ATP 6-02.45

TECHNIQUES FOR TACTICAL SIGNAL SUPPORT TO THEATER OPERATIONS

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Techniques for Tactical Signal Support to Theater Operations

Contents

		Page
	PREFACE	**iii**
	INTRODUCTION	**v**
Chapter 1	**THE OPERATIONAL ENVIRONMENT**	**1-1**
	The Information Environment	1-1
	The Tactical Network	1-3
Chapter 2	**ECHELONS ABOVE CORPS TACTICAL NETWORK ARCHITECTURE**	**2-1**
	Section I –Network Architecture and Transport Capabilities	**2-1**
	Colorless Core Architecture	2-1
	Network Transport Capabilities	2-3
	Section II – Types of Warfighter Information Network-Tactical At-The-Halt Systems	**2-5**
	Single Shelter Switch	2-5
	Joint Network Node	2-6
	Command Post Node	2-6
	Commercial Coalition Equipment	2-6
	Satellite Transportable Terminal	2-6
	High-Capacity Line-of-sight	2-7
	Regional Hub Node	2-7
	Tactical Hub Node	2-8
Chapter 3	**THEATER TACTICAL SIGNAL BRIGADE**	**3-1**
	Section I – Theater Tactical Signal Brigade	**3-1**
	Overview	3-1
	Theater Tactical Signal Brigade's Roles and Responsibilities	3-2
	Operations Staff	3-2
	Use of the Operations Process to Plan Signal Support in Theater	3-3
	Section II – Expeditionary Signal Battalion	**3-5**
	Overview	3-5
	Expeditionary Signal Company	3-8
	Joint/Area Signal Company	3-11
	Section III – Expeditionary Signal Battalion-Enhanced	**3-14**
	Overview	3-14
	Expeditionary Signal Company-Enhanced	3-16

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Section IV – En Route Communications Company 3-17
Overview 3-17
En Route Communications Company Capability 3-17
Section V – Tactical Installation and Networking-Enhanced Company 3-18
Overview 3-18
Tactical Installation and Networking-Enhanced Company Capabilities 3-19

Chapter 4 ORGANIZATIONS REQUIRING TACTICAL COMMUNICATIONS SUPPORT FOR THEATER OPERATIONS 4-1
Section I – Organizations Without Organic Tactical Communications Assets 4-1
Theater Army Main Command Post 4-1
Joint Task Force Headquarters 4-2
Joint Forces Land Component 4-3
Functional Brigades and Groups 4-3
Section II – Organizations Requiring Tactical Communications Support For Augmentation 4-4
Corps 4-4
Division 4-5
Multifunctional Support Brigade 4-5
Brigade Combat Teams 4-7
Global Response Force 4-8
Security Force Assistance Brigade 4-8

Appendix A EXPEDITIONARY SIGNAL BATTALION COMMUNICATIONS EQUIPMENT ALLOCATION A-1

Appendix B TACTICAL REGIONAL CYBER CENTER INTEGRATION PROGRAM B-1

Appendix C REQUEST FOR FORCES PROCESS C-1

Appendix D COMMUNICATIONS & ELECTRONICS MAINTENANCE SUPPORT D-1

GLOSSARY Glossary-1

REFERENCES References-1

INDEX Index-1

Figures

Figure 2-1. Colorless core architecture 2-2
Figure B-1. Stages of a tactical regional cyber center integration program B-2
Figure C-1. Force tracking number format C-1
Figure C-2. Request for forces process C-2

Tables

Table A-1. Expeditionary signal company communications equipment allocations A-1
Table A-2. Joint/Area signal company communications equipment allocations A-3

Preface

Army Techniques Publication 6-02.45 builds on the tactical communications information provided in FM 6-02. This publication establishes non-prescriptive ways to perform missions, functions, and tasks associated with providing theater tactical signal support using communications support packages. This publication provides techniques associated with theater tactical communications support of the Army's portion of the Department of Defense information network known as Department of Defense information network-Army. ATP 6-02.45 supersedes FMI 6-02.45, dated 5 July 2007. This publication supports doctrinal principles outlined in JP 3-12, JP 6-0, FM 3-0, and FM 6-02.

The primary audience for ATP 6-02.45 consists of commanders and staff at a division and above headquarters conducting theater operations and organizations designated as a joint task force headquarters or a joint force land component command. This publication provides information that can assist a theater tactical signal brigade headquarters and its subordinate units with details necessary when designing a communications support package for theater signal support. The United States Army Forces Command may find this publication informative when determining which mission force in the available force pool meets the communications requirements for requesting units.

Commanders, staffs, and subordinates ensure that their decisions and actions comply with applicable United States, international, and, in some cases, host-nation laws and regulations. Commanders at all levels ensure that their Soldiers operate in accordance with the law of war and the rules of engagement. (See FM 6-27.)

ATP 6-02.45 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. ATP 6-02.45 is not the proponent publication for any Army terms. For other definitions shown in the text, the term is italicized, and the reference number of the publication follows the definition.

ATP 6-02.45 applies to the Active Army, Army National Guard/Army National Guard of the United States, and United States Army Reserve unless otherwise stated.

The proponent for this publication is the United States Army Cyber Center of Excellence. The preparing agency is the Doctrine Division, United States Army Cyber Center of Excellence. Send comments and recommendations on a DA Form 2028 *(Recommended Changes to Publications and Blank Forms*) to Commander, United States Army Cyber Center of Excellence and Fort Gordon, ATTN: ATZH-OP (ATP 6-02.45), 506 Chamberlain Avenue, Fort Gordon, GA 30905-5735; by e-mail to usarmy.gordon.cybercoe.mbx.gord-fg-doctrine@mail.mil.

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Introduction

The vision for the Department of Defense information network-Army is the employment of an end-to-end network that provides assured global command and control and enables the Army to fight and win in a contested and congested operational environment. This network integrates services and capabilities from strategic to tactical echelons and enables all warfighting functions. The network is a warfighting platform. It enables the command and control system to integrate joint combined arms and all elements of combat power. It supports leaders' ability to understand, visualize, and describe the operational environment; problems, and approaches to solving them; supports commanders' ability to make decisions and direct action toward a desired end state; assess understanding of the problem and adequacy of the operational approach; and evaluate subsequent plans and levels of progress.

Operational forces that do not have organic communications capabilities or require additional communications assets to enlarge or enhance their portion of the tactical network require communications support to gain or augment their ability to access the Department of Defense information network-Army and provide users with services provided by the Defense Information Systems Agency. This publication describes the mission forces that provide communications support packages to meet those communications requirements. This publication identifies those operational forces that request theater communications support using the request for forces process.

ATP 6-02.45 further expands on the tactics established in FM 6-02 while adopting updated terminology and prescribing techniques as necessary. Updates to this publication will occur as improvements, and changes in capabilities develop, or when there are changes in the operational environment to maintain the advantage.

This publication is consistent with joint and Army doctrine and builds on the doctrinal foundation established in FM 6-02. The tactical signal brigade and its subordinate expeditionary signal battalions provide crucial tactical signal support to operations. The tactical signal brigades deploy communication packages to provide tactical network communications and information services, enabling commanders the ability to shape, prevent, conduct large-scale ground combat, and consolidate gains.

ATP 6-02.45 contains four chapters and four appendices:

Chapter 1 provides an overview of the operational environment. It discusses the information environment and categorizes the challenges encountered while operating throughout the operational environment. This chapter discusses the tactical network and its tiers, followed by an overview of the Defense Information Systems Agency's network service center.

Chapter 2 provides an overview of Warfighter Information Network-Tactical at-the-halt communications systems. This chapter discusses the capabilities of Warfighter Information Network-Tactical at-the-halt, including the colorless core and its architecture, the top secret and sensitive compartmented information networks. This chapter describes the types of Warfighter Information Network-Tactical at-the-halt systems, including the network communications nodes and transmission systems.

Chapter 3 provides in-depth information about the theater tactical signal brigade, its subordinate tactical signal battalions, and tactical integration network-enhanced company. This chapter discusses techniques on how a theater tactical signal brigade uses the operations process to plan for the deployment of a communications support package to provide theater tactical communications support.

Chapter 4 discusses the various organizations that require tactical communications support while conducting operations in theater, including both contingency and large-scale combat operations. This chapter discusses organizations that do not have organic tactical communications assets and organizations that have tactical communications but require augmentation for conducting theater operations.

Appendix A defines and illustrates the communications allocation tables for an expeditionary signal battalion's subordinate expeditionary signal companies and joint/area signal companies. Each

communications allocations table identifies the team and equipment types in the expeditionary signal companies and joint/area companies, including the line item numbers and equipment amount.

Appendix B describes the five stages of the Tactical Regional Cyber Center Integration Program. This appendix describes the use of the five stages to ensure that communications support packages remain in a constant state of employment.

Appendix C describes the request for forces process. It discusses how a joint task force headquarters requests communications support packages to meet the various communications requirements when conducting operations in theater.

Appendix D discusses how communications support packages receive communications and electronics maintenance support while providing communications support in theater. It describes how a communication support package receives both field-level and sustainment-level maintenance when under operational control or tactical control of a supported unit conducting theater operations.

Chapter 1
The Operational Environment

This chapter discusses the information environment and the tactical network as part of the operational environment. It discusses the difficulties encountered while conducting Department of Defense information network operations in a congested and contested spectrum. This chapter discusses the various types of cyberspace threats and threat actors encountered while conducting Department of Defense information network operations. It describes the tactical network and provides a brief description of the network service center.

THE INFORMATION ENVIRONMENT

1-1. *The information environment* is the aggregate of individuals, organizations, and systems that collect, process, disseminate, or act on information (JP 3-13). The cyberspace domain is part of the information environment, while cyberspace operations are the employment of cyberspace capabilities in and through the cyberspace domain. The primary purpose of information operations is to create effects in the information environment. Cyberspace is a global domain within the information environment. Cyberspace operations are the employment of cyberspace capabilities to achieve objectives in or through cyberspace.

1-2. When employed in support of information operations, cyberspace operations generally focus on the integration of offensive and defensive capabilities in and through cyberspace, with other IRCs, and across multiple lines of effort. Cyberspace operations, when in support of information operations, deny or manipulate adversary decision making, through targeting an information medium in the physical dimension (such as wireless access points), the information dimension (such as the message itself), or the cognitive dimension (such as a cyber-persona which is an identity that facilitates communication, decision making, and the influencing of audiences).

