Signal Center of Excellence

TRADOC Capability Manager
Network and Services (TCM N&S)

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• Purpose
• What is the Expeditionary Network?
• Army 2020 Network Objective
• Expeditionary Network FY 15-18 Capabilities
• Questions
Purpose:

To provide our industry partners an overview of current and emerging network operational / technical requirements and challenges for FY 15-18.
Expeditionary Network

Satellite Communication Links

- Military Satcom
- Commercial Satcom
- Aerial Link
- Point-to-Point LOS
- Meshed LOS

- SATCOM Links
- Aerial Links

- R&S BDE CP
- CAB CP
- Fires BDE CP
- SUST BDE CP
- CORPS CP
- ENG BDE
- CBRNE BDE
- ADA BDE
- DIV CP
- MEB CP
- BCT CP
- BN CDR (OTM)
- UAS
- TNCC
- RHN
- Corps, Division, BCT
- Multi-Functional Brigades (R&S, CAB, Fires, MEB, SUST)
- Functional Brigades (ADA, CBRNE, ENG, MI, MP, MED)
- Color Code

- Corps CP
- MED BDE
- ENG BDE
- Fires BDE
- BN CP
- UNCLASSIFIED
“The entire network must be treated as a single entity, unified from the Global Information Grid to the installation to the farthest tactical edge, and provide the integrated capabilities that support a seamless link from home station, through the enterprise, to the lone dismounted Soldier in theater. This means the Army must design, develop, acquire and field the network in a comprehensive, synchronized manner.”


- Support the Network 2020 objective by:
  - Building capacity
  - Improving system interoperability
  - Extending the network
Expeditionary Network
FY 15-18 Capabilities

- Terrestrial
- Troposcatter
- Cellular
- Coalition Commercial Equipment
- Protected SATCOM Interoperability Upgrade
- Multiband SATCOM Upgrade
- RHN Commercial Internet
- Enroute Mission Command Communications
- Modular Communications Node – Advanced Enclave
The terrestrial solution bridges the gap between the disparate WIN-T Increments by providing a mesh radio that is software programmable, allowing seamless interoperability between all Increments. This solution provides an intuitive interface and is self-aligning and self-healing.

**Requirements**

- Terrestrial throughput shall provide 32 Mbps (Threshold), 48 Mbps (Objective)
- Must be inter-operable with all WIN-T Increments
- Must use existing man power

**Operational Impact**

- The primary connectivity between WIN-T Increments is via constrained satellite connectivity. This solution provides the Commander with a high-bandwidth, low-latency terrestrial back bone which provides immediate and reliable delivery of critical Mission Command services.

**DOTmLPF**

D - Enhances the Commanders ability to conduct Mission Command Essential Capabilities by providing high capacity terrestrial connectivity.
O - Will use existing personnel, vehicles and facilities
T - Combination of institutional, Unit provided and NET/NEF.
M - Reuse of existing WIN-T materials where possible
L - TBD
P - No additional MOS requirements; Use existing skill sets
F - TBD
Troposscatter

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**Requirements**

- Must provide data throughput of is 50 Mbps (Threshold), 100 Mbps (Objective) at 100 nautical miles.
- Reduce SWAP and minimized transit case size in order to use current tactical vehicles and power generation equipment.

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**Operational Impact**

- Transit case tropo gives the Commanders a high-bandwidth, low latency, BLOS solution that provides the timely delivery of critical Mission Command services. In a highly congested SATCOM based network, this is a viable alternative and compliments the existing WIN-T terrestrial network.
• Transmission systems support for each user will provide .5 Mbps (threshold), 1.5 Mbps (objective) user data rate for uploads and 1 Mbps (threshold), 2.5 Mbps (objective) user data rate for downloads at a distance of 5 kilometers (threshold) and 15 kilometers (objective).
• Each cellular support capability will support 32 simultaneous users (threshold), 48 simultaneous users (objective).
• The system will be capable of providing the full cellular capability in 10 MHz of spectrum (3G) and 20 MHz (4G LTE).

