• Purpose

• ITNE Imperatives

• ITNE Capability Development Methodology

• ITNE Complexity

• ITNE Concept of Operations

• ITNE Planning Process

• ITNE Management Process

• ITNE Analysis Process

• ITNE Unit Task Reorganization (Appendix K)

• ITNE Dependencies

• ITNE Troop to Task List

• Questions
Purpose

Provide an overview of the ITNE Concept of Operations (CONOPS) with an emphasis on Signal Planning, Management, and Analysis Processes
ITNE Imperatives

• Ensure the materiel integration of all radio platforms, waveforms, mobile/mounted mission command application management, ancillary devices and associated Network Operations (NetOps) Management software capabilities

• Ensure the integration and interoperability of network operations between Joint, Interagency, Multinational, Army Upper Tactical Internet (UTI) and ITNE capabilities

• Ensure the proper development, integration, and sustainment of comprehensive ITNE training for the S-6 staff

• Ensure the development of an ITNE Concept of Operations (CONOPS) to support the ITNE IS CDD, NIE, Capability Set Fielding process, Force Structure Analysis, and Personnel Alignment
**UNCLASSIFIED**

**ITNE Complexity**

**CS 13 CNR-to-ITNE Core Evolution**

<table>
<thead>
<tr>
<th>CS 12 and Earlier (CNR)</th>
<th>CS 13 and Beyond (ITNE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radio Platforms</strong></td>
<td><strong>Radio Platforms</strong></td>
</tr>
<tr>
<td>H F</td>
<td>SRW</td>
</tr>
<tr>
<td>U H F</td>
<td>S INCGARS</td>
</tr>
<tr>
<td>ENM</td>
<td>WNW</td>
</tr>
<tr>
<td>JACS/ACES</td>
<td>ANW 2</td>
</tr>
<tr>
<td><strong>Element Managers</strong></td>
<td><strong>WF Software</strong></td>
</tr>
<tr>
<td>Vendor NM</td>
<td>S RF W</td>
</tr>
<tr>
<td><strong>Plan and Load</strong></td>
<td><strong>Networking Devices</strong></td>
</tr>
<tr>
<td>Plan, Load, Manage, and Monitor</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complexity Growth – IBCT CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Waveform = 1 (SINCGARS)</td>
</tr>
<tr>
<td>Radio Platforms = 5</td>
</tr>
<tr>
<td>Loadsets = 4-8</td>
</tr>
<tr>
<td>Radio Total = 37 Radios</td>
</tr>
<tr>
<td>Security Enclave = 1</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

* This depiction reflects a moment and time and does not represent the objective end state for an IBCT
## ITNE Complexity
*(SDR Platform Environment)*

<table>
<thead>
<tr>
<th>OSI Reference</th>
<th>Radio Platform</th>
<th>Developers</th>
<th>Information Elements</th>
<th>Areas of Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission Command Application Layer (NettWarrior &amp; Mobile Apps)</td>
<td>Software Engineering CTR (SEC)</td>
<td>FBCB2 - SIL</td>
<td>IP ranges &amp; assignment multicast groups unit reference numbers (URNs) role names</td>
<td>Req</td>
</tr>
<tr>
<td>Waveform Application Layer (SINCGARS/SRW/Mid-Tier)</td>
<td>Boeing</td>
<td></td>
<td>waveform preset assignments voice call group assignments</td>
<td>Req</td>
</tr>
<tr>
<td></td>
<td>Raytheon</td>
<td></td>
<td></td>
<td>System Design</td>
</tr>
<tr>
<td></td>
<td>Harris</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio Operating System (OS)</td>
<td>Harris</td>
<td></td>
<td>types of parameters parameter settings (default)</td>
<td>Req</td>
</tr>
<tr>
<td></td>
<td>Exelis</td>
<td></td>
<td></td>
<td>System Design</td>
</tr>
<tr>
<td></td>
<td>General Dynamics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio Physical Layer</td>
<td>Harris</td>
<td></td>
<td>Memory Capacity Chip Design Motherboard circuitry Transmission subsystem</td>
<td>Req</td>
</tr>
<tr>
<td></td>
<td>Exelis</td>
<td></td>
<td></td>
<td>System Design</td>
</tr>
<tr>
<td></td>
<td>General Dynamics</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Additional ITNE components not illustrated in this depiction include routers, cross domain solutions, gateways, mission command mobile/mounted applications, networked and non-networked ancillary devices, and the Network Operations (NetOps) system.*
Integrated Tactical Networking Environment (ITNE) operations capability includes the planning, configuration, management, and monitoring of all capabilities across the transport systems composed of legacy and new networking radio waveforms.