1-3. The information environment encompasses all the operational domains (air, land, maritime, space, and cyberspace) and therefore exists in any operational environment. The proliferation of cyberspace capabilities by friendly, enemy, neutral, and commercial organizations in the information environment have resulted in challenges throughout the operational environment. The categorization of these challenges are within either the congested or the contested environments.

CONGESTED ENVIRONMENT

1-4. The competition for finite available bandwidth sometimes results in an extremely congested spectrum, particularly when operating in developed nations. Commanders must gain and maintain control of cyberspace. Cyberspace includes the interdependent network connectivity of cyberspace capabilities throughout the electromagnetic spectrum and wired networks. Tactical signal support enables commanders at the theater level to project command and control in and through cyberspace. All forces and supporting agencies depend on cyberspace to collect, process, disseminate, and act on information throughout the multiple domains. Throughout cyberspace, joint forces contend with civil agencies, commercial entities, allied forces, enemies, and adversaries for the use of a common electromagnetic spectrum resource.

1-5. Insufficient resources caused by spectrum congestion may result in degraded capabilities in the information systems of U.S. forces and allies. Lack of coverage in the electromagnetic spectrum because of inadequate communications satellite capacity is an example of a degraded capability due to insufficient resources. As cyberspace use increases, information transported in and through cyberspace becomes more congested, requiring the commander to make decisions on the prioritization or shaping of traffic flows for mission critical data.

Note. As the Army transitions from its current operational concept (unified land operations) to multi-domain operations (MDO), we can expect that new network requirements will continue to drive change to both communications systems and organization structure. The implications that MDO will result in increased congestion throughout cyberspace is highly conceivable.

CONTESTED ENVIRONMENT

1-6. Enemies and adversaries may deliberately attempt to deny the Army and its ally's use of cyberspace across multiple domains. Because of heavy joint reliance on advanced communications systems, such an attack may be a central element of any enemy or adversary anti-access and area denial strategy, requiring a higher degree of protection for friendly command and control (C2) systems and planning for operations in a denied or degraded environment.

1-7. Enemies and adversaries have demonstrated an increased technological capability that has become a continuous threat to U.S. dominance throughout cyberspace. U.S. military communications and information networks have become high-value targets of an enemy or adversary trying to deny or manipulate communications, a key enabler to U.S. military operations.

1-8. Technologically sophisticated enemies and adversaries understand the extent of U.S. forces' reliance on cyberspace capabilities. These peer and near-peer enemies and adversaries have demonstrated the ability to cause an immediate threat. We should expect continued contests throughout the information environment by enemies and adversaries in an attempt to deny or manipulate operations and diminish the effectiveness of U.S. and allied forces.

1-9. Successfully integrating communications support with cyberspace, electronic warfare, and intelligence operations are crucial to obtaining and maintaining freedom of action in the electromagnetic spectrum. These integrated capabilities provide the ability to deny or manipulate enemy and adversary abilities to conduct successful operations. Synchronizing these integrated capabilities across multiple domains and warfighting functions maximize their effects in and through cyberspace.

THREATS

1-10. A *threat* is any combination of actors, entities, or forces that have the capability and intent to harm U.S. forces, U.S. national interests, or the homeland (ADP 3-0). Various actors in any area of operations (AO) qualify as either an enemy, an adversary, an insider, a neutral, or a friend. The Army categorizes an adversary, enemy, and insider threat as types of threat actors. An *adversary* is a party acknowledged as potentially hostile to a friendly party and against which the use of force may be envisaged (JP 3-0). An *enemy* is a party identified as hostile against which the use of force is authorized (ADP 3-0). An *insider threat* is a person with placement and access who intentionally causes loss or degradation of resources or capabilities or compromises the ability of an organization to accomplish its mission through espionage, providing support to international terrorism, or the unauthorized release or disclosure of information about the plans and intentions of U.S. military forces (AR 381-12). Insider threats may include unintentional or accidental threats that impact operations. Insider threats may include shooters, bombers, spies, and other threats embedded within or working with U.S. forces. Insider threats present unique challenges because they are trusted individuals with authorized access to Army capabilities and sensitive operational information.

1-11. In large-scale combat operations, a peer threat poses the most concern. Communications support packages are designed to provide signal support for Army forces implementing the Army strategic roles in defeating peer threats during large-scale combat operations (see FM 3-0 for more information on the Army strategic roles). A *peer threat* is an adversary or enemy with capabilities and capacity to oppose U.S. forces across multiple domains worldwide or in a specific region where they enjoy a position of relative advantage (ADP 3-0). Peer threats possess roughly equal combat power in geographical proximity to a conflict area with U.S. forces.

THE TACTICAL NETWORK

1-12. The tactical network encompasses the integration of the Warfighter Information Network-Tactical (WIN-T) network and the tactical radio network to establish the Department of Defense formation network-Army (DODIN-A) in an operational environment. The tactical network is one of the three segments that make up the DODIN-A (home or mobile; post, camp, or station; and the tactical network). The tactical network consists of two logical tiers: the upper tier and the lower tier.

UPPER TIER

1-13. The upper tier consists of commercial off-the-shelf, WIN-T at-the-halt, and WIN-T on-the-move resources that allow tactical network connectivity. Communications transport is attained using frequency division multiple access satellite transmission, time division multiple access (TDMA) satellite transmission tropospheric scatter (TROPO) transmission, and line-of-sight transmission as means of network transport. The upper tier connects the lower tier to the Department of Defense information network (DODIN).

1-14. An expeditionary signal battalion (ESB), assigned to a theater tactical signal brigade (TTSB), provides WIN-T at-the-halt resources to units and organizations in a theater that do not have organic communications assets or require communications augmentation. ESBs can support small to large command posts.

1-15. The expeditionary signal battalion-enhanced (ESB-E), assigned to a TTSB, provides the same at-the-halt capabilities as an ESB using commercial off-the-shelf modular communications resources. Like an ESB, the ESB-E can support medium and large command posts but is scalable to support a smaller command post than an ESB. The ESB-E provides rapid enroute and force entry capabilities for a joint task force (JTF) headquarters, a joint force land component commander (JFLCC), and a global response force conducting joint operations.

1-16. A brigade combat team primarily employs WIN-T on-the-move assets with limited WIN-T at-the-halt capabilities. A brigade combat team uses combat net radio gateways that provide a bridge between the upper and lower tiers. WIN-T on-the-move communications assets support small-to-medium sized command posts using TDMA satellite transmission, and high band networking waveform line-of-sight transmission as a means of communications transport.

Note. For more information on brigade combat teams (BCT) and WIN-T on-the-move communications, refer to ATP 6-02.60.

LOWER TIER

1-17. The lower tier consists primarily of single channel tactical satellite systems, and single channel radio systems in support of tactical formations down to team leaders. The WIN-T combat net radio gateway provides a bridge to connect the tactical radio network to the WIN-T network, thus establishing the tactical network.

Note. WIN-T at-the-halt continues to be a key component when the integrated tactical network (ITN) architecture replaces the current DODIN-A tactical network. WIN-T is interoperable with communications systems currently in development for the integrated tactical network architecture, including the modular communications systems and enroute communications systems used by the global response force, security force assistance brigades, and the expeditionary signal battalion-enhanced (ESB-E).

NETWORK SERVICE CENTER

1-18. Units employing WIN-T communications assets to establish the upper tier of the tactical network receive necessary Defense Information Systems Agency (DISA) services through one of its network service

centers. Network service centers extend DODIN access, connecting Army users to DISA services and applications. A network service center consists of three critical components:

- **Regional cyber center—**enterprise manager that provides network oversight, security of the DODIN-A, DODIN operations capability, and services to support the Army.
- **Regional hub node (RHN)**—provides Defense Information Systems Network services (data, voice, and video teleconferencing), extends connectivity between WIN-T and the DODIN, and provides reachback for units conducting operations in the tactical network.
- **Data center**—provides enterprise information technology services, application hosting, and backup for C2, intelligence, and business systems. Services include SECRET Internet Protocol Router Network (SIPRNET), Non-classified Internet Protocol Router Network (NIPRNET), and mission partner environment within all theaters.

Chapter 2

Echelons above Corps Tactical Network Architecture

Connectivity to the tactical network uses the colorless core 3 architecture. WIN-T at-the-halt provides connectivity to the tactical network and provides tactical users with access to such DISA services as SIPRNET, NIPRNET, secure and non-secure Voice over Internet Protocol digital phones, secure and non-secure analog phones, Defense Red Switched Network phones, DODIN operations capabilities, and battlefield video teleconferencing services to tactical users at-the-halt.

SECTION I –NETWORK ARCHITECTURE AND TRANSPORT CAPABILITIES

2-1. This section discusses the network and transport capabilities of WIN-T at-the-halt. It describes the colorless core and architecture, top secret and sensitive compartment information networks, and the Trojan Network Control Center. This section provides an overview of the RHN and discusses the reachback capability provided to tactical users once connected to WIN-T at-the-halt and the RHN. This section discusses the satellite and line-of-sight communications transport systems used by WIN-T at-the-halt and the various is usually.

COLORLESS CORE ARCHITECTURE

2-2. The colorless core is a DISA-compliant architecture that offers Internet Protocol network encryption and transport capabilities. The key benefits of the colorless core are data protection and efficiency of bandwidth usage.

2-3. The colorless core architecture encrypts all data, regardless of classification, from end-to-end. Classified and unclassified data undergo encryption and before wide-area transmission. Since all the encrypted information looks the same, an enemy or adversary cannot distinguish between encrypted and unencrypted data. The colorless core makes unclassified information just as hard to recover as classified information. The colorless core makes it difficult for an enemy or adversary to target classified networks.

2-4. With the colorless architecture, data undergoes encryption and decryption twice—once at the network layer for communications security and again at the link layer for transmission security. Additionally, link layer encryption isolates the network backbone from external networks. User data decryption takes place after the data leaves the wide-area network at its destination. Colorless core protects over-the-air broadcast and limits insider threats to the overall tactical network.

2-5. For echelon above corps units, the colorless core architecture extends the tactical network to the DODIN-A through the RHN using high assurance Internet Protocol encryption. High assurance Internet Protocol encryption capability uses an inline network encryptor (INE). An example of an INE is the tactical local area network encryption. INE provides encryption to isolate the network's backbone. INEs are National Security Agency-approved communications security devices.

