TECHNET

Integrated Tactical Networking Environment (ITNE)

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TRADOC Capability Manager Tactical Radios

9 September 2014
Provide an update on the progress of the Cyber Center of Excellence Integrated Tactical Networking Environment (ITNE) DOTMLPF capability for the U.S. Army
• What is the ITNE
• How do we get there (DOTMLPF)
• Interoperability Considerations
• Future Radio Design Considerations
• Questions
“Wars may be fought with weapons, but they are won by men. It is the spirit of men who follow and of the man who leads that gains the victory”
– General George S. Patton

Radio Platforms
The Radio Platform component is a combination of the hardware design inherent to the radio to include: antenna, batteries, IO Device, vehicular, man-pack or base mounts and the software design inherent in the radio operating system. The radio operating environment software allows the interaction between the radio hardware components and the NetOps and Waveform Applications component software. In the legacy radios, the hardware and software design are fully integrated within the radio and include the waveform.

Waveforms & Waveform Applications
The Waveform Application component of the ITNE is composed of all current and future software defined waveform applications that provide a means to pass voice and/or data across the transport layer of the network in both the lower and mid-tier portions of the ITNE. Waveform Applications are peer-to-peer programs that facilitate the exchange of application data across the spectrum of radio networks. Each waveform application is optimized to meet the mission needs of the portion on which it operates (low/mid-tier).

NetOps Management System
The NMS component of the ITNE is the integrated capability that allows network managers to plan, configure, manage, and monitor all other components of the ITNE. This includes radio platforms, mission command mobile/mounted applications, ancillary devices, and waveform applications. The NMS is the capability through which the Battalion S-6 staff develops and builds a network plan and initializes and operates the radio network for their respective command level.

Ancillary Devices
The Ancillary Devices component of the ITNE covers all networked and non-networked items that connect directly to the radio platform or provide assistance in the routing and transmission of data between radios or security environments within the lower and mid-tier of the ITNE.

Mobile/Mounted MC Apps
The Battalion S-6 and their staff are responsible for ensuring that mission command applications that operate on mounted platforms and mobile (dismounted soldiers) are properly planned, configured, and initialized in support of the commander’s mission.
What is the ITNE (Operational Construct)

The Integrated Tactical Networking Environment (ITNE) includes the planning, management, and analysis of all signal components and systems contained within the tactical radio environment.

Execute Network Operations

The Integrated Tactical Networking Environment (ITNE) includes the planning, management, and analysis of all signal components and systems contained within the tactical radio environment.
What is the ITNE (Human Processes)

It is all about the soldiers and their processes
What is the ITNE (The Radio Platform)

<table>
<thead>
<tr>
<th>OSI Reference Model Layer</th>
<th>Radio Platform &amp; End User Device</th>
<th>Information Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>Mission Command &amp; NetOps Applications</td>
<td>IP Ranges &amp; Assignment, Multi-cast Groups</td>
</tr>
<tr>
<td>Presentation</td>
<td>Mission Command &amp; NetOps Applications</td>
<td>COMSEC</td>
</tr>
<tr>
<td>Session</td>
<td>Waveform Applications</td>
<td>Preset Design &amp; Assignment, Voice Call Group Design &amp; Assignment</td>
</tr>
<tr>
<td>Transport</td>
<td>Waveform Applications</td>
<td>IP addressing, COMSEC, HAIPE, Quality of Service, Network Services</td>
</tr>
<tr>
<td>Network</td>
<td>Waveform Applications &amp; Radio Operating System</td>
<td>Waveform parameter settings</td>
</tr>
<tr>
<td>Data Link</td>
<td>Waveform Applications &amp; Radio Operating System</td>
<td>Radio parameter settings</td>
</tr>
<tr>
<td>Physical</td>
<td>Radio Operating System</td>
<td>Power, Audio, Local Processing (memory and chip set), Transmission Subsystem</td>
</tr>
</tbody>
</table>
What is the ITNE (The Waveform Application)

Waveform applications are peer-to-peer programs that facilitate the exchange of application and network information (voice/data) across the spectrum of the tactical radio environment. These waveforms exist as legacy and software defined within the ITNE.