**Plan the Network:**
- Conduct Mission Analysis
- Develop Command Routing Scheme (METT-TC)
- Identify Frequency Requirements
- Complete Signal Annex to Command Order

**Configure the Network:**
- Configure data sets, presets, scenarios, and networks
- Configure applicable network associations between waveforms
- Import Communications Plan

**Manage the Network:**
- Manage Fault Data
- Conduct Troubleshooting Procedures
- Prepare and Provide Reports (METT-TC)

**Monitor the Network:**
- Monitor connectivity status
- Monitor platform status

J-TNT, as part of the ITNE, will be used for radios running SRW, ANW2.
ITNE

Concept of Operations
ITNE Concept of Operations (CONOPS) - Development

Capability Set and ONS Fielding
- Lessons Learned
  - ONS
  - ONS
  - CS 13
  - CS 13
  - CS 13
- TTPs
  - CS 13
  - CS 13
  - CS 13
- Emerging Concepts
  - CS 13
  - CS 13
  - CS 13

Test and Evaluation
- Lessons Learned
  - NIE 11.2
  - NIE 12.1
  - NIE 13.1
  - NIE 13.2
- TTPs
  - NIE 12.2
  - NIE 12.2
  - NIE 12.2
  - NIE 12.2
- Emerging Concepts
  - NIE 13.1
  - NIE 13.1
  - NIE 13.1
  - NIE 13.1

Doctrine
- Lessons Learned
  - Signal Operations
  - Army Enterprise NetOps CONOPS
- TTPs
  - Army Planning
  - Army Operations
- Emerging Concepts
  - NetOps CONOPS
  - FM 6-02.43
  - FM 101-5
  - FM 3-0
**ITNE Concept of Operations (CONOPS) - Content**

**ITNE Components & Operations**

- **Definition**
- **Network Tiers**
- **S-6 Concept**

**ITNE Operations**

- **Planning Process**
- **Management Process**
- **Analysis Process**

**ITNE Vignettes**

- **Initial Entry Operations**
- **Phase III (HIC) Operations**

**Appendices**

- A: Acronyms
- B: Glossary
- C: References
- D: Multinational Interoperability
- E: Radio Platforms
- F: Waveform Applications
- G: MC Apps Mgmt
- H: Ancillary Devices
- I: ITNE Netops Mgmt
- J: Aviation Integration
- K: UTR
- L: ITNE Help Desk
- M: TTPs
- N: Vignette Information
- O: CS 13 DTPs

CONOPS highlights the interdependency of near term and long term concepts.
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.
The ITNE operates within a tactical network architecture that consists of a lower and upper tier. These are historically referred to as the lower tactical and upper tactical Internet. These tiers are fully integrated allowing for the flow of voice and data across both network tiers according to the unit commander’s information priorities and mission parameters.

Within the ITNE, there are two terrestrial based tiers; a celestial based tiered focused on a narrowband satellite communications (SATCOM) capability; and potentially an objective aerial layer tier. The aerial tier is not available in near term capability sets (CS 13/14) but may be added in later capability sets as required.

The terrestrial based tier is divided into a lower and a mid tier. These tiers are mutually supportive and are both required in order to provide a robust radio based terrestrial layer for organic passage of voice and data for tactical edge commanders.

**Lower Tier:** The lower tier portion of the ITNE is composed of organic network resources from each ITNE functional component designed to support company and below formations down to soldier. This tier is characterized by primarily single channel radios operating at both the unclassified and secret level along with two channel radios at platoon and company to ensure multi-network integration and connectivity. The provisioning of mission command information is provided by mobile applications that enable visualization, and human machine interface and ancillary devices such as GPS receivers that provide Position, Navigation, and Timing (PNT) information for basic soldier and unit situational awareness (SA), fires targeting data, voice, and sensor capability. The primary lower tier waveforms are the Soldier Radio Waveform (SRW) and SINCGARS. There is the potential that other lower tier waveforms could be added and/or combined as the ITNE evolves over time.

**Mid Tier:** The mid tier portion of the ITNE is composed of organic network resources from each ITNE functional component designed to support battalion and company level operations. The mid tier is the critical high capacity backbone of the radio environment. It provides the battalion and company commander with the means to process voice and larger amounts of data across their tactical formation over a terrestrial based network. In addition, the mid tier is the interoperability point for higher echelons, Joint integration, aviation integration, and multinational interoperability. The primary mid tier waveform is the Wideband Networking Waveform (WNW). There is the potential that other mid tier waveforms could be added and/or combined as the ITNE evolves over time. These waveforms are defined in Appendix F.

Figure 2.0 below illustrates the objective relationship between the lower and mid tier portions of the ITNE. The objective ITNE requires a robust mid tier capability within the company and the battalion.
The Battallion S-6 performs two primary functions regarding network resources for their commander.