2-6. Routers and switches on the SIPRNET and NIPRNET local area networks provide local area network extension, access to DISA services for local users through the tactical network, and enclave protection. The INE cryptographically isolates all user traffic from the wide-area network while the colorless routers provide a meshed transport network between WIN-T nodes.

2-7. The routing design consists of—

- Local area network routers at the edge of the network that host multiple internet protocol subnets. The local area network router uplink connects to an INE.
- INEs that encrypt and tunnel the data before sending it through the wide-area network.
- The INE uplinks interface that connects to the wide-area network router.
- The cluster of wide-area network routers that form the colorless core of the WIN-T network.

2-8. The SIPRNET and NIPRNET local area network data undergo separate user data encryption before passing through the INE for link encryption at the local area network side of the wide-area network router. Only the encrypted colorless core data passes through the wide-area network (see figure 2-1).

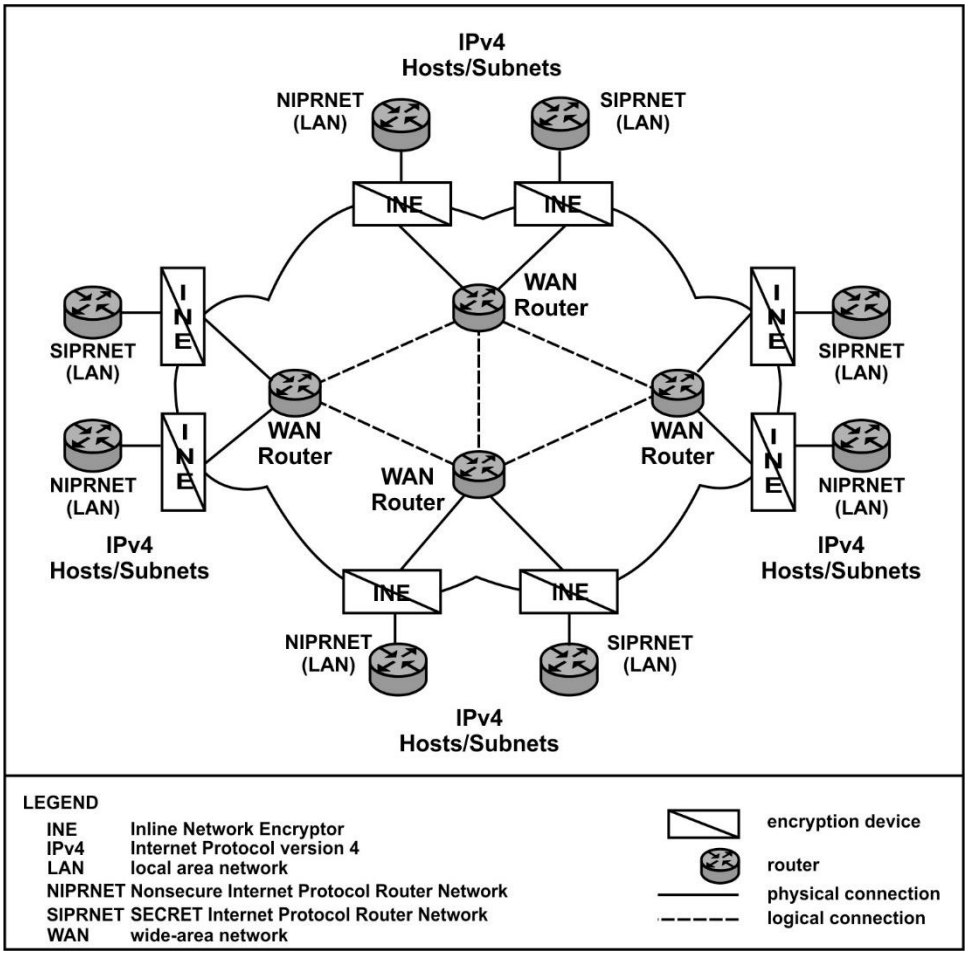


Figure 2-1. Colorless core architecture

TOP SECRET AND SENSITIVE COMPARTMENTED INFORMATION NETWORKS

2-9. The Joint Worldwide Intelligence Communications System and National Security Agency Network are intelligence operated sensitive compartmented information networks that provide division and brigade commanders and their intelligence elements access to top secret and sensitive compartmented information. The WIN-T colorless core tunnels sensitive compartmented information from the Trojan Network Control Center through the RHN to the end users. The tunnel allows the end user to send information back using the same path. Encryption devices cryptographically isolate sensitive compartmented information from the SIPRNET and NIPRNET. WIN-T provides only network transport for these networks. The (Army) assistant chief of staff, signal (G-6), (Army) battalion or brigade signal staff officer (S-6), and the division and brigade

network operations and security center (NOSC) do not perform DODIN operations for the sensitive compartmented information networks.

2-10. The division, brigade, and battalion G-6/S-6 perform DODIN operations to establish a tactical network that allows the ability to share top secret and sensitive compartmented information. The G-6/S-6 receives assistance from the intelligence staff using policy guidance from the Deputy Chief of Staff, Intelligence.

TROJAN NETWORK CONTROL CENTER

2-11. The Trojan Network Control Center provides top secret and sensitive compartmented information services and DODIN operations. The Trojan Network Control Center provides the encrypted top secret and sensitive compartmented information network data to the RHN for transmission over the WIN-T colorless core. Intelligence users access the Trojan Network Control Center over the WIN-T colorless core using the modular communications node-advanced enclave (MCN-AE) or TROJAN Special Purpose Intelligence Remote Integrated Terminal.

REACHBACK COMMUNICATIONS

2-12. *Reachback* is the process of obtaining products, services, and applications, or forces, or equipment, or material from organizations that are not forward deployed (JP 3-30). WIN-T at-the-halt connects to the DODIN-A using the RHN. The RHN provides reachback to home station, and access to DISA services.

2-13. RHNs and Department of Defense (DOD) gateways connect through the global agile integrated transport (GAIT). With GAIT architecture, data remains on the tactical network between RHNs, or from the home station to a DOD Gateway site for extension to deployed elements. GAIT architecture reduces the need for multi-hop satellite transmission paths. GAIT eliminates the need to push data from an RHN over a satellite back to the home station. The new architecture simplifies the network and supports planning, operations, management, and troubleshooting.

NETWORK TRANSPORT CAPABILITIES

2-14. WIN-T systems combine line-of-sight and satellite communications transport for network reliability and multiple routes of transmission. The network backbone prioritizes line-of-sight transport as much as possible to minimize the demand for satellite transmission.

2-15. Satellite communications establish tactical network connectivity and reachback to access DISA services. Satellite communications provide an alternate network transport means to ensure an uninterrupted connection to critical services.

LINE-OF-SIGHT TRANSMISSION

2-16. After establishing the tactical network in theater, major WIN-T nodes create a high bandwidth line-of-sight backbone between the large and small nodes throughout the local area network. Distance, terrain, and man-made obstructions are limiting factors when employing line-of-sight transmission systems at-the-halt.

2-17. Line-of-sight terminals provide primary network transport between the large and small nodes throughout a local area network. Line-of-sight systems provide much greater bandwidth and lower operating costs than the satellite systems but are limited by the maximum distance for which they can transmit. Line-of-sight systems can transmit in satellite denied environments.

TROPOSPHERIC SCATTER TRANSMISSION

2-18. TROPO systems are an alternative beyond-line-of-sight communications transport system for extended network range and throughput. TROPO often replaces satellites in satellite denied environments for long haul communications. TROPO is transmitting and receiving signals that bounce off the troposphere from a distant end TROPO system.

2-19. TROPO systems provide significantly more bandwidth and less cost than satellite transmission. TROPO systems add redundancy and operational flexibility to the tactical network.

SATELLITE COMMUNICATIONS TRANSMISSION

2-20. Satellite communications transport provides significant advantages for an expeditionary force. Satellite communications transport provides—

- Global reach from the national command authority to the deployed forces.
- Connection to DISA services in austere environments.
- Immediate access to the tactical network upon initialization.
- Access for isolated special operations forces without terrain or distance limitations.
- Long-haul backbone data transport and reachback to home station.
- Transmission capabilities that span beyond line-of-sight distances, terrain obstructions, or hostile forces.

2-21. Connecting to the RHN using satellite communications transport provides full access to DISA services as soon as a node connects to the tactical network. Despite its advantages, satellite communications have drawbacks. Satellite bandwidth is costly and susceptible to transmission delays. Satellite bandwidth availability may be limited, particularly in some remote or sparsely populated regions. Satellite communications are subject to degradation during severe weather.

2-22. Three primary waveforms used for Army satellite transmission are—

- Frequency division multiple access waveform.
- TDMA waveform.
- Network centric waveforms.

WARFIGHTER INFORMATION NETWORK-TACTICAL WAVEFORMS

2-23. WIN-T uses three distinct waveforms when establishing the tactical network. Frequency division multiple access waveforms create the backbone link from a single shelter switch (SSS) or joint network node (JNN) to the RHN. Time Division Multiple access waveforms communicate with WIN-T on-the-move assets throughout the AO. Network centric waveform establishes satellite communications links between the SSS or JNN and its associated command post nodes (CPN) located throughout the local area network.

Frequency Division Multiple Access Waveform

2-24. A frequency division multiple access waveform carries multiplexed traditional serial voice and data or packetized Internet Protocol traffic. Frequency division multiple access is a transmission technology that allows multiple users to access the network separated by frequency. Using two frequencies is required for a full duplex carrier. The RHN has preset bandwidths allocated for frequency division multiple access waveform. The RHN cannot reallocate the dedicated bandwidth for other resources, even when traffic is not present on the satellite link. The RHN designs a satellite link with enough bandwidth to carry maximum nominal traffic, but it cannot expand to meet increased demand automatically.

Time Division Multiple Access Waveform

2-25. Time division multiple access waveform is a channel access method that enables multiple satellite terminals to transmit intermittently on the same frequency. With TDMA, several users share the same frequency channel by dividing the signal into different time slots. Each user transmits packets in rapid succession, one after the other, using individual time slots. Once the RHN receives the packets, it repackages the data from each user and forwards the repackaged data to its destination using either another satellite transmission or GAIT. With TDMA, there is no dedicated satellite bandwidth for a single link. The RHN can reallocated bandwidth for other time slots when traffic is not present.

