

Speaking with One Voice

The Network Modernization Roadmap illustrates our Army leaders' strategy to fill capability gaps and make necessary improvements to network functionality that ensures American Soldiers remain the most lethal fighting force on the battlefield.

By Kyle D. Barrett

Let's look at how we get to the future from where we are.

Today, the U.S. Army has tactical networks that connect commanders and Soldiers with voice and data capabilities to the lowest echelon.

However, the tactical network is pieced together with a myriad of mismatched systems that work well separately but were not designed to work together, requiring significant integration and configuration efforts. This “borne-of-necessity” approach has increased the number and size of communication platforms while introducing a great deal of complexity in how Soldiers interact with the network.

The Army’s tactical network of tomorrow provides robust communications that are rapidly deployable, versatile and scaled to fit a multitude of mission types. A recently published Army white paper titled Army Vision – Force 2025 describes future operations as “decentralized, distributed, and integrated.”

The Program Executive Officer for Command, Control, and Communications – Tactical has created a “Network Modernization Roadmap” that will guide the Army’s tactical network of today to a network capable of supporting operations in 2025. The roadmap consists of three phases that form building blocks: Network 2.0 from 2014 to 2016, Simplified Tactical Army Reliable Network from 2016 to 2020, and the Network after Next from 2020 and beyond.

The Army of 2025 is comprised of mission tailored units, organized with capabilities needed for a specific mission and environment, and are engaged regionally and deliberately across the globe. The Army has defined three lines of effort to optimize the force: force employment; science and technology and human performance optimization; and force design. The S&T line of effort concept is that technology drives concept,

meaning projected technological advancements serve as a template for future tactical communication concepts. While maneuver forces continue to refine their tactics and techniques on the battlefield, advances in S&T will allow maneuver elements to be even more agile and rapidly deployable. BG Daniel P. Hughes, program executive officer of PEO C3T “picture[s] a landscape in which Soldiers can start up a wireless command post at the push of a button, a quick voice command can summon and interpret a wealth of operational data, and a digital map looks the same from smartphone to tablet to vehicle-mounted touch screen.” Simplified tactical communication platforms that are lightweight and versatile, yet robust and secure, are essential to the successful evolution of Force 2025.

With Army Vision – Force 2025 as its guide, the Army Signal Corps and PEO C3T have begun to implement the Network Modernization Roadmap, which synchronizes the operational priorities of versatility, mobility and security with technology imperatives and program-of-record objectives. Over the last three years, the Army has fielded the Capability Set 14 network as an initial step toward network modernization. CS 14, also known as the Warfighter Information Network – Tactical Increment 2, introduces “on the move” satellite communication capabilities that allow company commanders and platoon leaders to stay situationally aware at all times, even when far away from their command post, thus empowering dismounted Soldiers with situational awareness through technical devices

and networking radios. More importantly, CPs can maintain accurate situational awareness in the dynamic decisive action environment. However, CS 14 has proven to be complicated and intimidating for some operators, primarily the commanders and leaders who operate the Soldier Network Extension and Point of Presence vehicle mounted platforms.

Recently Jennifer Zbozny, PEO C3T chief engineer, reported that a new simplified version of the SNE and PoP will be included with the next-generation network known as Network 2.0. While Network 2.0 includes a simplified user interface with communication platforms, the next-generation network provides commanders and network engineers with enhanced command and control capabilities.

With mission tailored, regionally aligned, and rapidly deployable units of Force 2025, rapid task organization for purpose is imperative. Network 2.0 includes technology where a commander may simply look at a battle command screen and drag-and-drop a unit icon to where it needs to go.

Task re-organization currently involves building a new mission plan and distributing it using a mission data loader – a task nearly impossible for units conducting continuous operations. Network management tools included in Network 2.0 are increasingly software based and share the same drag-and-drop simplicity when reconfiguring all nodes in a network. Simply put, Network 2.0 simplifies the human interface with network platforms while

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bridging the Army's current technology and the lightweight and highly capable STARNet of 2020.