The first is to perform subscriber functions associated with higher level networks (Upper Tactical Internet) and/or commercial networks (Blue Force Tracking (BFT) I and II) over which the battalion has no network control. The subscriber functions allow strategic and operational services to be extended to the battalion based on the guidance of higher level commanders. The Battalion S-6 will ensure compliance and configuration according to these instructions for all systems operated by higher echelons but physically resident within the battalion area of operations.

The second primary function performed by the battalion S-6 are the administrator functions associated with network resources owned by the battalion. These assets comprise the ITNE functional components. Figure 2.1 below illustrates the relationship, components, and systems associated with this dynamic S-6 responsibility.
The Planning Process of ITNE Signal Operations involves five phases that cover all activity required by the S-6 staff. This includes everything from the receipt of their commander’s operations order to the verification that the commander’s network is initialized and fully operational. The five Planning Process phases include the Signal Analysis Phase, the Data Collection Phase, the Network Design Phase, the Network Build Phase, and the Network Load/Verification Phase. In total, these five phases include thirty separate steps that must be performed to standard by the appropriately trained soldier skill set. Failure to follow the steps correctly can easily result in planning mistakes that create capability gaps in the network design and/or flawed ITNE data synchronization across all devices. Minimally, these failures will result in certain incorrectly planned devices from initializing. In extreme cases, the entire ITNE can fail to initialize.

The ITNE Signal Operations Planning Process is the most crucial phase for the S-6 staff.

This phase requires the application of the “art of war” versus the “science of war”. This means the S-6 leadership must understand how to conduct signal specific mission analysis, course of action processes and other MDMP related functions. The ability for the S-6 leadership to conceptualize a network design that fits into the commander’s mission concept will make or break the S-6 staff.

The process for bringing together the different components of the network into a specific mission network design and ensuring they function is a multi-step process that calls for accuracy, flexibility, and agility across the S-6 staff.

If the plan is wrong from inception, the Management and Analysis Processes of ITNE Signal Operations are likely to fail. The ITNE cannot be initialized and made operational with a plan that is fundamentally flawed in either concept or design.
The **Management Process** of ITNE Signal Operations involves four simultaneous phases that are preceded by the operational network verification step 30 from the ITNE Planning Process Network Load/Verification Phase. The Verify OPNET step is the transition point between the Planning and the Management Process.

The **Management Process** provides the S-6 an ability to actively monitor the commander’s network to ensure hardware and software faults are identified early in the failure process and remedied prior to realization on the operational network preventing loss of capability to combat forces. Additionally, the S-6 is able to monitor performance and security matters based on the METT-TG identified in the approved commander’s operations order, ensure compliance, and correct deficiencies during operations. The S-6 uses the Administrative Management Phase to ensure version control of hardware and software, execute critical patch updates, modify role names based on task reorganization, and inform network users on radio platform preset change over while still conducting operations. This includes everything from the receipt of their commander’s operations order to the verification that the commander’s network is initialized and fully operational.

- **Fault Management**
  - F-Step 1
  - F-Step 2
  - F-Step 3
  - F-Step 4
  - F-Step 5
  - F-Step 6
  - F-Step 7

- **Administrative Management**
  - A-Step 1
  - A-Step 2
  - A-Step 3
  - A-Step 4
  - A-Step 5
  - A-Step 6

- **Performance Management**
  - P-Step 1
  - P-Step 2
  - P-Step 3

- **Security Management**
  - S-Step 1
  - S-Step 2
  - S-Step 3

The **Management Process** within ITNE Signal Operations provides the S-6 staff with the means to monitor and affect ITNE component systems in real time. This requires an ability of each ITNE system to advertise key information elements to the ITNE NMS and for the ITNE NMS to collect those information elements, analyze them, and provide an overall status with regard to the information category collected.

- The **Management Process** is all about predictive analysis and proactive actions taken by the S-6 staff to resolve network faults, failures, and vulnerabilities prior to their realization causing a loss of network capability for the commander. Unlike the Planning Process, the Management Process is a parallel set of phases based on the ISO telecommunications management network framework called the Fault, Configuration, Accounting, Performance, and Security (FCAPS) model.

---

**The ITNE Management Process is nested within existing Mission Command current operations and includes all monitoring capability required to detect, analyze, respond, and resolve real time ITNE component capability impacts.**
The Analysis Process of ITNE Signal Operations involves four steps that leverage the information and data collected during the Planning and Management Processes. The Analysis Process begins at any point but for purposes of illustration is shown in this CONOPS as a third process because it leverages the data collected in the first two processes of ITNE Signal Operations. Analysis is always ongoing and there is no limitation to conducting the Analysis Process concurrently with the Planning or Management Processes so long as the S-6 has the staff, time, and the data is relevant within the context of the mission planning cycle. The four steps of the Analysis Process include Identify Trend Analysis Report (TAR), Generate TAR, Analyze TAR, and Record Lesson Learned.