**Lower Tier**

**Single Channel Ground and Airborne Radio System (SINCGARS):** VHF/FM combat net radio that provides the primary means of command and control in the tactical formation. Provides voice and limited data capability. (Legacy and SDR)

**Soldier Radio Waveform (SRW):** wideband (1.2 MHz) multi-hop, adaptive, self-forming and healing mobile ad hoc network (MANET) waveform. Provides digital voice and data capability and the ability to link across multiple SRW networks. (SDR Only)

**Mobile User Objective System (MUOS):** Narrowband military satellite waveform designed to provide beyond line of sight extension for SRW networks. Provides digital voice and data extension to tactical formations. (SDR Only)

**Mid Tier**

**Wideband Networking Waveform (WNW):** Self forming and healing network that provides terrestrial data extension for lower tier networks. Serves as the digital data backbone for BCTs and Battalions. Provides network services for maximum control. (SDR Only)

**Mobile User Objective System (MUOS):** This waveform operates in the mid tier as well.
Ancillary Devices consist of all networked and non-networked items that connect directly to the radio platform or provide assistance in the routing and transmission of data between radios, security environments, and the user and their transmission equipment.
What is the ITNE (Mission Command Applications)

Mission Command Applications includes the planning, initialization, and management of all mission command applications operating on mobile, mounted, and the command post environment that utilize the integrated tactical radio environment. These applications primarily include the family of applications in the Joint Battle Command Platform system and the Nett Warrior mobile system.
The ITNE Network Operations Management System (INMS) is the integrated capability that enables the S-6 to plan, manage, and analyze their ITNE set of network and mission command systems. The INMS is a distributed capability that contains built in functionality from the INMS, to the waveform application, the radio platform operating system, and the ancillary set of devices.

The objective INMS is present in all software on all devices ensuring a fully distributed and ever present management capability to fight and protect the commander’s network.
How do we get there (Methodology)
How do we get there (Progress)

Seven Separate Institutional Processes requiring synchronization with the unifying operational concept

- **Doctrine**
  - 3. Manuals/Policies/TTPs

- **Organization**
  - 6. Combat Formation Structure

- **Training**
  - 2. Unit and Institutional Service Level

- **Materiel**
  - 1. Radio Platforms/Waveforms/NetOps/MC Applications/Ancillary Devices

- **Leadership**
  - 5. Leader Level Tasks

- **Personnel**
  - 4. Soldier Skill Alignment/Job Descriptions

- **Facilities**
  - 7. Infrastructure Support

Unifying Operational Concept

Indicate sequence of work:
- **Completed**
- **In Progress**
- **Not Started**

[Image of Concept of Operations for Integrated Tactical Network Environment]
How do we get there (Materiel)

ITNE Requirements Integrated Database (IRID)

The IRID set of requirements contains 982 integration lines across all 250 Capability Definition Package requirements.

ASA(ALT) Cross PM Data

Modeling of ITNE (Ontology)
## Capability Set Key Leader Training

**2012-2013**

#### Capability Set New Equipment Training

**2013-2014**

<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>CI Per CI</th>
<th>Total CI</th>
<th>MOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>STT Delta Course</td>
<td>16 hrs.</td>
<td>1 session</td>
<td>1 session</td>
<td>25U, 25B, 254A</td>
</tr>
<tr>
<td>ITNE CONOPS Overview &amp; Unit Task Organization (UTR)</td>
<td>64 hrs.</td>
<td>2 session</td>
<td>1 session</td>
<td>25U, 25B, 254A</td>
</tr>
</tbody>
</table>

### Institutional Training (Pilot Course for Leaders)

**2014-2015**

#### Spectrum & Networking Fundamentals

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#### Future Training Paradigm

- **Process versus System Training**
- 1 Hour block of instruction combining the art and science of war

## How do we get there (Training)

- **Planning**
  - Signal Analysis
  - Network Design
  - Network Build
  - Load & Verification
  - Integrated POI
- **Management**
  - Data Collection
  - Fault Management
  - Integrated Individual & Collective Tasks across MOSs
  - Integrated POI
  - Integrated Individual & Collective Tasks across MOSs
- **Cumulative STAFFEX & FTX**
  - 25A
  - 250N
  - 25U30
  - 25C

- **Analysis**
  - Identify TARs
  - Generate TARs
  - Analyze TARs
  - Record Lessons Learned
How do we get there (Doctrine)

Includes ITNE CONOPS Paragraphs 1.0 and 2.0

Includes ITNE CONOPS Paragraphs 2.1, 2.2, Appendix D (Multinational), Appendix J (Aviation Integration), and Appendix K (UTR)

December 2014
4 New - 55 Current ITNE Leader tasks
1 New – 27 Current ITNE Tasks
5 New – 75 Current ITNE Tasks
1 New – 45 Current ITNE tasks

13 New - 78 Current ITNE tasks
1 New - 3 Current ITNE tasks
7 New - 17 Current ITNE tasks
1 New – 62 Current ITNE tasks
1 New – 18 Current ITNE tasks

BN S-6 Staff = 278 tasks
BCT S-6 Staff Tasks = 182 tasks

All tasks must be migrated into the ITNE process approach versus the existing system driven approach.