DOTmLPF
D - How will the integration of this Jolted Tactics naval cellular capability into the Army’s network enhance or affect Mission Command?
O - TBD
M - TBD
L - TBD
P - What changes to knowledge and skills are required to operate/maintain/repair/defend the tactical network?
F - TBD

Operational Impact
• The cellular Transmission capability is integrated into WIN-T Increment 1b, 2, and 3 configuration items [JNN, Battalion Command Post Nodes (BN CPN), Tactical Communications Nodes (TCN)], and Soldier Extension Nodes (SNE) and provides cellular service to Soldiers in and around the command post.
• The cellular capability is also required at ESBs to support command posts that do not have organic WIN-T assets. The cellular system shall be compatible with the WIN-T IP voice and data networks.
Cellular Distribution

- KU/KA BAND SATCOM
- STEP/Teleport/Regional Hub
- POP
- NOCS-D
- TCN
- STT
- NOCS-B
- TCN
- STT +
- Cellular Base Station
- Cellular Base Station
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Neighboring (Commercial, RITE 2020, JOLTED TACTICS, etc) Cellular Initiatives
### Requirements

- Commercial and Coalition
  - Commercial internet and mission network capabilities
  - Mission network capabilities that support CENTRIX-ISAF, US SIPR, NATO Secret, CENTRIXs-GCTF, and ISAF Secret

- Radio-Cross-Banding w/Voice
  - Interoperable with local, state, and federal agencies
  - Voice interoperable with current WIN-T voice architectures
  - Interconnects disparate voice communications networks/devices

### Operational Impact

This capability describes the operational requirements of the CCE capabilities which will support all phases of combat contingencies as well as the Army National Guard Bureau (NGB) in mitigating Homeland Defense and Civil Support (HD/CS) Net-Centric capability gaps outlined in the Army NGB HD CS Deployable Communications Integration Analysis dated June 2008 and the HRF Consolidated IMPLAN Appendix 1 of Annex K, dated 30 September 2012.

D - The doctrinal impact of the WIN-T program’s absorption of the JISCC capability would be minimal. Current doctrine exist for both programs.

O - Distribute to states and territories, ABCT, IBCT, CAB, Fires, SUS, CORPS and DIV

T - LARs and FSRs will be available to provide training

M - TBD

L - Leadership training will be provided by NET

P - Staffing for JISCC operation and maintenance must be task organized from existing units and organizations within the states or territories

F - Will leverage the same facilities already supporting WIN-T system.
**SMART-T**

- AEHF data rates up to 8.192 Mbps
- Fiber & Legacy Serial Interfaces
- On-board Vehicle & Generator Power
- Rapid Setup Time (15 minutes)
- Uses MILSTAR & AEHF Satellites
- No Fee for Service
- Anti-Jam /Assured Access in all Environments
- Low Probability of Detection and Intercept
- Real-time Resource Monitoring and Management
- Warfighter can reconfigure resources as mission changes

**Requirements**

SMART-T is the only protected SATCOM available for the foreseeable future. It must be flexible enough to cover all missions going forward and be as WIN-T NETOPS compliant & capable as possible.

- Provide dual stack Internet Protocol (IP) Interface for SMART-T IP version 4 and version 6
- Provide a standardized single interface connection that may be used by all WIN-T nodes deployed at all echelons.
- The interface shall be addressable and accept traffic managed by WIN-T NETOPS
- Provide Fiber to Ethernet media conversion with SMART-T
- Provide Type 1 link encryption for traffic transmitted over satellite with SMART-T

**Operational Impact**

- Provides a more flexibility SMART-T for the Warfighter
- WIN-T Nodes supporting METT-TC operations may be provided a PROTECTED path currently not available
- SMART-T becomes compatible with all WIN-T nodes with a direct connect capability for WIN-T’s colorless core traffic and routing management schemes.
- Provides IP routable Interface to allow WIN-T NETOPS to rapidly route priority traffic to and from this protected path to mitigate effects of jamming on the WIN-T network.
- Standardized IP compatible interfaces improves ease of operations, and increased terminal employment.
- Maximizing SMART-T’s “No fee for Service” usage reduces operational costs over the life of the terminal

**DOTmLPF**

D - Standardizing WIN-T Interfaces simplifies Doctrine
O - No Impact to Organization
T - Minimal 25Q SMART-T OPR /25N NETOPS is simplified
M - Requires Development & Fielding of Material Solution
L - No impact
P - No Impact - Same Operators & Maintainers
F - No Impact
**Requirements**