- The Analysis Phase of ITNE signal operations provides the S-6 staff the ability to review, refine, adapt, and improve upon all aspects of ITNE signal operations.
- The Analysis Phase establishes the steps necessary to properly review a previous mission planning and management cycle and identify strengths and weaknesses for further enhancement and/or improvement.
- The Analysis Phase is a subset of the overall commander’s after action reporting and lesson learned process and should be tailored by the S-6 to meet the commander’s intent for staff level feedback. At the same time, the S-6 must leverage the Analysis Phase as a means to conduct internal improvement of their planning and management processes to ensure greater success in future operations.
- As with the previous phases of ITNE signal operations, the Analysis Phase in the near term (CS 13/14) is a completely manual process. The mechanism for tracking and recording must be done with home grown tool sets like PowerPoint, Excel, and/or Word. In the mid to long term (CS 15 and beyond), the ITNE NMS will incorporate automated system capabilities that allow for the replay of key features within a previously run mission command network and identify areas for further analysis and improvement.
The Signal Analysis Phase is the first phase of the ITNE Planning Process and begins with the receipt of the commander’s approved mission course of action to include the approved task organization. The S-6 staff then analyzes the mission command requirements and translates them into the Signal Estimate. The S-6 uses the mission variables of Mission, Enemy, Troops, Terrain, Time, and Civilians (METT-TC) to identify specified tasks, implied tasks, network constraints, assets available, and commander support requirements in order to develop the Signal Support Architecture (SSA) and the Radio Platform Preset Architecture (RPPA) for ITNE. The Signal Estimate published at the completion of this phase contains the SSA and the RPPA. There are six steps in the Signal Analysis Phase.

Signal Products: Information Flow Diagram, Network Plan (SSA, RPPA), Signal Estimate
ITNE Concept of Operations (CONOPS) – Ontology Crosswalk

ITNE Planning Process
(Signal Analysis Phase)
The Data Collection Phase is the second phase of the ITNE Planning Process and begins with the publication and availability of the approved Signal Estimate and is completed when the S-6 receives all requested data associated with the Signal Estimate required to build the detailed unit network design. There are eight steps in the Data Collection Phase.

Signal Products: Spectrum Range, COMSEC Key, IP Address Space, and Map Data
The Network Design Phase is the third phase of the ITNE Planning Process and begins once all the requested network data is received and the impact to any request denials are fully vetted and approved by the commander and published in a final Signal Estimate. Using the received ITNE data, the Battalion S-6 formulates an IP scheme and a Network Routing Architecture (NRA). The Battalion S-6 then finalizes the SSA and the RPPA by applying the IP scheme, network routing architecture, frequencies, narrowband SATCOM, and COMSEC data. The completion of this phase is a published Signal Annex to the battalion operations order that establishes the ITNE Network Design (ND). There are six steps in the Network Design Phase.

Signal Products: NRA, ND, Signal Annex
The Network Build Phase is the fourth phase of the ITNE Planning Process. In this phase, the S-6 uses the Network Design from the previous phase and builds the **Radio Network Configuration File (RNCF)** and **Application Configuration File (ACF)**. With the completion of these two products, the Battalion S-6 now has the ITNE **Mission Configuration File (MCF)**. The MCF includes all network device and application configuration files required to implement and execute the battalion’s mission network. In **the near term (CS 13/14)**, the Battalion S-6 then manually tests and validates the MCF through direct access and observation. In **the mid to long term (CS 15 and beyond)**, the S-6 utilizes simulation tools built into the ITNE NMS. The end state of this phase is the **manual and/or automated distribution of the MCF to all battalion units** in support of follow-on Network Load/Verification Phase operations. The completion of this phase is a published MCF. There are five steps in the Network Design Phase.

**Signal Products:** RNCF, ACF, MCF
The Network Load & Verification Phase is the fifth and last phase of the ITNE Planning Process. In this phase, the S-6 and subordinate units load all mission network devices and mission command systems with their specific MCF, initialize the network, and conduct a communications check. At the end of this phase, the S-6 provides a commander approved operational network (OPNET) that meets and supports the identified information exchange requirements. There are four steps in the Network Load & Verification Phase.

Signal Products: None
The Verify OPNET portion of the ITNE Management Process begins with Step 30 of the ITNE Planning Process when the Network Load/Verification Phase is completed through the communications check process and ends when the S-6 validates that the MCF meets the information flow requirements of the commander established in the Signal Analysis Phase of the ITNE Planning Process. This is accomplished by comparing the DSSA and the DNS to the actual NCOP populated in the Verify OPNET process. Once the NCOP and DSSA and DNS are validated, the MCF is valid and the ITNE is fully initialized and ready for mission command operations. There are three steps in the Verify OPNET process.

