network Operations
NIPR – Non-secure Internet Protocol Router
NMC – Non-Mission Capable
NTC – National Training Center
PACE – Primary, Alternate, Contingency, Emergency
PLL – Prescribed Load List
PPT – Power Point
QRF – Quick Reaction Force
QTip – Internet Vulnerability Scanning Software
RSOI – Reception, Staging, Integration, Onward Movement
RTU – Rotational Unit
RTX – Retransmission
SEP – Symantec EndPoint Protection
SICO – Signal Company
SIPR – Secure Internet Protocol Router
SNAP – SIPR/NIPR Access Point
STAFFEX – Staff Exercise
STX – Squad Tactical Exercise
SVoIP – Secure Voice over Internet Protocol
TACSAT – Tactical Satellite
TBC – Tactical Battle Command
TLP – Troop Leading Procedures
TOC – Tactical Operations Center
UAS – Unmanned Aerial System
UPS – Uninterrupted Power Supply
VTC – Video Teleconference
WAN – Wide Area Network
WIN-T – Warfighter Information Network – Tactical
WSUS – Windows System Update Servers

New Army streamlined COMSEC processes do more without more

By Josh Davidson

Program Executive Office Command, Control and Communications-Tactical and Project Director Communications Security is partnering with platform and system integrators across the U.S. Army to more efficiently secure networked mission command solutions whose future enhancements will require greater protection.

"We can really bring to the table a focus and an in depth knowledge-base as programs try to integrate COMSEC into their systems," said Chris Manning, project director for COMSEC.

PD COMSEC procures, sustains and fields capabilities that secure and encrypt data on the Army's tactical network. It is also a central point for the Army's system integrators who seek COMSEC expertise as they integrate network and software capabilities.

PD COMSEC will synchronize system integrators from separate project management offices through semi-annual COMSEC Integration Integrated Process Team forums. Representatives from the PD will travel to various Army acquisitions hubs to discuss COMSEC integration-related challenges and lessons-learned. Industry will also use the forum to present the future objectives in their roadmaps.

Government representatives will pose issues to multiple corporations who will offer potential solutions. Representatives from separate government entities and industry will converge, examine the pros and cons of various solutions and determine which approach might be best suited for their respective needs, Manning said. Previously, individual

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Photo by U.S. Air Force TSG Johnny L. Saldivar

BAGHDAD, Iraq - Prior to the start of a mission, Army Sgt. Justin Green (left) and Pfc. Michael Moore (right) program a simple key loader to allow their radios to communicate securely between vehicles during a detail in Iraq. Their personal security detail team provides constant individual security. Both are deployed from the 2nd Brigade Heavy Combat Team, 1st Infantry Division, Fort Riley, Kan.

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approaches to these solutions may have prevented the COMSEC community from efficiently reaching its overall objectives, he said.

At the forums, PD COMSEC will also articulate innovative, cost-effective communications security approaches to Army platform integrators. The integrators will determine the most effective ways to build COMSEC features into their future capabilities.

PD COMSEC has collaborated with the Assistant Secretary of the Army for Acquisition, Logistics and Technology ASA(ALT) Systems of Systems Engineering Office to institute the most effective communications security and key management approaches and analysis across ASA(ALT)'s programs of record.

"We will assist project managers throughout ASA(ALT) in making informed program decisions regarding COMSEC integration into their platforms," Manning said.

For example, many systems engineers deem Type 1 encryption necessary on capabilities that require less than the top secret protection it can provide, Manning said. Excess expenses are incurred when programs procure greater COMSEC protection than the operational level they need. PD COMSEC guides these individuals to alternatives to Type 1, when lesser security levels are appropriate.

"By consolidating and establishing PD COMSEC, those program offices have a place to go with acquisitions professionals that understand the business they are working in and understand that what you need in a program office are choices," Manning said.