Network Centric Waveforms

2-26. Network centric waveforms use multi-frequency TDMA and demand-assigned multiple access for internet protocol over satellite, allowing for more efficient bandwidth and satellite usage while effectively increasing throughput. A network centric waveform modem supports terminals with different antenna, power, and transceiver characteristics. These terminals range from the large commercial satellite terminals

to small tactical terminals. A network centric waveform modem supports a mobile, distributed network by design.

2-27. A network centric waveform satellite network depends on accurate master network timing from one network centric waveform modem acting as a network controller. For all terminals in the network to share the allotted satellite bandwidth, the network controller—

- Transmits timing information to each satellite terminal on the network.
- Controls network signaling and communications traffic between satellite terminals on the network.
- Manages, controls, and allocates satellite bandwidth and time assigned in the satellite access authorization for all network signaling and communications traffic.

2-28. Although the network centric waveform modem at the RHN is usually the network controller, the number of satellite terminals it can effectively manage is limited. For better management and redundancy, the network controller can designate a large to medium satellite terminal on the network as a backup. A network member configured as a backup network controller can assume control if the designated network controller fails. The network controller and backup controller monitor their control transmissions on the satellite downlink.

SECTION II – TYPES OF WARFIGHTER INFORMATION NETWORK-TACTICAL AT-THE-HALT SYSTEMS

2-29. This section discusses the various WIN-T at-the-halt systems employed to provide theater tactical signal support. It provides a brief overview of the networking communications systems used to establish communications nodes in the tactical network. This section discusses the communications transmission systems that provide intra-connectivity between network communications systems in the tactical network and interconnectivity between network communications systems, to include connectivity to an RHN for access to DISA services and reachback capabilities

2-30. WIN-T at-the-halt systems include the SSS, the JNN, the CPN, the satellite transportable terminal (STT), high-capacity line-of-sight (HCLOS) radio, and the tactical hub node. WIN-T at-the-halt is the upper tier tactical communications asset used by TTSBs, armored BCTs, United States Army Reserve, and Army National Guard units. WIN-T at-the-halt connects to the DOD wideband global satellite communications satellites using the Ka-band, with Ku band commercial satellites as an alternate.

2-31. WIN-T systems combine line-of-sight and satellite communications transport for network reliability and multiple routes of transmission. The network backbone prioritizes line-of-sight transport as much as possible to minimize the demand for satellite transmission.

Note. The ESB-E consists of non-WIN-T systems, employing modular communications systems that provide supported units with the same WIN-T capabilities, however, with a significant reduction in size, weight, and power. Both the ESB-E's modular communications systems and WIN-T are components of integrated tactical network architecture when it replaces the current DODIN-A tactical network.

SINGLE SHELTER SWITCH

2-32. The SSS is an echelon above corps vehicle-mounted, communications platform that establishes a large communications node, providing DODIN-A connectivity and extending DISA services from an RHN or tactical hub node to the tactical user. The SSS's backbone connection uses a dedicated frequency division multiple access satellite communications link using either a Phoenix or Secure Mobile Anti-Jam Reliable Tactical-Terminal (SMART-T) for gateway access to the DODIN-A, while simultaneously receiving communications transmissions from its associated CPNs throughout the local area network. It shares satellite bandwidth among its CPNs using the network centric waveform.

2-33. The SSS can rapidly deploy to provide first in capabilities and is the building block for tactical network expansion. A division or brigade G-6 can employ a SSS to establish a tactical NOSC. The SSS provides joint

and coalition interoperability using organic coalition communications equipment, while providing communications officers increased functionality to engineer the unit's portion of the tactical network and overseeing DODIN operations. The SSS uses HCLOS systems as their primary transmission means to connect to line-of-sight systems, to connect to its associated CPNs. The SSS can be employed as a contingency hub node for a local area network, using the Phoenix terminal to attain X band satellite connectivity to a DOD gateway for DODIN-A and DISA services access.

JOINT NETWORK NODE

2-34. The JNN is a vehicle-mounted communications platform that establishes a medium-sized communications node that extends DISA services. It allows nodal management and prioritization of its local area network. The JNN connects to the RHN for gateway access to the DODIN-A for access to DISA services. The JNN's backbone connection to the RHN uses a dedicated frequency division multiple access satellite communications link. It shares bandwidth among its CPNs using network centric waveforms.

2-35. The JNN connects users to a multitude of DISA services, including SIPRNET, NIPRNET, secure and non-secure analog phone service, secret and non-secure Voice over Internet Protocol (VoIP) phone service, and battlefield video teleconferencing. The JNN uses its STT to attain gateway access to the DODIN-A while simultaneously receiving communications transmissions from CPNs in its local area network. The JNN uses the HCLOS system as a primary transport means to attain line-of-sight connectivity with CPNs. The JNN can additionally use a Phoenix satellite communications terminal or SMART-T as alternate satellite communications transport means. The JNN can be employed as a contingency hub node for a local area network, using the Phoenix terminal to attain X band satellite connectivity to a DOD gateway for DODIN-A and DISA services access.

COMMAND POST NODE

2-36. The CPN establishes a small communications node that extends limited DISA services, including SIPRNET, NIPRNET, secret and non-classified VoIP, and video teleconferencing services. The CPN uses its STT to attain connectivity with a JNN, using the network centric waveform, to provide users with DODIN-A connectivity and access to DISA services. The CPN uses the HCLOS system as its primary means to attain line-of-sight connectivity with the JNN or SSS.

COMMERCIAL COALITION EQUIPMENT

2-37. Commercial coalition equipment provides access to commercial or coalition voice, video, and data services. Commercial coalition equipment provides frequency modulation radio bridging and voice cross-banding, enabling radios on different frequencies to cross-connect. The commercial coalition equipment supports static battalion command posts. The commercial coalition equipment accesses the DODIN-A using a physical connection to the SSS, JNN, and CPN.

2-38. Commercial coalition equipment come in small form factor cases for commercial transport. The commercial coalition equipment provides two removable hard drives for immediate declassification and re-use within different security enclaves.

SATELLITE TRANSPORTABLE TERMINAL

2-39. The STT is a trailer-mounted, 2.4-meter Ku and Ka-band satellite communications terminal. It provides beyond line-of-sight network transport for the JNN and CPN. The STT operates at-the-halt only. There are two versions of the STT. The STT V(1) is collocated with a JNN, while the STT V(2) is with a CPN. The STT V(1) uses TDMA, frequency division multiple access, and network centric waveforms, and the STT V(2) uses network centric only. The STT can operate using its onboard generator.

2-40. The CPN uses its STT V(2) to establish satellite connectivity with its associated JNN or SSS using their STT V(1). The transmission path between the CPN's STT V(2) and the JNN or SSSs STT V(1) uses the network centric waveform only. An STT V(1) can establish satellite connectivity with up to three STT V(2)s throughout the local area network using network centric waveform, while simultaneously establishing

a frequency division multiple access transmission link with an RHN or tactical hub node, attaining DODIN-A connectivity and accessing DISA services. This frequency division multiple access path, along with an RHN or tactical hub node in conjunction with the network centric waveform path with the CPNs, allows the JNN or SSS the ability to forward DODIN-A connectivity and access to DISA services to tactical users throughout its local area network. Time division multiple access waveforms with the STT V(1) allows on-the-move WIN-T and other legacy and coalition satellite systems to attain access to the tactical network through the JNN or SSS.

Note. In addition to the STT, the SMART-T and Phoenix systems are additional satellite systems used throughout the tactical network. TROPO systems are another beyond-line-of-sight tactical communications transmission alternative using the troposphere. The Phoenix satellite terminals provide more capabilities and higher data rate transmission capability in comparison to the STT. Both the SMART-T and TROPO systems provide higher data rates and can operate in satellite denied environments (see Chapter 2 for additional information).

HIGH-CAPACITY LINE-OF-SIGHT

2-41. After establishing the tactical network in theater, major WIN-T nodes create a high bandwidth line-of-sight backbone using and HCLOS systems. Distance, terrain, and man-made obstructions are limiting factors when employing line-of-sight transmission systems at-the-halt.

2-42. The HCLOS terminal provides alternate network transport for the JNN and CPNs. The HCLOS radio is a terrestrial microwave radio system capable of up to 16 megabits per second data throughput, depending on the radio band selected. Its maximum range is 40 kilometers, depending on the terrain. There are two types of HCLOS systems. The HCLOS V(3) is collocated with the JNN, while the HCLOS V(2) is with a CPN. The HCLOS terminal provides much greater bandwidth and lower operating costs than the STT but is limited to terrestrial line-of-sight.

Note. The terrestrial transmission line-of-sight (TRILOS), though not a WIN-T asset, is a more robust means of line-of-sight transport for WIN-T, further discussed throughout Chapter 2. TRILOS comes in a significantly reduced size, weight, and power (SWaP) in comparison to the HCLOS, while providing increased bandwidth, range, and with lower latency than satellite communications.

REGIONAL HUB NODE

2-43. The RHN extends DISA services and DOD gateway access to the WIN-T tactical network. The United States Army Network Enterprise Technology Command pre-provisions commercial satellite bandwidth for the RHN to support contingencies. RHNs provide the primary communications connection between deployed forces and home station. Major WIN-T nodes can connect using either military Ka-band or commercial Ku band satellites. The U.S. Army has positioned RHNs in five separate strategic regions around the world: Continental United States East, Continental United States West, Central Command, European Command, and Pacific Command

2-44. The RHN is the gateway routing and transport node for the WIN-T and the transport medium for theater-based network service centers. The RHNs provide network transport and routing capabilities to extend top secret and sensitive compartmented information networks to deployed brigade and above units. The RHNs only provide bandwidth; they do not process the data and are not responsible for DODIN operations oversight. An RHN does not have to be in the same theater of operations as the tactical network, but it is located within the range of a single-hop Ku or Ka-band satellite link. RHNs additionally provide such data services as VoIP call management, routing worldwide defense switched network calling.

Note. RHNs have X band capability to support transportable tactical command communications (T2C2) and Phoenix systems.

2-45. RHNs are globally distributed and collocated with selected DOD gateways. They operate in a sanctuary or outside the combat zone. RHNs' strategic positioning provides global coverage to give Soldiers immediate access to DISA services. Some theater missions may operate in austere environments where communications infrastructure often does not exist. RHNs allow forces to establish DODIN-A connectivity and reachback capabilities quickly, without having to develop network access solutions.