Signal Products: NCOP
The Fault Management Phase provides for the **detection, isolation and resolution of network problems**. The S-6 utilizes the Fault Management Phase as an **active listening capability** on all ITNE networked devices. This capability is configurable based on parameters established through the S-6. These **parameters are based on the commander’s primary concerns** which once again link to the information flow diagram developed early in the ITNE Planning Process. The S-6 will **focus monitoring on interoperability nodes, crossbanding locations, Battalion interconnectivity, communication with higher and attached units, and quality of service performance**. There are six steps in the Fault Management Phase.

**Signal Products:** Fault Reports, Restoration Reports, Trend Analysis Reports
The Administrative Management Phase of the ITNE Management Process includes those functions that add, change, modify, delete, and/or update administrative information within the MCF. The cause for these administrative changes are as simple as adding a new soldier or as complex as executing a unit task reorganization (UTR). Administrative Management includes, but is not limited, to some of the following common functions: management of authorized users by establishing names, passwords, roles, and permissions with a user based login policy; performing systems software backup, updates, and synchronization; and executing UTRs. In the near term (CS 13/14), functions within the Administrative Management Phase are performed across a range of systems by different soldiers within the BCT S-6 and Battalion S-6. In the mid to long term (CS 15 and beyond), the BCT and Battalion S-6 will utilize the ITNE NMS to manage all of these functions within their respective echelons organic and attached network. There are six steps in the Administrative Management Phase.

Signal Products: Component Updates, Preset Changes, Trend Analysis Reports
ITNE Management Process
(Performance Management)

Science of War
Network Performance Monitoring & Control

The Performance Management Phase of the ITNE Management Process consists of measuring and optimizing the network to ensure it can support the flow of voice and data traffic according to the quality of service priorities established by the commander. Performance management offers a foundation for pro-active management of ITNE component devices. In the near term (CS 13/14), performance management is extremely limited. Most current ITNE performance management functionality is in reality more a Fault Management Phase functionality where a problem is identified and resolved. In the mid to long term (CS 15 and beyond), the ITNE NMS will provide performance management features that allow the measuring and modification of all ITNE component devices. This will include the ability to measure packet loss/completion, node link state, bandwidth consumption, route congestion, and other key performance metrics that enable real time adjustment to the flow of voice and data across the ITNE. There are four steps in the Performance Management Phase.

Signal Products: Trend Analysis Reports
The Security Management Phase of the ITNE Management Process involves all activities that the S-6 undertakes to protect ITNE component device value, usability, data integrity, and continuity of operations. The staff must effectively identify threats and then choose the most effective ITNE NMS tool to combat them. In the near term (CS 1/14), ITNE Security Management is limited to communications security (COMSEC) protections and local account login procedures. In the mid to long term (CS 15 and beyond), the ITNE NMS will provide security services that include host based and external intrusion protection and prevention capabilities. The Security Management Phase is an extension of the Fault and Performance Management Phases for security devices within the ITNE components. There are four steps in the Security Management Phase.
ITNE CONOPS
Unit Task Reorganization (UTR)
(Appendix K)
• Since the initial fielding of these ITNE systems in fiscal year 2012, the Army, through the Assistant Secretary of the Army for Acquisition, Logistics, and Technology (ASA(ALT)), provided supporting contract personnel to assist in all facets of planning and management of the ITNE

• *ITNE Signal Operations as defined in this CONOPS is primarily performed by a number of ASA(ALT) program managers, organizations, and contractors.* The only portion performed by soldiers to date is the Network Build Phase and the Network Load/Verification Phase of the ITNE Planning Process

• The first three phases are currently executed by ASA(ALT). *Until units are able to properly execute all the steps of the ITNE Planning Process, they will run a high risk of properly managing their network once operational* if there are any issues related to the SSA, RPPA, NP, and ND

• *These products and their associated predecessor steps must be owned and performed by the S-6* in order for the responsible commander to truly control their tactical network
Unit Task Reorganization (UTR):

- A UTR is the process performed by an S-6 staff upon receipt of the commander’s Operations Order during combat operations that translates mission command MDMP task organization changes into specific actions required by the S-6 to modify the communications (Voice/Data) network to match the modified unit structure. The UTR process follows the ITNE Planning Process and results in a modified NP, ND, and MCF along with the updated Signal Estimate and Signal Annex for the operations order.