Aside from the cost efficiencies yielded by its efforts, PD COMSEC is also bringing efficiency to the field. To lessen the logistics burden on Soldiers, PD COMSEC is leading the Army effort, in conjunction with the National Security Agency, to deploy Over The Network Keying capability to the Army to reduce the need

Components of the Project Director Communications Security portfolio. PD COMSEC procures, sustains and fields capabilities that secure and encrypt data on the Army's tactical network.

to receive COMSEC key from a physical workstation. The goal is to leverage the Key Management Infrastructure based solution in the next iteration of the Simple Key Loader. SKL is used to load cryptographic keys to encryption devices used to make data indiscernible to the enemy.

With this solution, the user will connect to the Secure Internet Protocol Router network from any location, register his or her brigade's devices and use the SKL to download key for each of their systems. This will eliminate the burden of carrying transit cases that contain large key distribution systems or searching for a COMSEC custodian.

"The user will be able to update key from garrison, all the way to the tactical edge," Manning said.

The solution will be usable with many of the 1.5 million end cryptographic units that are currently fielded, but some legacy systems will be replaced to support this application.

"We see this as the bridge until the Army can modernize its entire crypto fleet, that 1.5 million devices, so that they have the hooks to be able to get the key directly through the KMI infrastructure," Manning said.

PD COMSEC interfaces with both the Army and National Security Agency to find the most suitable key management and cryptographic materiel solutions for both entities. It is also collaborating with the NSA to resolve the challenge of distributing commercial key through military standard key distribution chains.

PD COMSEC manages the overall Army budget of the NSA-led KMI Program. This includes coordination, cost, schedule, performance and management. It also leads the training, fielding, sustainment and other logistics efforts for Army communications security.

Many Army developers approach industry to solve COMSEC challenges where viable solutions already exist. Some systems engineers may make their initial approach their sole solution to an issue. They do so without determining if the algorithms in the device can still function for the life of the host platform and must replace the capability within a few years. PD COMSEC's knowledge-set covers the broad scope of the Army's COMSEC products. The project management office offers viable options and specific timeframes on when key will become outdated, Manning said.

PD COMSEC was chartered to the Army's Program Executive Office for Command, Control and Communications-Tactical (PEO C3T) in September 2010. It was created as a result of an April 2008 memorandum when then CECOM Commanding General, LTG Dennis Via, recommended that ASA(ALT) establish an O6-level project management office within PEO C3T to centrally manage programs of record for the cryptographic modernization, key management and overall life-cycle management of Army COMSEC. PD COMSEC was established to synchronize a multitude of capabilities and program offices which require COMSEC, the many joint agencies which coordinate their delivery and centrally manage the more than 380 separate cryptographic and ancillary models in the field.

"The scope of COMSEC across the Army results in a high level of complexity of program of record and policy requirements and information assurance architecture modernization," Manning said.

The organization which simultaneously supports cryptographic modernization and key management objectives, is participating in a joint Lean Six Sigma project with CECOM to make Army wide COMSEC help desks more efficient. The project will streamline help desk support for users who now access separate help desks throughout the United States.

The organization was established within PEO C3T's existing force structure, which eliminated the need for additional personnel authorizations. It also used the funding lines already allocated for the Army's key management and cryptographic modernization efforts, so additional budget requests were unnecessary.

"We did 'more without more' as we stood up the organization within the existing funding lines, without requesting additional money or affecting the amount of equipment purchased," Manning said.

Josh Davidson *is a graduate of The College of New Jersey (formerly Trenton State College), in Ewing, N.J. Prior to becoming a government civilian strategic communications representative with PEO C3T, he was an investigative, music, sports and municipal journalist with numerous publications including Gannett Newspapers. He has interviewed GEN David Petraeus, GEN (Ret)Kevin Chilton, and GEN Ann Dunwoody. He has covered numerous tests, exercises and events related to Army satellite communications systems and applications.*

ACRONYM QuickScan

ASA(ALT) - Army for Acquisition, Logistics and Technology
IPT - Integrated Process Team
KMI - Key Management Infrastructure
NSA - National Security Agency
OTNK - Over The Network Keying
PD COMSEC - Project Director Communications Security
PEO C3T - Program Executive Office for Command, Control and Communications-Tactical
SKL - Simple Key Loader