- Add additional capabilities to current Quad-band, Multi-carrier, AN/TSC-156D Phoenix terminals
- TDMA Modems (Linkway, MPM-1000, and/ or iDirect)
- Dual Head capability with current 16 foot LHGX
- Dual Head capability with high gain multi-band antenna

**Operational Impact**

- The addition of TDMA modems takes advantage of the Phoenix multi-carrier capability by allowing simultaneous operation in both TDMA and FDMA networks at the same time.
- Dual head with the LHGX takes advantage of the Phoenix Multi-band capability by allowing simultaneous operation in both TDMA and FDMA networks at the same time in different bands or different satellites (effectively making the Phoenix a double terminal with one crew).
- Dual head with a high gain multi-band antenna adds more diversity and flexibility to the above capability. In addition, with an MRT may also provide network timing for small scale or contingency operations when operating on WGS satellites in multiple footprints not covered by an RHN.

**DOTmLPF**

D - Enhances capability, diversity, flexibility & throughput
O - Recommended redistribution to Corps and Division Sig COs
T - Training will have to be updated at the SOE, NET and CBT
M - No additional vehicles will be required
L - Leadership training will be updated via the TTP process
P - No additional personnel will be required
F - No additional facilities will be required
Representative WIN-T Increment 1a Brigade + Increment 2 Division/Brigade Network
Increment 1 Corps Network w/Phoenix (either organic or from ESB)
Representative WIN-T Increment 1a Brigade + Increment 2 Division/Brigade Phoenix at Division Main with IP Modem Upgrade and Dual Head Upgrade

Providing the capability to use both the high gain antenna and the on-board antenna at the same time will enhance flexibility. Terminal could use the 2.4 meter dish on any of the four bands and the high gain antenna in X-band (Procuring large multiband antennas would provided even great throughput and satellite efficiency).

Provides double the terminal capability with no additional Soldiers. Will overcome some issues related to WGS footprints by allowing operations in multiple footprints (X and Ka).
Enroute Mission Command Communications

The Airborne Command Post will use a roll on/carry on, transit case configuration that provides baseband and network equipment needed to connect to the aircraft’s wideband SATCOM and line of site antennas. This configuration will provide a display capability to share the Common Operational Picture (COP), display processed full-motion video feeds (FMV), and other imagery.

Requirements

- Includes hatch mounted satellite antenna for reachback capability and a three (3) variant system to host mission command applications:
  - 1 x Command and Staff Palletized Airborne Node (CASPAN): 12 users, reachback capable
  - 7 x Key-leader Extension Node (KEN): 5 users, reachback capable
  - 21 x Dependent Airborne Node (DAN): 5 users, inter-aircraft capable

DOTmLPF

- D - Facilitates the utilization of MC systems seamlessly during employment allowing Joint and ABCS connectivity
- O - Employed on USAF AMC aircraft for forced entry or deploying Army forces
- T - Natural extension of current enroute systems requiring minimal training and no new facilities
- M – 
- L - No impact
- P - Existing personnel will operate the new system
- F - No new facilities are required for this capability

Operational Impact

- Allows enroute/deploying Commanders the ability to maintain Mission Command, Situational Awareness and basic Planning functions for the Airborne force. This capability also provides enroute/deploying Joint connectivity via the following services to enroute mission commanders: video teleconferencing, ability to receive one processed full motion video feed, access to 12 Voice Over Secure Internet Protocol (VoSIP) phones, access to 12 Voice over Internet Protocol (VoIP) phones, and 12 SIPR connections to support laptops hosting Army Mission Command systems and Command Post of the Future (CPOF) or current command and control software systems.
Enroute Mission Command Communications (EMC2)

**Legend**
- **SATCOM Link**
- **Air-to-Air Mesh**

**Joint Forced Entry Operations**
**Strategic CONOPS**

**Enroute Mission Command Communications (EMC2)**

- **Location**:
  - **Lajes Field, Azores**: 3,500NM小于
  - **ISB 1 & 1A: Morón AFB/Rota NAS**: Refueling/Transloading/ARFOR Staging - Operational at D-3
  - **ISB 1**: 2,000NM小于
  - **ISB 3**: RoaKe, Ivory Coast - Refueling/Transloading/Staging - NEO Support - Operational at D-1
  - **NAS Sigonella**: Tanker Ops - Air Ops Launch/Diverst location
  - **CMBD**: 600NM小于