2-46. An RHN permanently connects to a tier 1 network. It extends access to DISA services and provides alternate transport of the top secret and sensitive compartmented information networks from the Trojan Network Control Center to tactical users equipped with MCN-AE or TROJAN Special Purpose Intelligence Remote Integrated Terminal. The RHN transports the data top secret and sensitive compartmented information networks; it does not encrypt or decrypt this data. RHNs provide enclave boundary protection between the tier 1 and tier 2 network, as well as between SIPRNET and NIPRNET. The RHN has frequency division multiple access modems, TDMA modems, network centric waveform modems, colorless core routers, and type-1 encryption devices. The RHN's frequency division multiple access, TDMA, and network centric waveform modems and colorless core routers support WIN-T at-the-halt satellite communications links.

Note. Both United States Army units and deployed Marine Corps use RHNs when conducting operations.

TACTICAL HUB NODE

2-47. Divisions have a mobile version of the RHN. The tactical hub node is the central element of the division's portion of the tactical network. It links deployed JNNs and CPNs via satellite communications transport while providing communication interfaces to other fixed and deployed systems in the tactical network. The tactical hub node can extend DISA services and C2 systems to subordinate BCT, where RHN service is not available. A tactical hub node may augment an RHN.

2-48. The tactical hub node supports the organic WIN-T systems at-the-halt and on-the-move of one division. It merges the TDMA, frequency division multiple access, and network centric satellite waveforms. It provides end-to-end network transport to extend DISA services to the tactical network. The tactical hub node consists of three major subsystems: the baseband shelter, and two satellite communications shelters. The tactical hub node regularly deploys to a DOD Gateway site to extend DISA service. When not located at a DOD Gateway site, the tactical hub node connects to the DOD Gateway using a Phoenix to gain access to DISA services.

Note. The tactical hub node is currently a division-only asset.

Chapter 3
Theater Tactical Signal Brigade

This chapter discusses the roles and responsibilities of a theater tactical signal brigade and the capabilities of its subordinate units. Tactical signal battalions deploy to install, operate, and maintain commercial off-the-shelf and WIN-T at the halt communications systems for theater communications support. The tactical installation and networking-enhanced company deploys personnel to install, repair, and maintain cable networks and power distribution systems in tactical environments and strategic facilities.

SECTION I – THEATER TACTICAL SIGNAL BRIGADE

3-1. This section provides an overview of a TTSB. It discusses TTSB's roles, responsibilities, and considerations for commanders and staff when conducting the operations process to deploy communications support packages for theater communications support. This section specifies the responsibilities of the TTSB operations staff officer (S-3) and associated staff.

OVERVIEW

3-2. A TTSB and its subordinate units provide communications support to meet theater and joint requirements for theater operations. A TTSB provides communications support packages according to the supported unit's mission variables and communications and network specifications identified during the request for forces (RFF) process. A TTSB is structured so that the commander can task organize to design staff, sustainment, and communications support packages to meet a unique task or mission. A TTSB consists of—

- A headquarters and headquarters company.
- Up to four tactical signal battalions composed of ESBs, ESB-Es, or both.
- A tactical installation and networking-enhanced (TIN-E) company.

3-3. A TTSB provides communications support using its tactical signal battalions (ESB or ESB-E), TIN-E company. A TTSB's headquarters assists its assigned and attached subordinate units with the following support—

- Communications oversight.
- Personnel support.
- Administrative support.
- Logistical support.
- Information protection of the TTSB's portion of the tactical network.
- Training management.
- Operational planning.
- DODIN operations.

3-4. Active Army TTSBs are assigned to U.S. Army Forces Command (FORSCOM), except for 1st TTSB (see note). TTSBs and their subordinate units are mission forces and part of FORSCOM's available force pool (see AR 525-93). When FORSCOM receives a request for communications support from the Joint Chiefs of Staff through the RFF process (see Appendix C), FORSCOM forwards orders to one of its TTSBs to provide communications support packages for a geographic combatant commander (GCC), a joint force commander, a JFLCC, or a corps or division conducting theater operations. TTSBs may be under operational control (OPCON) or tactical control (TACON) to a—

- Theater army main or contingency command post.
- JTF headquarters.
- JFLCC.
- Corps, when not assigned as a JTF headquarters or JFLCC and designated a subordinate AO by a JFLCC or ARFOR headquarters.
- Division, when not assigned as a JTF headquarters or JFLCC and designated a subordinate AO by its corps headquarters.

Note. The 1st TTSB is currently the only theater organic TTSB assigned to U.S. Army Network Enterprise Technology Command. The 1st TTSB provides communications support to United States Forces Korea and 8th Army in the Korean theater of operations. The 1st TTSB is not part of FORSCOM's available force pool.

Note. The 35th TTSB and 11th TTSB are the only two TTSBs under OPCON to corps. The 35th TTSB is under OPCON to XVIII Airborne Corps. The 11th TTSB is under OPCON to 3rd Corps.

Note. National Guard and U.S. Reserve TTSBs and subordinate ESBs are assigned to their states. They are OPCON to FORSCOM once mobilized.

THEATER TACTICAL SIGNAL BRIGADE'S ROLES AND RESPONSIBILITIES

3-5. The TTSB conducts C2 for up to four tactical signal battalions and other assigned or attached units to meet communications requirements in a theater of operations. Additionally, the TTSB—

- Attains an understanding of the situation and mission, develops courses of action, and produces an operation order (OPORD) or operation plan (OPLAN) for subordinate tactical battalions and TIN-using the military decision-making process.
- Conducts systems planning, transport, and infrastructure engineering for immediate communications connectivity and future tactical network expansion and upgrades.
- Develops architecture, design, and integration studies.
- Determines technical circuit characteristics.
- Develops plans for designing communications systems.
- Provides field support and sustainment to assigned and attached subordinate units.
- Develops a continuity of reconstitution plans.
- Provides communications coordinating staff elements for deployed subordinate organizations.
- Develops communications input to its higher headquarters conceptual planning, OPORD, and OPLAN.
- Manages frequency and communications security requests and associated records for assigned tactical battalions.
- Provides a span of control for echelons above corps' portion of the tactical network in a joint operations area.
- Provides passive and value-added services to Army Forces within the joint operations area, including common user services and continuity of operations facilities.
- Oversees connection to the DODIN for supported Army and unified action partners.

OPERATIONS STAFF

3-6. The S-3 consists of a signal plans branch, a signal engineering branch, a signal control branch, and a command, control, and communications branch. The S-3 is responsible for—

- Developing and publishing OPORDs and OPLANs to subordinate units.

- Coordinating with other staff for administrative, logistical, and maintenance support.
- Providing mission command for all subordinate assigned and attached units.
- Conducting spectrum management operations and cyberspace security within the TTSB's AO (see ATP 6-02.70 for spectrum management operations).
- Overseeing the integration of the brigade's communications systems into a theater tactical network, while identifying and resolving compatibility issues with established communications systems that are already in theater.
- In conjunction with the S-2, developing the cyberspace common operational picture of the supported theater tactical network for the commander and subordinate units.
- If required, establishing a tactical NOSC for conducting DODIN operations for the TTSB's portion of the tactical network.
- Directing and managing the TTSB's portion of the tactical network to ensure network and information systems availability and delivery.
- Conducting continuous network optimization for the theater tactical network in response to continually changing network configurations and unit movement.
- Establishing and maintaining the required databases necessary to assist in near real-time control of TTSB's communications systems.
- Providing cybersecurity guidelines to subordinate units for patches, updates, and scans.
- Employing a contingency hub to support subordinate or attached units.

USE OF THE OPERATIONS PROCESS TO PLAN SIGNAL SUPPORT IN THEATER

3-7. Major C2 activities conducted during the operations process are—planning, preparing, executing, and continuously assessing. Upon receiving an OPORD or OPLAN from higher headquarters, the brigade commander organizes and initiates C2 using the operations process. In a TTSB, the brigade commander, with assistance from staff and subordinate commanders, conducts the operations process to ensure successful deployment of communications assets identified to provide theater communications support. In theater, the supported unit includes the communications assets in its operations process for planning theater operations. For detailed information on the operations process, refer to ADP 5-0.

PLANNING

3-8. Conducting planning activities allows the brigade commander and staff the ability to develop an in-depth understanding of the mission in conjunction with the operational and mission variables as described by the OPORD or OPLAN received from higher headquarters. Effective planning helps leaders understand the land domain throughout the theater AO that communications assets provide theater communications support. Leaders attain an understanding of the information environment within the theater AO to identify cyberspace challenges throughout the operational environment.

3-9. Leaders can then develop solutions to solve or manage those problems by designing a communications support package with continuous and reliable capabilities that meet the requesting unit's communications requirements. A communications support package could be one small network team providing communications support to a small command post for a contingency mission, up to an entire TTSB, including all assigned communications equipment and personnel, for a large-scale combat operation.

3-10. Understanding the mission and developing solutions to mitigate problems enhances the brigade commander's and staff's ability to task-organize the TTSB while establishing support priorities to ensure the communications support package has the necessary resources to accomplish the theater communications support mission. When task organizing, the brigade commander and the S-3 designates which tactical battalion is to provide the communications support package.

3-11. The battalion commander of the designated tactical battalion and staff design the communications support package with equipment and personnel necessary to meet the supported unit's unique theater mission.

Designing a communications support package may require allocating communications assets from other tactical battalions within the TTSB to the communications support package to ensure mission readiness.

3-12. The TTSB establishes command and support relationships with the supported unit in the theater to define command responsibility and authority. Typically, the deploying communications support package is under TACON of the supported unit once in theater; however, the establishment of a command relationship specifies the chain of command and ensures unity of effort, enabling the commander of the supported unit the flexibility to maximize the use of the communications support package to accomplish the mission. This flexibility may require the requesting unit to have full OPCON of the communications support package. The establishment of the support relationship specifies how the communications support package receives sustainment and protection while in the theater. If a single communications support package is deploying, the brigade commander focuses priority of support on that single communications support package; however, if more than one communications support package is deploying, the brigade commander shifts priorities according to the relativeness of importance. The brigade commander directs, coordinates, and synchronizes all aspects of planning through orders and plans developed using the military decision-making process.

PREPARING

3-13. The company commander of the communications support package conducts troop-leading procedures as preparation measures for mission readiness of Soldiers and equipment. Incorporating preparation measures ensures the unit is proficient at executing the upcoming theater communications support mission. The Tactical Regional Cyber Center Integration Program (TRIP) plays a vital role in preparing the communications support package's for deployment (see Appendix B) and consists of five stages—

- Preparation.
- Installation as a Docking Station (IaaDS)
- Home station training.
- Combat training center.
- Deployment.