- The complexity of a UTR can range from a very simple modification involving only a few ITNE component devices and ITNE Planning Process steps to a full scale planning effort of all ITNE components requiring all steps of the ITNE Planning Process. Either way, the S-6 is required to understand and execute these steps in support of a UTR during all phases of operations under any METT-TC set of conditions.
• During the ITNE Planning Process for a UTR, it is imperative that the S-6 quickly
gauge their ability to execute the UTR within a certain period of time. This is to
ensure the S-6 can provide a risk assessment to their commander on the likelihood of
UTR success given the time provided. Where the time frames will not meet the
execution of a UTR to standard, the S-6 must quickly notify the commander and
provide alternative approaches by trading capability to ensure some measure of
network connectivity and services.

• The connectivity and services chosen for the time frame involved should meet the
commander’s information priorities noted in the Signal Analysis Phase of the ITNE
Planning Process. Notification of UTR time requirements must be given to the
command and staff in the early stages of the ITNE Planning Process. This must
occur as soon after receiving the approved task organization as possible.

• The commander will always set information flow priorities on the network. However,
until that direction is provided, the S-6 should always start their prioritization of
communications and network capability based on the establishment of the transport
and networking components of the ITNE before the mission command application
capability. The following is a high level list of capability priorities during ITNE UTR
planning and execution operations.
Capability Priorities:

- **Priority 1**: Local Transport: (Radio Platforms: SINCGARS, SRW, and Mid Tier waveforms)
- **Priority 2**: Mission Command Applications (JBC-P, Nett Warrior) capable of running on the local transport only.
- **Priority 3**: Wide Area Transport (Ancillary Devices: Tier III routers, cross domain solutions, and gateways) to link together the local transport.
- **Priority 4**: Mission Command Applications (JBC-P, Nett Warrior) to run data services across the wide area transport.
- **Note**: Voice capability is always the first priority over mission command data.
• **Planned UTRs**: The planned UTR is instantaneous upon execution as a preset on a radio platform or networked ancillary device. The time involved in executing the ITNE Planning Process for a pre-planned UTR is done before mission time and is therefore inconsequential to the S-6 and their staff during mission operations. However, the need to follow the ITNE Planning Process from beginning to end is essential to ensure the pre-planned network is functional and meets all of the pre-planned UTR task organization information flow requirements. Failure to ensure this before loading that pre-planned UTR for a mission could cause an unforeseen failure during mission operations and result in catastrophic loss of communications and network capability.

• **Unplanned UTRs**: The unplanned UTR is much more difficult due to the need to execute the ITNE Planning Process and Verify OPNET process during mission time. In order to properly handle the risk associated with the time requirements for unplanned UTRs, the S-6 must be able to conduct a quick estimate on the time required to complete the ITNE Planning Process and Verify OPNET process for their commander in order to ensure there is sufficient time to execute the task organization specified. An inability to estimate the UTR time during the Signal Analysis Phase could result in a failure to complete the ITNE Planning Process and Verify OPNET Process in time for mission execution thus jeopardizing the entire mission and command.

• **Risk Mitigation**: The S-6 mitigates the risk associated with UTR time estimation and mission execution time requirements by determining the level of complexity for the particular UTR as a measure of soldier tasks required. This is a subjective assessment to help the S-6 organize their staff. Secondly, the S-6 actually calculates an estimated time factor based on a formula designed to equate system ITNE Planning Process and Verify OPNET time with UTR time. The UTR categories of complexity are noted in Table K1 of the ITNE CONOPS. The UTR completion time calculation is discussed in paragraph 4.2 of that appendix.
## UTR Process (Complexity Categorization)

