NETWORKING THE SOLDIER

ARMY TACTICAL NETWORK MODERNIZATION

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The Army is delivering a tactical network that guarantees we can prepare for war and fight and win against any adversary. Today, as part of the tactical network modernization strategy, the Army is addressing the most critical operational shortfalls and pivoting to field integrated network capability sets on a two year basis starting in FY21. The Army is developing and fielding a network that is more expeditionary and mobile, less complex and better protected. The strategy is designed to target these network challenges and enable the Army to “fight tonight” while also actively seeking next-generation solutions to stay ahead of potential adversaries.

Today, through Capability Set fielding and development, the Army is actively inserting industry capability to enhance the network to give commanders multiple communication choices (both military and commercial networks), make it more user friendly, harden it against cyber and EW threats and provide easier methods to share information with collation partners.
The Army’s approach to tactical network modernization is focused at keeping pace with threats in the near term and developing an optimized future network through rapid insertion of new technology. Today, the Army is building two-year capability sets and conducting market research to insert the latest commercial capability into future sets. In order to incorporate real-time operational feedback and generate less prescriptive requirements, the Army is utilizing the proven industry practice of developmental operations (DevOps) and robust operational experimentation, which places developers side by side with Soldiers in operational units to evaluate potential technology solutions. Army network developers are working with industry to make real-time program improvements as part of the DevOps construct. These assessments will inform Capability Set network design, future capability requirements, resourcing and acquisition decisions, and help the Army and its industry partners to evolve the network at the pace of commercial innovation.

Today, the Army continues fielding advanced network technology to the Security Force Assistance Brigades, while preparing to field Capability Set 21 and modernize all 24 Expeditionary Signal Brigades. The Army is also pure fleeting all service components with the latest mounted mission command applications and hardware, modernizing cryptographic applications and fielding the first iteration of the Common Operating Environment, the Command Post Computing Environment. We are also developing Capability Set 23 with a focus on integration of commercial cellular and satellite capability, enhanced data management of mission command systems, addition of advanced secure waveforms and incorporating cloud services and artificial intelligence, and continuing to reduce size, weight and power of our network systems.
The Network-Cross Functional Team is composed of the operational community, capability managers, acquisition/contracting professionals and policy experts. Today, the Network-Cross Functional Team is planning future Capability Sets and experimentation, conducting industry market research, aligning capability to need and coordinating network-related S&T. Near-term focus areas are automation and intelligence, resilient communications and situational understanding of the electromagnetic environment, data management and prioritizing network related resources to ensure the Army is poised to quickly procure promising commercial capability. The N-CFT supports the rapid transition of leader-approved capability requirements to the Army Acquisition System and addresses network disconnects and misalignments by horizontally and vertically integrating requirements while seeking available solutions for experimentation, demonstration and evaluation by Soldiers and leaders in the field.
The Army’s strategy will focus on four modernization priorities, known as lines of effort (LOEs): creating a unified network transport layer; building a common operating environment (COE) for mission command applications; improving Joint Force and Coalition interoperability and improving command posts’ mobility and survivability.

**LOE 1: UNIFIED NETWORK TRANSPORT**
WHAT: Establish an available, reliable and resilient network that ensures seamless connectivity in any operationally contested environment.
WHY: The Army requires assured network transport in a contested environment against a peer adversary.
Efforts: Integrated Tactical Network | Tactical Radios ESB-Enhanced | Tactical Network Transport Signal Modernization/SATCOM

**LOE 3: INTEROPERABILITY**
WHAT: Ensure Army Forces can more effectively interact (technically and operationally) with Joint and Coalition partners.
WHY: The Army will achieve and sustain a level of interoperability within the Army, Joint and Unified Action Partners to enable Joint All Domain Command and Control (JADC2).
Efforts: Mission Partner Environment

**LOE 2: COMMON OPERATING ENVIRONMENT (COE)**
WHAT: Provide a simple, intuitive, single common operating picture through a single mission command suite operated and maintained by Soldiers.
WHY: Commanders must be able to execute distributed mission command and make rapid, knowledge-based decisions (Observe, Orient, Decide and Act (OODA)).
Efforts: Handheld | Mounted | Command Post Server Computing Infrastructure

**LOE 4: COMMAND POST**
WHAT: Enable commanders to lead and fight their formations from anywhere they choose and ensure command post deployability, reliability, mobility and survivability.
WHY: Command Posts must be mobile and survivable in a dynamic, lethal combat environment.
Efforts: Command Post Integrated Infrastructure