3-14. Preparation measures improve the chances of success. These measures include back briefs, rehearsals, and inspections.

Note. Army National Guard and Army Reserve TTSBs and associated ESBs do not use TRIP for operational readiness and deployment preparation. See AR 140-145 for information regarding preparing the Army National Guard and Army Reserve units for mobilization.

BACK BRIEFS

3-15. Using back briefs, the company commander can update the battalion commander and staff with training, maintenance, and logistical statuses of the communications support package, while requesting support and resources as needed. Back briefs allow the opportunity for the battalion commander and staff to provide mission updates to the company commander while maintaining a shared understanding of the situation and requirements.

REHEARSALS

3-16. The brigade commander, subordinate commanders, and staff members ensure the deploying communications support package conducts rehearsals using IaaDS, home station training, and combat training centers during preparation. Rehearsals should simulate the operational environment that the communications support package may encounter when providing theater communications support, as best understood from higher headquarters' OPORD or OPLAN. Rehearsals include engineering the communications support package's portion of the tactical network, as described in the higher headquarters OPORD or OPLAN. During rehearsals, the communications support package reacts to various scenarios consistent with communications-related challenges that may occur during the theater mission. Rehearsals

facilitate the communications support package, staff, and Soldiers with gaining a better understanding of their roles in the upcoming communications mission, training on complicated tasks, and ensuring communications equipment is functioning properly.

3-17. The company commander and subordinate leaders conduct inspections to identify and resolve problems as quickly as possible. In addition to rehearsals, inspections further enable the commander to identify personnel, maintenance, and logistical issues that must be resolved before deployment execution.

EXECUTION AND ASSESSMENT

3-18. Conducting planning and preparation activities result in effective deployment execution. Deployment is the final stage of TRIP. Commanders, staff, and subordinate leaders from the TTSB headquarters, down to the deploying communications support package, execute the deployment plan using situational understanding to assess progress while adjusting deployment operations as the situation changes. Assessments occur throughout the entire operations process with the commanders, staff, and subordinate leaders monitoring the situation and evaluating the progress of the deployment operations. Execution and assessment of the deployment operations end once the requested unit establishes OPCON or TACON of the communications support package.

SECTION II – EXPEDITIONARY SIGNAL BATTALION

3-19. This section provides an overview of an ESB. It discusses the capabilities of an ESB and the roles and responsibilities of an ESB's headquarters S-3 staff. This chapter describes the expeditionary signal company, the joint/area signal company, and their capabilities by organizational structure.

OVERVIEW

3-20. An ESB provides upper tier communications support for theater operations to establish the tactical network. An ESB contains all switching personnel, transmission systems, network management systems, and C2 systems necessary to create a complete communications node. An ESB's design simplifies the overall control of communications assets. As a scalable element, it eliminates the need to task organize from multiple organizations to form a single communications support package, thereby enhancing unit cohesion and deployment planning. Each ESB allows reachback to the home station while providing interconnectivity between intra-theater nodes using network service centers.

3-21. An ESB may be under OPCON or TACON to a division or higher when conducting theater operations. An ESB can operate as part of a separate communications support package supporting specific missions such as homeland defense. ESBs deploy to provide communications support to units and organizations that do not have organic communications assets or require additional augmentation to meet mission requirements. Units and organizations that do not have organic communications assets and require communications support from an ESB include—

- Theater army main or contingency command posts.
- JTF headquarters.
- JFLCC.
- A forward-deployed signal command (theater) [SC(T)].
- A security force assistance brigade (SFAB).
- A functional support brigade or group.
- Some multifunctional support brigades: military intelligence brigade and some maneuver enhancement brigades.

3-22. Units and organizations that have organic communications assets, but may require an ESB to provide additional communications support for augmentation include—

- Corps headquarters.
- Division headquarters.
- Global response forces.
- Brigade combat team (BCT).

- Some multifunctional support brigades: combat aviation brigades, most maneuver enhancement brigades, field artillery brigades, and sustainment brigades.

3-23. An ESB can support up to 30 command posts—two large command posts, four medium command posts, and 24 small command posts—simultaneously. An ESB consists of—

- A headquarters and headquarters company.
- Two expeditionary signal companies.
- A joint/area signal company.

Note. See Appendix A for an ESB's communications equipment allocation tables. Modifications to the ESB's current table of organization and equipment (TOE) will be necessary to meet future MDO communications requirements.

EXPEDITIONARY SIGNAL BATTALION CAPABILITIES

3-24. An ESB and its subordinate units provide supported units with DODIN connectivity and conduct DODIN operations oversight of its subordinate units. An ESB has the capabilities to—

- Provide DODIN-A connectivity to units conducting missions in a theater, joint, or multinational (coalition, combined, or coalition and combined) AO by establishing the tactical network.
- Provide a modernization path to incorporate new systems, updates, and changes.
- Provide access to DISA services for a maximum of 30 command posts across various ranges of theater, joint, and multinational operations.
- Rapidly deploy worldwide to plan, engineer, install, operate, maintain, and defend the tactical network.
- Conduct DODIN operations for subordinate units throughout a designated AO.
- Provide pooled communications support to augment corps, divisions, BCTs, and support brigades (functional and multifunctional) during theater, joint, and multinational operations.
- Integrate tactical, commercial, and coalition networks.

3-25. When deployed, an ESB is under OPCON or TACON to the supported unit unless a different command relationship has been determined to allow more flexibility. Expeditionary signal companies and the joint/area signal company both provide personnel and communications assets necessary to establish DODIN connectivity for supported units that require DISA services. The expeditionary signal companies provide communications support for small to medium command posts located at battalions and brigades. The joint/area signal company provides more substantial switch data capabilities, and more robust transmission capabilities to support base clusters and large command posts, with limited communications support for small command posts.

3-26. The headquarters staff sections support the commander with executing the battalion's communications support mission. The headquarters staff sections are responsible for—

- Attaining an understanding of the situation and mission, developing courses of action, and producing an OPORD or OPLAN for subordinate companies using the military decision-making process.
- Planning and installation oversight during the engineering of an ESB's portion of the tactical network, establishing DODIN-A connectivity.
- Conducting DODIN operations within an ESB's AO.
- Providing administrative support to assigned or attached subordinate units.
- Providing logistical support to assigned or attached subordinate units.
- Planning and oversight of force protection within an ESB's AO.
- Oversight and support for field-level maintenance of organic and attached units' wheeled vehicles, power generation equipment, communications and electronics (C&E) equipment, and weapons.

3-27. The headquarters company provides personnel to perform the duties in the headquarters staff sections. The headquarters company provides food services in a field environment. An ESB headquarters and each

signal company contains an operations section scalable and capable of providing support as tactical NOSC for supported units or providing augmentation to established signal organizations based on mission variables. This role expands when providing tactical network connectivity to multiple collocated units without organic communications capabilities or for units that require augmentation due to geographical separation.

3-28. An ESB's scalability affords network planners at the supported unit's G-6/S-6 flexibility while configuring the tactical network by providing communications resources that meet the supported unit's requirements without underusing resources. An ESB and its signal companies, platoons, and teams are tailorable, and task organized so that only the capabilities needed to satisfy a specific mission deploys.

3-29. An ESB and its subordinate units can provide communications support to units anywhere in a theater AO. Communications support missions may require a full battalion, a company, or a platoon; however, missions may require the deployment of individual teams to support separate units in widely dispersed locations at every echelon of an operation. Mission orders flow down from the Joint Chiefs of Staff to the Army G-3/5/7 in coordination with the Army chief information officer G-6 through FORSCOM and arrive at the ESB through the TTSB headquarters (see Appendix C).

Note. Three ESBs are theater committed assets and not part of FORSCOM's available force pool. The 44th ESB belongs to 2nd Theater Strategic Signal Brigade; the 307th ESB belongs to 516th Theater Strategic Signal Brigade, and the 304th ESB belongs to 160th TTSB. These ESBs provide tactical communications support within their assigned theater's area of responsibility only. Mission orders flow down from the GCC, through the theater army headquarters, to the signal command (theater), and arrives at the ESB through the assigned theater strategic signal brigade or TTSB.

3-30. While primarily an echelon above corps asset, an ESB can support corps, division, brigade combat team, or multinational headquarters based on mission variables. ESBs assigned to a TTSB can be OPCON or TACON to higher-level organizations or operate as part of a separate network package supporting specific missions such as a global response force or homeland defense.

3-31. C&E maintenance support for an ESB resides at the company and battalion level. Companies, platoons, sections, and teams that deploy separately receive C&E maintenance support from the supported unit (see Appendix D).

EXPEDITIONARY SIGNAL BATTALION S-3 SIGNAL SECTION

3-32. The S-3 oversees DODIN operations for the ESB. The S-3 is responsible for—

- Planning the ESB's communications network using redundant means of transport to meet the commander's intent.
- Developing a primary, alternate, contingency, and emergency plan to mitigate the impact of degraded networks.
- Overseeing cyberspace security throughout the ESB's AO.
- Directing the actions and movements of the ESB's communications assets through the orders process.
- Assisting the TTSB's S-3 and supported unit's S-6 with defining communications and network requirements during the military decision-making process.
- Identifying and validating support requirements for the ESB's communications assets and coordinate support through the supported unit's G-6.
- Consulting with higher, lower, and adjacent headquarters to ensure effective communications throughout the ESB's AO.
- Developing courses of actions and a draft scheme of communications support to determine the best employment of communications support from information gained during mission analysis.

- Assisting the supported unit's G-6 and the TTSB's S-3 with conducting a signal site analysis with a focus on mobility, survivability, and sustainability.
- Understanding the operating characteristics, limitations, and the planning distance for each communications asset assigned to the ESB.

EXPEDITIONARY SIGNAL COMPANY

3-33. An expeditionary signal company provides network services to small and medium command posts. Medium command post locations include—division main G-6 and NOSC; forward-deployed SC(T); functional support brigades; multifunctional support brigades; brigade combat team, command posts; and maneuver enhancement brigades. Small command posts are battalion level assets.

Note. Only two expeditionary signal companies in an ESB can integrate into a coalition network using the commercial coalition equipment.

Note. Modification to the expeditionary signal company's current TOE is probable to meet future MDO communications requirements.