<table>
<thead>
<tr>
<th>UTR (Category 1)</th>
<th>Organizational Modification</th>
<th>Network Tiers</th>
<th>ITNE and/or UTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A1</td>
<td>All</td>
<td>T/A/C</td>
<td>Both</td>
</tr>
<tr>
<td>1A2</td>
<td>B/I</td>
<td>T/A/C</td>
<td>Both</td>
</tr>
<tr>
<td>1A3</td>
<td>B</td>
<td>T/A/C</td>
<td>Both</td>
</tr>
<tr>
<td>1B1</td>
<td>All</td>
<td>T/A</td>
<td>Both</td>
</tr>
<tr>
<td>1B2</td>
<td>B/I</td>
<td>T/A</td>
<td>Both</td>
</tr>
<tr>
<td>1B3</td>
<td>B</td>
<td>T/A</td>
<td>Both</td>
</tr>
<tr>
<td>1C1</td>
<td>All</td>
<td>T</td>
<td>Both</td>
</tr>
<tr>
<td>1C2</td>
<td>B/I</td>
<td>T</td>
<td>Both</td>
</tr>
<tr>
<td>1C3</td>
<td>B</td>
<td>T</td>
<td>Both</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UTR (Category 2)</th>
<th>Organizational Modification</th>
<th>Network Tiers</th>
<th>ITNE and/or UTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A1</td>
<td>All</td>
<td>T/A/C</td>
<td>ITNE</td>
</tr>
<tr>
<td>2A2</td>
<td>B/I</td>
<td>T/A/C</td>
<td>ITNE</td>
</tr>
<tr>
<td>2A3</td>
<td>B</td>
<td>T/A/C</td>
<td>ITNE</td>
</tr>
<tr>
<td>2B1</td>
<td>All</td>
<td>T/A</td>
<td>ITNE</td>
</tr>
<tr>
<td>2B2</td>
<td>B/I</td>
<td>T/A</td>
<td>ITNE</td>
</tr>
<tr>
<td>2B3</td>
<td>B</td>
<td>T/A</td>
<td>ITNE</td>
</tr>
<tr>
<td>2C1</td>
<td>All</td>
<td>T</td>
<td>ITNE</td>
</tr>
<tr>
<td>2C2</td>
<td>B/I</td>
<td>T</td>
<td>ITNE</td>
</tr>
<tr>
<td>2C3</td>
<td>B</td>
<td>T</td>
<td>ITNE</td>
</tr>
</tbody>
</table>

**Organizational Modification:** This UTR complexity factor measures the relative complexity of the task organization structure deviation from the unit’s specific MTOE.

**Network Tiers:** This UTR complexity factor measures the relative complexity of the volume of network systems based on the number of required network tiers affected by the UTR.

**Network Levels:** This UTR complexity factor measures the relative complexity of the interconnectivity planning required between the Upper Tactical Internet (UTI) network and systems and the ITNE network and systems based on the amount of interconnection and crossbanding points required for the particular UTR.
## UTR Process

**(Network Planning Times)**

### Lower Tier:

<table>
<thead>
<tr>
<th>Network Type</th>
<th>Network Description</th>
<th>Network Complexity</th>
<th>Systems</th>
<th>$T_{key}$ (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINC</td>
<td>Terrestrial</td>
<td>Basic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRW</td>
<td>Terrestrial</td>
<td>Basic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUOS</td>
<td>Celestial</td>
<td>Basic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SATCOM</td>
<td>Celestial</td>
<td>Basic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINC SRW</td>
<td>Terrestrial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINC SRW</td>
<td>Terrestrial Aerial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINC MUOS</td>
<td>Terrestrial Celestial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINC SATCOM</td>
<td>Terrestrial Celestial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRW MUOS</td>
<td>Terrestrial Celestial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRW SATCOM</td>
<td>Terrestrial Celestial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUOS SATCOM</td>
<td>Celestial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINC SRW MUOS</td>
<td>Terrestrial Celestial</td>
<td>Advanced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINC SRW MUOS</td>
<td>Terrestrial Aerial Celestial</td>
<td>Advanced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINC SRW SATCOM</td>
<td>Terrestrial Celestial</td>
<td>Advanced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SINC SRW SATCOM</td>
<td>Terrestrial Aerial Celestial</td>
<td>Advanced</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mid Tier:

<table>
<thead>
<tr>
<th>Network Type</th>
<th>Network Description</th>
<th>Network Complexity</th>
<th>Systems</th>
<th>$T_{orr}$ (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANW2</td>
<td>Terrestrial</td>
<td>Basic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANW2 HF</td>
<td>Terrestrial Aerial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WNW</td>
<td>Terrestrial</td>
<td>Basic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WNW HF</td>
<td>Terrestrial Aerial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANW2</td>
<td>Terrestrial Celestial</td>
<td>Advanced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANW2 HF</td>
<td>Terrestrial Celestial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WNW</td>
<td>Terrestrial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WNW HF</td>
<td>Terrestrial Aerial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANW2</td>
<td>Terrestrial Celestial</td>
<td>Advanced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANW2 HF</td>
<td>Terrestrial Celestial</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*UNCLASSIFIED*
• UTR Completion Time Calculation: The S-6 and their staff can quickly estimate the amount of time it takes to plan, configure, load, initialize, and validate a set of networks to match a UTR by applying the following formula.

\[ T_{UTR} = \sum_{i=1}^{n} X_i T_{NET} \]

• This equation provides the estimated time required to complete a specified UTR. This is accomplished through the summation of all of the ITNE Planning Process and Verify OPNET times associated with all the systems of all the networks requiring modification and or creation to support the published task organization.
• **UTR NPs, NDs, and MCFs can be planned and loaded as a preset on ITNE component devices expected to utilize that network design for a particular set of missions.** These UTRs range across all categories listed under paragraph 4.0 of the ITNE CONOPS and are only limited to the imagination of the commander and their staff in preparing for contingencies.