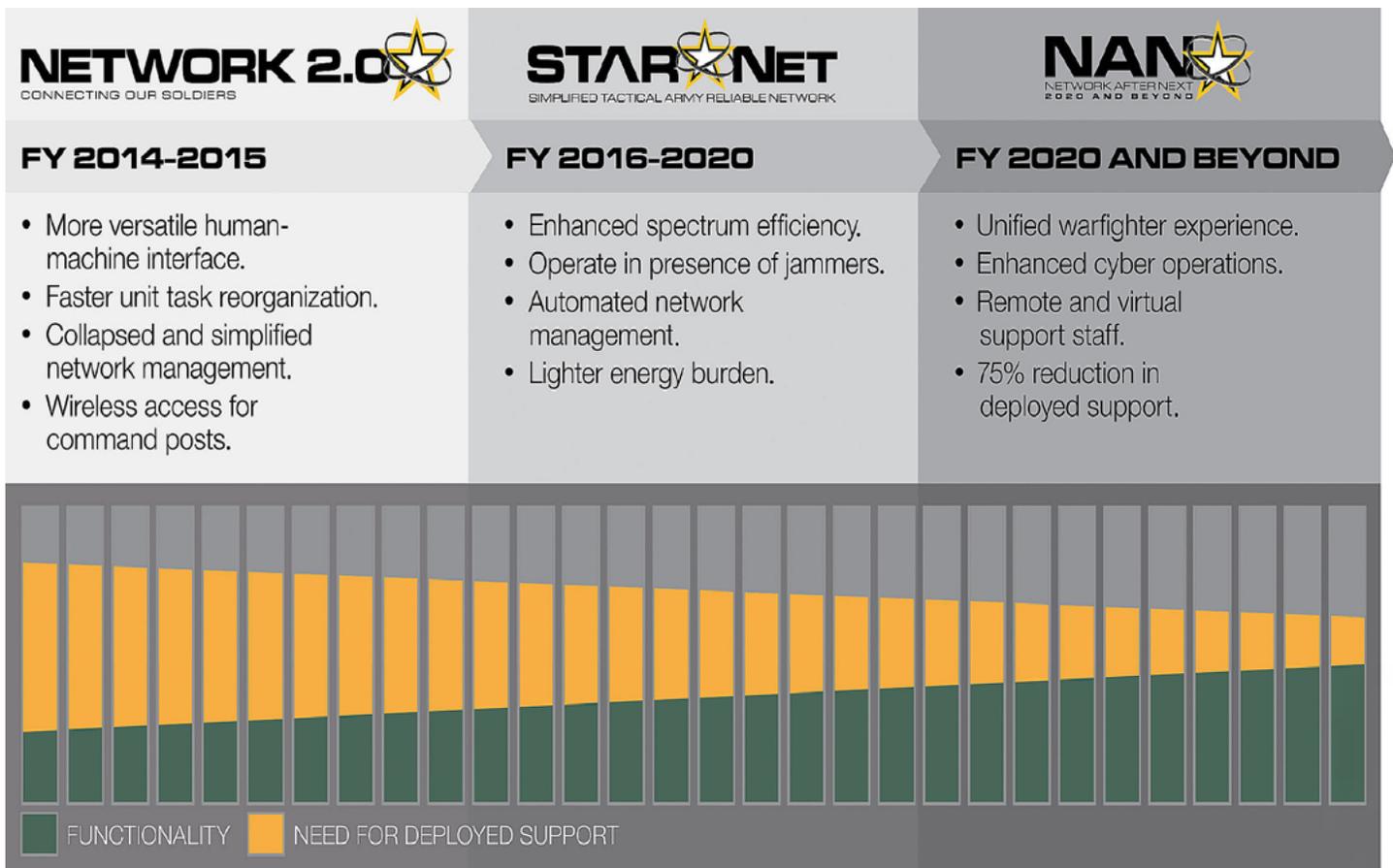
With communication security one of the top priorities of the Network Modernization Roadmap, and with cyber warfare on the forefront, increased use of radio transmissions are difficult. Challenges included in the STARNet is developing applications that use limited spectrum.

By 2020, advancements in waveform technology will allow operators to communicate while simultaneously jamming enemy signals-intelligence operations. STARnet's decreased physical equipment burden requires less power and decreases the overall footprint of future maneuver forces.

Currently, network management at the Brigade level requires 20 separate laptops and servers. As tactical communication platforms reduce their footprint, so do Network Operations

Centers. STARNet introduces the increased use of virtualization – through virtual local area networks and virtual private networks – and automated node management, decreasing the number of devices required for NetOps. Additionally, this network convergence effort will provide cloud computing so that strategic level echelons can take over some services once provided at the tactical level. This effort to decrease the size of NetOps Center corresponds with smaller brigade command posts of Force 2025.

The network is a key and essential part of the Army's vision of a leaner and more expedient force, able to adjust to any situation anywhere in the world. NaN, the final phase of the Modernization Roadmap, includes "adaptable solutions, to have our equipment adapt to different missions and challenges no matter where we are," says Zbozny of PEO C3T. Part of that adaptability will likely include a human-machine interface similar to Apple's Siri technology. With this technology, a





The Warfighter Information Network-Tactical Increment 2 Point of Presence is the primary on-the-move configuration item to be installed on tactical combat platforms such as this Mine Resistant Ambush Protected All-Terrain Vehicle, at division, brigade and battalion echelons. It will be tested during the WIN-T Increment 2 Initial Operational Test and Evaluation scheduled for May at White Sands Missile Range, N.M.

“digital tactical butler” inside mission command systems aids commanders on the battlefield.

At lower echelons, the Army’s CS 14 delivers software-defined radios that communicate with smartphone-like technical devices. These technical devices are making mission objectives more transparent to higher commands through accurate position location information, text messaging, photo sharing, and full motion video feeds. The focus of the NaN is to “untether” the technical device from the radio, using Long Term Evolution, commonly known as 4G wireless technology, so that troops can communicate more seamlessly across echelons. A key component of NaN is the ability for data and voice transmissions to take a different “path” if an existing route has moved or is jammed. This seamless transition from radio to LTE to satellite, while difficult and complex is a critical element of the Network Modernization Roadmap and Force 2025.