EXPEDITIONARY SIGNAL COMPANY CAPABILITIES

3-34. An expeditionary signal company can provide communications support to two medium command posts and ten small command posts simultaneously. Each network node can provide users with DODIN-A connectivity and DISA services, transported using satellite or HCLOS transmission systems.

3-35. An expeditionary signal company consists of—

- A company headquarters.
- Two expeditionary signal platoons.

COMPANY HEADQUARTERS

3-36. The company headquarters consist of personnel responsible for coordination and oversight of company DODIN operations while providing administrative, logistical, and field-level maintenance support to its signal platoons. Upon receiving OPORDs and OPLANs from the battalion, the company commander directs, coordinates, and synchronizes all aspects of training by issuing company WARNORDs and OPORDs. Troop leading procedures include rehearsals that allow the company commander and operations cell the ability to analyze, plan, and prepare the communications support package for mission readiness. The company commander organizes tasks to ensure the communications support package has the capabilities and resources necessary to accomplish the assigned theater communications support mission.

3-37. When the company deploys as a single communications support package, the company headquarters can conduct organic maintenance operations but may require additional sustainment support from the supported unit. Commanders at all levels identify necessary sustainment requirements during the operations process.

EXPEDITIONARY SIGNAL PLATOON

3-38. The expeditionary signal platoon consists of—

- A medium network team.
- Two line-of-sight V(3) teams.
- Five small network teams.
- A tactical satellite team.
- A cable team.

3-39. The platoon installs, operates, and maintains communications systems to support small to medium command posts. The platoon can dispatch individual teams to support separate missions or combine with other teams, platoons, or companies to meet mission requirements at any echelon.

Medium Network Team

3-40. A medium network team installs, operates, and maintains a JNN. The JNN allows tactical network connectivity for a medium command post consisting of a minimum of 200 end users. Users attain access to the DISA services necessary for conducting C2 and DODIN operations throughout the AO with reachback to the home station.

3-41. An expeditionary signal company headquarters collocates with a supported medium command post and retains one of its medium network teams to gain access to the tactical network for its company DODIN operations cell while providing DISA services to users. The expeditionary signal company's second medium network team deploys to provide access to the tactical network and DISA services to a brigade or higher echelon. A JNN establishes a network communications node to support a medium command post.

3-42. JNN capabilities include—

- SIPRNET and NIPRNET voice, data, video teleconferencing, and private branch exchange capability.
- STT V(1) can use either time-division multiple access, frequency-division multiple access, network-centric waveform, or all three waveforms simultaneously to connect to the RHN or a DOD gateway through a tactical hub node using either military Ka or commercial Ku bands.
- Capability to interface to legacy line-of-sight, HCLOS, and TROPO systems; SMART-T; legacy satellite systems; and commercial satellite communications.
- Capability to provide an interface to the standard tactical entry point or teleport; access to defense switch network, SIPRNET, NIPRNET, joint worldwide intelligence communications system, and combined enterprise regional information exchange system.
- Enclave boundary protection.

3-43. The JNN uses satellite communications and HCLOS systems as its means of network transport. Satellite transport is accomplished using its STT V(1) that is part of the JNN's inventory. The satellite transmission link between the JNN and the RHN is the backbone connection. The backbone connection is the frequency division multiple access links that allows connectivity to the DODIN-A and access to DISA services for the JNN and all associated CPNs in the local area network. When a CPN is in austere environments or at a distance beyond the limits of the HCLOS, employment of the STT is necessary to establish connectivity between the JNN and CPN. The STT V(1) uses frequency division multiple access, TDMA, and network centric waveform, either individually or simultaneously. Use of the frequency division multiple access waveforms is for the backbone; network centric waveforms are for linking to the CPNs, and TDMA is used for communications systems that may be in the network incapable of transmitting or receiving data using frequency division multiple access and network centric waveforms.

3-44. The line-of-sight V(3) teams provide HCLOS, the primary transport means for connectivity between the JNN system and its associated CPNs (see the line-of-sight V3 team section for the HCLOS V(3) capabilities).

Line-of-sight V(3) Team

3-45. A line-of-sight V(3) team is responsible for installing, operating, maintaining, and performing operator level maintenance of an HCLOS V(3). The HCLOS V(3) is the primary means of data transport between the JNN and its associated CPNs, using terrestrial microwave radio systems capable of up to 16 megabits of data per second throughput. The HCLOS V(3) allows higher bandwidth than the STT, however, for only a short distance. When a CPN is in austere environments or at a distance beyond the limits of the HCLOS, the employment of the STT establishes connectivity between the Join Network Node and CPN. The maximum distance of the HCLOS V(3) is 40 kilometers.

3-46. CPNs that have established small communications nodes throughout the AO use HCLOS V(1)s to create a transport link with the HCLOS V(3) collocated with the JNN. An HCLOS V(3) may be used to

establish a transport link radio link to the HCLOS V(3) collocated with an SSS. The HCLOS V(3) is capable of handling three separate line-of-sight transmissions that are multiplexed and forwarded to the JNN over one media source—employing the HCLOS V(3) to handle short communications transport results in less use of satellite bandwidth while allowing dynamic routing.

Note. ESBs assigned to the 35th TTSB has replaced all HCLOS systems with TRILOS systems. The TRILOS V(1) has replaced the HCLOS V(3) and the TRILOS V(2) has replaced the HCLOS V(1). See paragraph 3-91 for information on the TRILOS systems.

Small Network Team

3-47. The small network team is responsible for the installation, operation, and operator level maintenance of a CPN, each accompanied with an STT V(2) as part of its inventory. A small network team has an HCLOS V(1) system. The CPN extends the tactical network established by the JNN and provides access to DISA services to small command posts with a maximum of 20 users. A CPN provides users with enclave boundary protection.

3-48. The CPN uses STT V(2) communications and HCLOS V(1) systems as means of communications transport to the JNN in the local area network. The STT V(2) establishes the alternate satellite link between the CPN and its associated JNN using the network centric waveform. The STT V(2) uses either military Ka or commercial Ku bands.

3-49. HCLOS V(1) provides a terrestrial microwave line-of-sight capability as the primary communications transport means between the CPN and the JNN. Each HCLOS V(1) can transmit and receive one line-of-sight communications link with a maximum range of 40 kilometers. Employing the HCLOS V(1) to handle short-range communications results in less use of satellite bandwidth while allowing dynamic routing.

Note. ESBs assigned to the 35th TTSB has replaced all HCLOS systems with TRILOS systems. The TRILOS V(1) has replaced the HCLOS V(3) and the TRILOS V(2) has replaced the HCLOS V(1). See paragraph 3-91 for information on the TRILOS systems.

Tactical Satellite Team

3-50. The tactical satellite team is responsible for the installation, operation, and operator level maintenance of the Phoenix terminal. The Phoenix terminal provides high capacity; inter-theater and intra-theater range extension for C2 information, including logistical, operational, intelligence, and administrative data. The Phoenix terminal is an echelon above corps asset and provides satellite communications support to units or organizations that require the ability to transmit and receive large amounts of data.

3-51. The Phoenix terminal provides added bandwidth, reception capability, and more frequency bands than an STT. The Phoenix terminal operates at military X and Ka frequency bands and commercial C and Ku frequency bands using frequency-division multiple access waveform only. The X frequency band allows the Phoenix to transmit directly to a DOD gateway, to attain user access to DISA services without the use of an RHN. The Phoenix is capable of transmitting data at 50 gigahertz per second and can transmit one satellite link while receiving up to four satellite links simultaneously. This capability is essential when collocated with a THN with multiple frequency division multiple access links from JNNs and tactical command nodes in a division's local area network, for transmission to a DOD gateway. This capability is essential when requiring large amounts of information and data from multiple locations. The Phoenix can transport information and data from such systems as the TROJAN Special Purpose Intelligence Remote Integrated Terminal or MCN-AE used to transport top secret/sensitive compartmented information. The Phoenix can transport logistical data by such systems as the Global Combat Support System-Army.

Cable Section

3-52. The cable section is responsible for engineering cable runs of all fiber optic and coaxial cables used for network cabling of the JNNs, CPNs, STTs, and the Phoenix. Personnel from the cable section deploy to

locations to engineer aerial cable runs, buried cable runs, and cable runs through manholes and hand-holes. Cable sections create, install, and repair category 5 cable runs in DODIN operations cells and CPs for VoIP phones, computers, peripherals, and video teleconferencing.

JOINT/AREA SIGNAL COMPANY

3-53. The joint/area signal company provides DISA services to small and large CPs and command post clusters. A joint/area signal company has a much more robust communications network expansion and transmission capability than an expeditionary signal company. A joint/area signal company consists of a company headquarters and two heavy signal platoons.

Note. Modification to the joint/area signal company's current TOE will be necessary to meet future MDO communications requirements.

JOINT/AREA SIGNAL COMPANY CAPABILITIES

3-54. The joint/area signal company establishes large network communications to provide DODIN-A connectivity and access to DISA services to large command posts and command post clusters conducting Army and joint missions in theater. The joint/area signal company primarily supports large headquarters command posts, such as a theater army, a JTF, or a JFLCC. The joint/area signal company has communications assets capable of providing DODIN-A connectivity and access to limited DISA services for small command posts.

COMPANY HEADQUARTERS

3-55. The company headquarters consists of personnel responsible for coordination and oversight of company DODIN operations while providing administrative, logistical, and field-level maintenance support to assigned signal platoons. Upon receiving OPORDs and OPLANs from the battalion, the company commander directs, coordinates, and synchronizes all aspects of training by issuing company warning orders and OPORDs. Troop leading procedures include rehearsals that allow the company commander and operations cell the ability to analyze, plan, and prepare the communications support package for mission readiness. The company commander may be required to task organize within the company to ensure the communications support package has the capabilities and resources necessary to accomplish the theater communications support mission.

3-56. When the company deploys as a complete communications support package, the company headquarters can conduct internal maintenance operations, requiring additional logistical support from higher as required. Commanders identify internal sustainment operations requirements during the operations process.

HEAVY SIGNAL PLATOON

3-57. Consists of one large network team, one line-of-sight V(3) team, two CPN teams, two line-of-sight V(1) teams, two light TROPO terminal teams, one tactical satellite team, a SMART-T team, and a cable section with two cable teams. With its larger switch terminals and additional beyond line-of-sight transmission capabilities, the platoon is suited to support large CPs, command post clusters, or support bases. The platoon can support battalion- and brigade-level CPs and can dispatch individual teams to separate support missions or to augment other teams, platoons, or companies to meet specific mission requirements.