**Satellite Mesh**:
- **CMBD**
- **ISB 1 & 1A**
- **ISB 3**
- **NAS Sigonella**

**Air-to-Air Mesh**:
- **RHN**
- **T2C2v1**

**Satellite Operations**:
- **AFRICOM**
  - COMCO Supported CCDR
  - USAFE-AOC Ops
- **USARAF**
  - JTF Cmd
  - Initially at Home Station

**Air-to-Air Operations**:
- **Abn TF/FBNC/PAAF**
  - IBCT A-Ech: 1700 Pax/48 Veh
  - IBCT B-Ech: 300 Pax/45 Veh/8 Helo/Sustain
  - ARFOR Initial C2
  - X Hr Planning

**Communications**:
- **20 x C17**
- **15 x F/A-18 AC**
- **4 x HD AC**
- **1 x CBS AC**

**Missions**:
- **Akuru International Airport**
- **Abia State University**

**Support**:
- **2 x PAC A/C**
- **5 x HD A/C**
The MCN-AE is a modular transit cased system capable of being deployed within the Tactical Sensitive Compartmented Information Facility (TSCIF) for use by tactical intelligence staff.

**Modular Communications Node - Advanced Enclave**

**Requirements**

- The MCN-AE will provide connectivity to JWICS or NSANet.
- The MCN-AE will provide access to support up to 24 end devices, to include VoIP phones, laptops and Video Teleconferencing Equipment for JWICS and NSANet.
- One MCN-AE will be required to support each Top Secret network accessed at the tactical level (e.g. JWICS and NSANet).
- The MCN-AE be capable of maintaining an acceptable level of round trip delay, which allows intelligible speech quality in accordance with MIL STD 1472.
- The JWICS and NSANet connectivity will be provided to the Trojan Network Control Centers through the WIN-T colorless core architecture.

**Operational Impact**

- The Modular Communications Node – Advance Enclave allows intelligence staff to access Top Secret information over the WIN-T network to support the intelligence requirements of the commander through the full range of military operations. The integration of this new capability within the WIN-T network supports the stated objectives in the Network Synchronization Plan to replace the Trojan Spirit in the tactical formation by providing a Top Secret Enclave within the WIN-T network.

**DOTmLPF**

D – Enhanced Network Mission Area to provide an integrated network to conduct NeMC essential capabilities.

O – What other personnel and/or equipment changes are necessary to conduct phase I of transport convergence?

T – What additional troop-to-task are required? 25 series. TTPs to be refined at NIE.

M – TBD

L – TBD

P – Clearance required for 25 series Soldiers

F – No impact
## Regional Hub Node
### Commercial Upgrades

**Capabilities**
- SATCOM connectivity to JTF-State and Federal HQs in support of HD/CS operations
- Tier 1/2 Interface to Commercial Internet Gateway Services in support HD/CS operations
- Commercial Data, VOIP, and PSTN Services
  - Support 4 Simultaneous CBRNE operations
  - Support 5,000 PSTN users
  - 45 Mbps commercial data
- Support for tunneling Coalition Mission Networks (CENTRIXS, ISAF, etc.)
- Upgrade Nodal Management Capabilities to manage (commercial and coalition networks)

**Components**
- Tier 1/2 Routers (Com)
- Enclave Perimeter Routers (Com)
- Ethernet Switch (Com)
- Perimeter Router (Com)
- Host LAN Firewall / IPS (Com)
- Perimeter Firewall /IPS (Com)
- Call Manager (Com)
- PBX interface (PSTN) COMSEC Devices (KIV-7M, TACLANE)
- CTM-100P
- NM Servers

**Employment**
- COCOMs (5)
  - CENTCOM, EUCOM, PACOM, CONUS(E), CONUS(W)

**Packing/SWAP**
- 19 inch equipment racks in building
- Three (3) 9.2m satellite dishes

**Ancillary Equipment**
- Test and Measurement equipment

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*Image of satellite dishes with text overlay:*

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- Commercial Data, VOIP, and PSTN Services
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Questions
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