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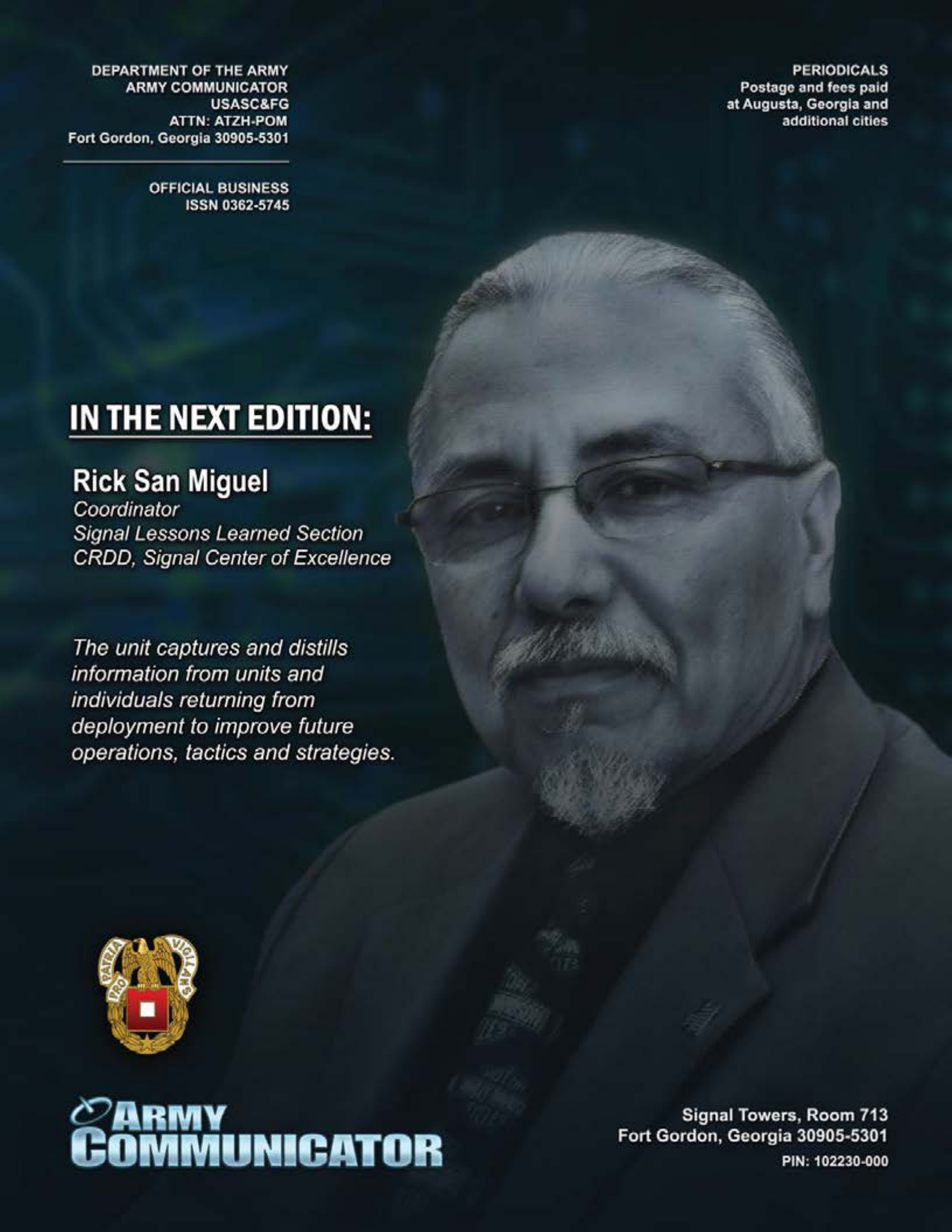

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