PEO C3T and the Communications – Electronics Research, Development and Engineering Center have joined forces to develop a single tactical computing environment that will provide a seamless user experience from handheld devices to vehicle platforms to command posts. BG Hughes asks us to “picture a Soldier with multiple personal devices that all run an Apple, Android or Windows operating system.” Force 2025 operates in a tactical realm delivering “standard maps,

messaging, and icons that are intuitive to operate and reduce the training burden.” With respect to mission command, this standardized operating environment facilitates the Army’s transition from stand-alone mission command systems to an integrated warfighting system with user-friendly “widgets” or apps.

Further advancements in Joint Battle Command-Platforms enable inter-agency near-real-time mission command capabilities. The current Joint Capability Release Force XXI Battle Command Brigade and below evolves into the Joint Battle Command – Platform with the capability to communicate over a hybrid network--Soldier Radio Waveform and Satellite. Most importantly, the JBC-P is common to all branches of the military, allowing joint interoperability and unified mission command capabilities. The STARNet phase of the Network Modernization Roadmap, combined with the JBC-P, forms a multi-tiered joint communications infrastructure by 2020.

None of these advancements will matter if we cannot protect our communication from our enemies. “One thing we can be sure of in our next fight is that our adversaries will be more sophisticated in cyber warfare,” declares BG Hughes. As cyber-attacks become more and more frequent among unstable regions across the globe, communication security becomes more and more important for national defense. Current tactical communication devices require strong passwords, but even the most complex password is only a single-factor form of authentication. NaN systems employ a simplified authentication mechanism, eliminating the need for multiple passwords to sign on to the network and increasing cybersecurity using biometric identification methods. Future warfighters can expect to provide advanced multi-factor authentication, including facial recognition and iris scans coupled with one-time passwords or tokens. Additionally, NaN systems communicate via protected satellites using anti-jamming technology. Key encryption is currently the primary means of securing satellite transmissions. Future satellites resemble Advanced Extremely High Frequency Milstar satellites that employ a spread-spectrum approach called adaptive nulling, in which the signal hops in pseudo-random fashion from frequency to frequency within an assigned bandwidth.

Leaders across the operational force will

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experience a steep learning curve, as they say goodbye to the equipment they were initially trained on and used during a decade of combat operations, and are introduced to equipment with a whole new look and feel. OIF and OEF produced tactically tested war fighters who are now leaders of our maneuver forces, and these leaders have become accustomed and comfortable with the use of combat net radios (SINCGARS, TACSAT, FBCB2) to enable mission command. The fielding and training efforts entrenched in the network modernization roadmap must result in a high level of comfort among brigade and battalion leadership in order to prevent leaders from dusting off their old MBITRs and ASIPs and reverting to operating how they are comfortable.

The network is fundamental to a smaller, highly capable



CPT Jonathan Page, a troop commander with the 4th Brigade Combat Team, 10th Mountain Division (Light Infantry), uses a rifleman radio and Nett Warrior end user device, at Nangalam Base, Afghanistan, in 2013. After fielding initial rifleman radios as part of the Capability Set 13 and 14 communications suite, the Army is moving forward to procure additional radios through full and open competition

Army that faces the increasingly complex enemy of tomorrow. The Network Modernization Roadmap illustrates the Army's strategy to fill capability gaps and make necessary improvements to network functionality that ensures American Soldiers

remain the most lethal fighting force on the battlefield. It is clear that the army has committed great time and resources toward modernizing our tactical communication architecture, but teaming up with the tacticians who are developing the force structure of 2025 is the most valuable initiative. The network of 2025 is no doubt more advanced, yet simpler to operate than our current network. Despite technological advancements, the tactical network's purpose remains constant – a means through which commanders exercise immediate and personal control over their forces.

CPT Kyle D. Barrett is an Army Signal captain serving as a senior Signal observer controller trainer at the Joint Multinational Training Center. CPT Kyle has served as a company fire support officer, mortar platoon leader, battalion fire support officer, and Signal company commander.

ACRONYM QuickScan

AEHF – Advanced Extremely High Frequency
ASIP – Advanced System Improvement Program
CERDEC – Communications – Electronics Research, Development and Engineering Center
CP – Command Post
CS 14 – Capability Set 14
FBCB2 – Force XXI Battle Command Brigade and Below
JBC-P – Joint Battle Command – Platform
JCR – Joint Capability Release
LTE – Long Term Evolution
MBITR – Multi Band Inter Intra Team Radio
MDL – Mission Data Loader
NAN – Network after Next
NetOps – Network Operations
OEF – Operation Enduring Freedom

OIF – Operation Iraqi Freedom
PEO C3T – Program Executive Officer for Command, Control, and Communications – Tactical
PoP – Point of Presence
SINCGARS – Single Channel Ground and Airborne Radio System
SNE – Soldier Network Extension
STARNet – Simplified Tactical Army Reliable Network
SRW – Soldier Radio Waveform
TACSAT – Tactical Satellite
VLAN – Virtual Local Area Network
VPN – Virtual Private Network
STARNet – Simplified Tactical Army Reliable Network
WIN-T – Warfighter Information Network – Tactical