**AR OY NETWORK MODERNIZATION LINES OF EFFORT**
The Integrated Tactical Network (ITN) provides simplified, mobile network availability down to the small unit dismounted leader through integration of commercial capability that includes tactical software-defined data radios, purpose built radios, hand held applications (Nett Warrior program) and devices, network gateways/cross domain solutions and small satellite terminals. The ITN provides commanders with multiple communications options that did not exist outside special operations forces, such as secure access to commercial cellular networks and the ability to send secure but unclassified data. With commercial network components and transport capabilities, the ITN forms a more flexible, resilient network environment for tactical warfighting with Joint and coalition partners.

ITN capability is fielded to Security Force Assistance Brigades and experimentation to achieve ITN capabilities is underway with operational units providing feedback to augment Army Network and Soldier systems programs and efforts. ITN network design decisions will be formalized in FY20 and experimentation will influence fielding of the ITN kit as a key part of Capability Set 21.
Tactical Network Technology Modernization in Service (TNT-MIS) is a major effort in-line with establishing unified network transport. Current TNT-MIS “next-generation” capability enhances cyber security, simplifies tactical network operations and initialization and reduces component size, weight and power. MIS efforts also include technical refresh of end-of-life/non-sustainable commercial tactical technology component equipment, enabling the implementation of a standards-based architecture. MIS enables commercial capability insertion to make the Army’s on-the-move and at-the-halt network more expeditionary. One example is the ongoing fielding of the tactical network transport on-the-move Network Operations Center and Tactical Communications Node–Lite versions, which greatly reduces component size, weight and power to enable integration on lighter vehicle platforms. MIS IT enhancements also improve the Army’s network Regional Hub Nodes and other critical SATCOM support capability to support the Expeditionary Signal Battalion–Enhanced modernization priority. As the Army develops Capability Set 23, the TNT MIS effort will be used to leverage commercial Low and Medium Earth Orbit commercial satellite constellations to provide additional network resiliency to Infantry, Stryker and Armor formations.
The Army’s continually evolving suite of expeditionary network transport equipment enables commanders to see first and act first, while increasing speed of maneuver and operational flexibility. These new expeditionary capabilities augment and expand the Capability Set to suit mission requirements.

- **Enroute Mission Command (EMC),** utilizing the Army’s tactical satellite network, provides critical in-flight mission command to the Global Response Force (GRF) and other XVIII Airborne Division units while onboard an aircraft en route to an objective.

- **The Transportable Tactical Command Communication (T2C2) inflatable satellite terminal** enables continuity of mission command during the initial phases of operation. Both the T2C2 Lite (1.2 meter satellite terminal) and air-droppable T2C2 Heavy (2.4 meter satellite terminal) provide robust high-bandwidth network communications and mission command for initial entry and more mature forward operations.
The small form factor Terrestrial Transmission Line Of Sight (TRILOS) radio provides a significant reduction in SWaP compared with the legacy at-the-halt High Capacity Line Of Sight (HCLOS) radio. TRILOS improves the robustness of the tactical network by providing an increase of 12x the bandwidth, along with increased range, with low to no latency versus SATCOM.

Next generation Troposcatter Transmission (Tropo) capability significantly extends network range and throughput, and greatly reduces SWaP over current Tropo capability. Tropo bounces signals off of the Earth’s atmosphere to provide beyond-line-of-sight capability without using expensive and limited satellite resources.

The small form factor Modular Communications Node-Advanced Enclave (MCN-AE) augments the existing intelligence network, enabling intelligence users to connect to all of the same resources they have when using the Traditional Trojan Intelligence Network, but instead using the tactical network.

Commercial Coalition Equipment (CCE) can be rapidly reconfigured to provide secure tactical access for the coalition or commercial networks to support both civil and military operations. CCE provides a Radio Bridging Voice (RBVC) capability that enables radios on different frequencies, or different equipment such as radios or cell phones, to seamlessly connect to each other.

Secure Wireless uses the National Security Agency-approved Commercial Solutions for Classified solution to provide classified and unclassified wireless capability to the Command Post (CP). Following Command Post setup, units can turn on their Secure Wi-Fi hotspot and the network can come up first instead of last, as little as minutes instead of hours, and Soldiers can stay connected longer when jumping the CP.
2-CHANNEL LEADER RADIOS (LR)

The HMS MP is a software defined, National Security Agency (NSA) Type 1 certified radio, providing two-channel secure voice and data communications via TSM, SINCGARS, SATCOM and SATCOM Integrated Waveform (IW), Mobile User Objective System (MUOS) and Enterprise Over-The-Air Management (OTAM).