Based on 14 Day Review (July 2014) of all Signal MOSs between TCM TR and CyberCoE DoT

Manpower Impact
How do we get there (Organization & Facilities)

10 – 18 month average timeline

Manpower Requirements Criteria

- Capability Gap drives DOTMLPF assessment
- TRADOC & Non-TRADOC PROponent, COE & CDID
- C-BA staffed with ARClC A&D prior to submission to FDD
- During FDU development, COE/Proponent will develop C-BA ICW C-BA POC

FDU Process

0. Review Board: TRADOC HG
   - FDD (Lead Office)
   - ABD
   - G3/5
   - MET
   - CCAR
   - ARMO
   - HODA (DAMD-1M lead)
   - ARMY G1
   - ARMY G4
   - ARMY G3 (DAMD-1M, FMO, USAF, FMC)
   - FORSCOM
   - FORSCOM
   - COE - CDID

1. Determine Organizational Solution required

2. Begin Documentation, Architecture, FIFA

3. Issue Resolution

4. Release for Field Staffing

5. Requirements Determination Dir. ARClC

6. HQDA-G3 FIFA Review, Approval, Documentation & Implementation Recommendation to VCSA

7. Implementation in TAA, Complete TOE & MTOE Development

8. VCWA Approval

9. Proposent Bill Payer

10. No Bill Payer
Interoperability Considerations (Radios)

Technology Dependencies drive interoperability considerations

- Radio Operating Environment Standard
- Waveform Application and Version
- Internet Protocol version (IPv4)
- EUD Operating System
- Mission Command Application Standard
- Security Domains
- EMI Shielding/Transmission Standardization
- Spectrum Planning and Supportability
- Information Assurance (IPDS, Authentication)
- Power Generation/Interoperability
- Logistics Interoperability
- Radio Operating Environment
Interoperability Considerations (Applications)

National Secret

- Mid Tier Mission Command Applications
  - MT SA
  - MT MSG
  - MT COP
  - MT Intel
  - MT Overlays
  - MT Staff Planning
  - MT Fires
  - MT Logistics

- Lower Tier Mission Command Applications
  - LT SA
  - LT Maps
  - LT Intel
  - LT Overlays
  - LT Sensors
  - LT Logistics

- ITNE Network Management
  - MUOS
  - L-SATCOM
  - WNW
  - SRW
  - SINCGARS

Coalition Secret

- Mid Tier Mission Command Applications
  - SA
  - MSG
  - COP
  - Intel
  - Overlay
  - VMF
  - CM

- Lower Tier Mission Command Applications
  - SA
  - MSG
  - COP
  - Intel
  - VMF
  - SA
  - Intel
  - Maps
  - Overlay
  - VMF
  - SA
  - Intel
  - Maps

Approved Cryptographic Boundary (NSA/CESG/Other Partner Security Agencies)

- ITNE NMS
  - Planning
  - Management
  - Analysis
  - Data Product Design
  - Crypto Key Mngt
  - Spectrum

Waveform Applications

- PEW
- PEO

Radio Operating Environment

Radio Physical Layer

Hardware compliant architecture (memory, processing, storage, circuitry)

Algorithmic Processing, radio subroutines

Peer to Peer technology, Quality of Service, OTAM, Voice, Data Processing, Black Core Cryptographic Handling
The Objective Radio Capability provides for a singular flexible design that is followed for all radio platforms operating in the lower and mid tier of the ITNE providing the foundation of the mobile network and communication infrastructure. These radio platforms provide a two channel capability for all approved waveforms along with a fixed state storage capability for mission command and NetOps storage requirements covering a 96 hour maximum time period and all the required ITNE Network Management System capabilities as outlined in the Objective ITNE CONOPS and ITNE IS CDD/CDPs requirement capabilities thus providing a truly distributed and integrated network management capability.
Questions

for more information on the ITNE capability you are invited to attend

TECHNET ITNE Operational Workshop
Wednesday, 10 September 2014
1300-1700
Marriott Hotel Rains A & B