• There is a **limitation on the number of loadable preset space** available on particular radios. This is based on the radio design and hardware and software limitations. This will change with time and vary by radio design. For example, the Rifleman Radio (PRC-154) can hold up to fifty presets while the Manpack Radio (PRC-155) can hold up to 100 presets operating with two simultaneous channels.
• **Preset space is a precious resource** for the S-6. There is always a need to use a percentage of preset space for **high probability task organization scenarios**. In effect, these should be baked in doctrinal presets for the movement or pure fleeted units as discussed earlier in this appendix. However, there is also a need for each unit to develop their own planned task organizations that go beyond pure fleeted organizational movements and include more CAT1 and CAT 2 A/B type organizational structures to meet their unique mission requirements. A good S-6 always leaves room on a radio for these kinds of mission specific pre-planned presets.

• In the near term (CS 13/14), the S-6 will receive their preset design, the RPPA, from their ASA (ALT) new equipment fielding (NEF) process. This baseline is formed on the latest considerations between the unit and the ASA (ALT) network design developers to facilitate the mission specific and doctrinal level requirements for planned missions. Over time, this responsibility will migrate directly to the unit rather than the program managers. Once this occurs, the unit will have the responsibility and control over the design of their RPPA in the Signal Analysis Phase of the ITNE Planning Process.
ITNE

Dependencies
There is a risk that there is an insufficient amount of specified spectrum to simultaneously operate all the radios in the Objective Architecture of the BCTs...

Primarily impacts Phase III High Intensity Conflict Operations requiring rapid mobile forces operating simultaneously.

Approximately: 3,500 Total Radios in Objective IBCT

Approximately: 1,500 Total Radios in Legacy IBCT

There is a risk that there is an insufficient amount of specified spectrum to simultaneously operate all the radios in the Objective Architecture of the BCTs...
The BCT data product is a combination of data from the global and the local network infrastructures. The Blue SA network infrastructure is a separate logical global network that is not aligned with organic unit control of data associated with their communications and network hardware.

Current Blue SA data is controlled and configured by the Army Enterprise through ASA(ALT) programs PD TNI and PD FBCB2.

Unit ownership of ITNE component data is critical to organic task reorganization.
**ITNE Dependencies**
(Data Product Process & Staging)

---

### Data Product Process

- **Current Army Enterprise controlled process**
  - Develop Horse blanket & Network Design
  - Develop IP Addressing and data/routing Schemes
  - Develop unit specific feeder data based on established design
  - Create data product holding all feeder data for delivery to tactical unit
  - Load data product feeder data into the ITNE NetOps System

---

### Data Product Staging

**Current**

- Current Data Product Staging
  - BCT Data Product
    - Single IP Addressing Scheme
    - Single Multicast Groups
    - Single Set of BCT wide URNs
    - Single Set of BCT wide Role Names
  - Data Product Interface
  - WIT

**Needed**

- Data Product Design Supporting organic UTR
  - BCT Data Product
    - Echelon Specific IP Addressing
    - Echelon Specific Multicast Groups
    - Echelon Specific URNs
    - Echelon Specific Role Names
  - Data Product Interface
  - WIT
ITNE Dependencies (Personnel Resourcing)

**ITNE NetOps Tasks (on-going analysis)**
(currently 147 draft signal tasks)

**Categories of BN Signal Tasks**

- Legacy MTOE BN S-6 Tasks
- MARC Study Legacy Equipment Maintainer Tasks
- Victory Architecture Derived NetOps Tasks
- ITNE NetOps Tasks (Plan/Monitor)
- Spectrum Planning/Deconfliction (Jamming)

**Undetermined ITNE Task Areas**

- VICTORY Architecture
- Spectrum capability at battalion
- Unknowns
ITNE

Troop to Task List
The troop to task list effort incorporates lessons learned from Network Integration Exercises, Operational Needs Statement and Capability Set Fieldings, and experimentation and critical analysis from the user community.
• TRADOC Capability Manager (TCM) Tactical Radios (TR)
  – COL Ralph “Trip” Higgins, DSN 780-7982, ralph.g.higgins.mil@mail.mil
  – LTC Greg Grzybowski, DSN 780-7982/0109, gregory.h.grzybowski.mil@mail.mil
  – Mr. Paul Chernek, DSN 780-7490, paul.m.chernek.civ@mail.mil
  – CPT Iaasac Simpson, DSN 780-7982, iaasac.a.simpson.mil@mail.mil
  – CPT Fernando Del Rio, DSN 780-7982, fernando.delrio2.mil@mail.mil
  – SFC Toneka Bland, DSN 780-7944, toneka.l.bland.mil@mail.mil
Questions