2-CHANNEL MANPACK (MP) RADIOS

The Leader Radio is a software defined, handheld, NSA Type 1 certified radio providing two-channel secure voice and data via the TSM and SINCGARS waveform. The LR can also be linked to the Nett Warrior.

Path diversity is an important component of a resilient communications network. The Army is executing COTS IT procurement and leveraging continued commercial waveform development of software-defined radios under the Handheld, Manpack and Small Form Fit (HMS) program. Product lines under HMS include the one channel radio, two channel Leader Radio (LR) and Manpack (MP) Radio.

The HMS effort is flexible, and as additional capability and waveforms emerge, the program office will work with industry to integrate desired capability. The Government has conducted extensive market research and will continue to do so on an annual basis to assess industry technology advances with possible on-ramps after the initial contract award. All vendors, including those previously off-ramped, will be eligible to compete at the on-ramp. As an example, the Army is aggressively working to port the TSM waveform onto Generation 2 Manpack radios and has enabled TSM capability on the Leader Radio.

TACTICAL RADIO MODERNIZATION

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“THE COMMANDER HAS TO MENTALLY FUSE INFORMATION TO MAKE DECISIONS. WE WILL NOW GET ONE PICTURE THAT HAS EVERY OVERLAY OF ALL WARFIGHTING INFORMATION NEEDED TO MAKE RAPID AND INFORMED DECISIONS.”

The Army is implementing a Common Operating Environment (COE) for mission command software and hardware systems. COE is an approved set of standards and applications that improve distributed mission command and enable rapid decision making (Observe, Orient, Decide, Act). This effort consolidates all warfighting functions in the dismounted, mounted and command post computing environments to provide a simple, intuitive, and integrated common operating picture.

The primary computing environment in the COE is the Command Post Computing Environment (CP CE). CP CE provides a software infrastructure framework (common interface, data and services) and a common server hardware configuration (Tactical Server Infrastructure). CP CE, which began fielding in late FY19 is the central computing environment developed from industry based ‘core’ software that will eliminate stove-piped legacy systems and provide an integrated, interoperable and cyber hardened framework for converged warfighting functions. The Agile CP CE program leverages continuous Soldier feedback to make software and functionality improvements.

Currently, the Army is also consolidating to a single software baseline for all mission command applications across Army, Army Reserve and Army National Guard formations. Standardization of mission command software and implementation of a universal baseline decreases the number of software patches and security updates that must be developed, tracked and introduced in the field. It also helps with release of CP CE by creating an environment for interoperability. Additionally, within the next five years all units will be synchronized with the same upgraded mobile mission command software called the Joint Battle Command-Platform (JBC-P), and a version of the Army’s new standardized tactical computer, the Mounted Family of Computing System (MFoCS). The combined capabilities of JBC-P and MFoCS deliver the Army’s next-generation friendly force tracking system.
In 2019 the Army launched a program to provide modernized mobile, scalable and survivable CP platforms. The program effort, called the Command Post Integrated Infrastructure (CPI2), will address current mobility issues while ensuring communications hardware and mission command application integration across platforms. The Army is executing CPI2 in increments. Culminating now is the first step of the first increment, in which the Army equipped selected units with mobile platforms and secure wireless and intelligent power solutions. Units provided comments, suggestions and lessons learned through command post design workshops and field exercises. The second effort of the first increment manages formal design, integration and CPI2 prototyping. This effort executed competitive prototyping for brigade combat team designs. One BCT is planned to be a government design, while the other BCT will be an industry driven design.

In some cases, the CPI2 program is arranging for the acquisition of select platforms such as the Family of Medium Tactical Vehicles, which will be integrated with C4ISR systems provided and integrated by CPI2 or other programs of record. In other instances, such as with the armored multi-purpose vehicle (AMPV) and Joint Light Tactical Vehicle (JLTV), these programs are already providing mission command variants. CPI2 platforms will exist from the corps to the battalion echelons. The Army plans to field two BCTs in 2020 and conduct early user evaluations. The remaining three BCTs will be fielded in FY21–22. CPI2 will also field one Corps and one Division Mobile Command Group (MCG) as well as one mobile CP solution for a Division HQ MAIN Command Post.
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