Large Network Team

3-58. The large network team is responsible for the installation, operation, and operator level maintenance of the SSS. The SSS is collocated with the ESB headquarters and Headquarters Company at a large command post consisting of a minimum of 500 end users, and functions as the primary communications node for the ESB's portion of the tactical network. The G-6/S-6 or TTSB S-3 can use a SSS to establish a NOSC, as well

as plan and engineer the local area network. A SSS deploys to establish a network communications node for a large command post or command post cluster.

3-59. The SSS capabilities include—

- Rapid deployment ability with a small footprint.
- First in capability and a building block for network expansion.
- S-6 communications functionality in a single shelter, not offered in a JNN.
- Joint and coalition communications interoperability.
- SIPRNET and NIPRNET voice, data, video teleconferencing, and private branch exchange capability.
- Ability to interface to a legacy line-of-sight, HCLOS, and TROPO systems, SMART-T, legacy satellite systems, and commercial satellite communications.
- Provision to interface with standardized tactical entry point or teleport, access to defense switch network, joint worldwide intelligence communications system, and combined enterprise regional information exchange system.
- Enclave boundary protection.

3-60. The large network team uses its assigned Phoenix or SMART-T satellite systems for connectivity to the DODIN-A and to provide users with access to DISA services. Determination on which satellite system to employ depends on mission requirements.

Line-of-sight V(3) Team

3-61. A line-of-sight V(3) team is responsible for installing, operating, maintaining, and performing operator level maintenance of an HCLOS V(3). The HCLOS V(3) is the primary means of data transport between the SSS and its associated CPNs, using terrestrial microwave radio systems capable of up to 16 megabits of data per second throughput. The HCLOS V(3) allows greater bandwidth than the STT, however, for only a short distance. The maximum distance of the HCLOS V(3) is 40 kilometers.

3-62. CPNs that have established small communications nodes throughout the AO uses HCLOS V(1)s to create a transport link with the HCLOS V(3) collocated with the JNN. A HCLOS V(3) may be used to establish a transport radio link to the HCLOS V(3) collocated with a sSSS. The HCLOS V(3) can handle up to three separate line-of-sight transmissions multiplexed and forwarded to the JNN over one media source. Employing the HCLOS V(3) to handle short communications transport results in less use of satellite bandwidth while allowing dynamic routing.

Note. ESBs assigned to the 35th TTSB has replaced all HCLOS systems with TRILOS systems. The TRILOS V(1) has replaced the HCLOS V(3) and the TRILOS V(2) has replaced the HCLOS V(1). See paragraph 3-91 for information on the TRILOS systems.

Small Network Team

3-63. The small network team is responsible for the installation, operation, and operator level maintenance of a CPN, each accompanied with an STT V(2) as part of its inventory. A small network team has a HCLOS V(1) system. The CPN extends the tactical network established by the SSS and provides access to DISA services to small command posts with a maximum of 20 users. A CPN provides users with enclave boundary protection.

3-64. The CPN uses STT V(2) communications and HCLOS V(1) systems as means of communications transport to its associated SSS in the local area network. The STT V(2) establishes the alternate satellite link between the CPN and its associated SSS using the network centric waveform. The STT V(2) uses either military Ka or commercial Ku bands.

3-65. An HCLOS V(1) provides a terrestrial microwave line-of-sight capability as the primary communications transport means between the CPN and the SSS. Each HCLOS V(1) can transmit and receive one line-of-sight communications link with a maximum range of 40 kilometers. Employing the HCLOS V(1)

to handle short-range communications results in less usage of satellite bandwidth while allowing dynamic routing.

Note. ESBs assigned to the 35th TTSB has replaced all HCLOS systems with TRILOS systems. The TRILOS V(1) has replaced the HCLOS V(3) and the TRILOS V(2) has replaced the HCLOS V(1). See paragraph 3-91 for information on the TRILOS systems.

Light Tropospheric Scatter Team

3-66. The light TROPO team is responsible for the installation, operation, and operator level maintenance of a TROPO transmission system. These systems provide beyond line-of-sight communications transport and reduce satellite communications demands by offering an alternative long-haul communications transmission method. TROPO transmission systems offer greater distance and bandwidth than the HCLOS systems and allow beyond line-of-sight communications transmission in a satellite denied environment.

T*a*ctical Satellite Team

3-67. The tactical satellite team is responsible for the installation, operation, and operator level maintenance of the Phoenix terminal. The Phoenix terminal provides high capacity, inter-theater, and intra-theater range extension for such C2 information as logistical, operational, intelligence, and administrative data.

3-68. The Phoenix terminal provides added bandwidth, reception capability, and more frequency bands than an STT. The Phoenix terminal operates at military X and Ka frequency bands and commercial C and Ku frequency bands using frequency-division multiple access waveform only. The Phoenix is capable of transmitting data at 50 gigahertz per second and can transmit one satellite link while receiving up to four satellite links simultaneously. These capabilities are important when requiring large amounts of information and data from multiple locations. The Phoenix can transport information and data from such systems as the Trojan Special Purpose Intelligence Remote Integrated Terminal or modular communication node-advanced enclave used to transport top secret/sensitive compartmented information. The Phoenix can transport logistical data using such systems as the Global Combat Support System-Army.

Secure, Mobile, Anti-jam, Reliable, Tactical Terminal Team

3-69. The SMART-T team is responsible for the installation, operation, and operator-level maintenance of a SMART-T. The SMART-T is a protected satellite transmission system. It enables commanders at brigade and higher the ability to operate in an electronic warfare threat environment including radio frequency jamming, signal detection, and geographic location threats. The SMART-T can survive the effects of a high-altitude electromagnetic pulse produced by nuclear detonations and is operable in a biological and chemical environment.

3-70. The SMART-T makes it possible for units to transmit communications beyond line-of-sight that cannot be jammed, detected or intercepted, enabling commanders to send critical text, data, voice, and video communications beyond their AO securely. SMART-T capabilities include—

- Interoperability with advanced, extremely high frequency satellites.
- The capability to provide low and medium data rates or extreme data rates for voice and data transmission.
- Interoperability with Military Strategic and Tactical Relay, extremely high frequency Military Strategic and Tactical Relay Standard 1582D, and Military Strategic and Tactical Relay Standard 188-136 compatible payloads.
- The capability to provide anti-jam and anti-scintillation communications.

Cable Section

3-71. The cable section is responsible for engineering cable runs of all fiber optic and coaxial cables used for network cabling of the SSS, CPNs, STTs, and the Phoenix. Personnel from the cable section employ to locations throughout the AO to engineer aerial cable runs, buried cable runs, and cable runs through manholes

and hand-holes. Cable sections create and install category 5 cable runs in DODIN operations cells and CPs for VoIP phones, computers, peripherals, and video teleconferences.

SECTION III – Expeditionary Signal Battalion-Enhanced

3-72. This section provides an overview of an ESB-E. It identifies the capabilities of an ESB-E and the roles and responsibilities of the S-3 staff. This section describes the expeditionary signal company-enhanced (ESC-E), including its capabilities by organizational structure.

OVERVIEW

3-73. The ESB-E provides rapidly deployable, enroute, and forcible entry communications support to FORSCOM units and the Army's global response force. The ESB-E is an enabler for C2 and mission command, allowing DODIN communications across air, land, and cyberspace domains. The ESB-E is a modular, expeditionary battalion that provides commanders, across all echelons, a full range of DISA services through a scalable, integrated internet protocol network architecture in a SWaP package. It provides DODIN-A connectivity, allowing the capability to conduct C2 and mission command from a remotely located company command post up to a JTF headquarters using scalable communications support teams.

3-74. An ESB-E has much more flexibility than an ESB because of its force structure consisting of four Soldier teams that can—be scaled to support a small command post of ten users or less with one team, by merging to support a large command post by combining four teams.

3-75. The ESB-E consists of—

- A battalion headquarters and headquarters company.
- Three identical expeditionary signal companies-enhanced.

3-76. The ESB-E structure provides scalable communications assets that enhance ESB capabilities by having a force structure that can support smaller units such as a maneuver company command post. The ESB-E can execute missions across the range of military operations and supports the joint fight and the expeditionary Army.

Note. The 50th ESB-E additionally has one en route communications company. See section IV of this publication for more information.

Note. Modification to the ESB-E's current TOE will be necessary to meet future MDO communications requirements.

EXPEDITIONARY SIGNAL BATTALION-ENHANCED CAPABILITIES

3-77. The ESB-E maintains the capability of the ESB mission by providing connectivity to the tactical network and access to DISA services for theater armies, corps, and division-level units. The ESB-E has the scalability to support small command posts, down to the maneuver company level, without misusing resources.

3-78. An ESB-E—

- Can provide communications support to 12 small command posts that can support up to six users. Communications support is provided using a small modular communications system (four total per company) and a sub-one-meter baseband kit as satellite transport. Two personnel from one of the network support teams deploys with a small modular communications system. This configuration is typically for early entry operations.
- Can provide communications support to 48 medium command posts that can support up to 96 users. Communications support is provided using a medium modular communications system (16 total per company) and a 1.3-meter baseband kit for satellite transport.

- Can provide communication support to six large command posts that can support up to 350 users. Communications support provided by combining two medium modular communications systems and either a 2.4-meter baseband kit, SMART-T, or Phoenix-E for satellite transport.

3-79. The amount of network support teams available for communications missions is contingent on the size of command posts that require communications support at a given time. For example, if an ESB-E is supporting 48 command posts simultaneously, it is not capable of providing support for additional small or large command posts. However, if an ESB-E provides support two small command posts (requires personnel from one of the network support teams) and one large command posts (requires personnel and medium modular communications systems from two network support teams) simultaneously, only 45 network support teams will remain for follow-on missions.

EXPEDITIONARY SIGNAL BATTALION-ENHANCED HEADQUARTERS AND HEADQUARTERS COMPANY

3-80. The headquarters company provides personnel and facilities to the battalion staff sections. The headquarters provide—

- Coordination and oversight of DODIN operations.
- Administrative support.
- Supply support.
- Planning, coordination, and implementation of force protection.
- Field-level maintenance support of wheeled vehicles, power generation equipment, C&E equipment, and weapons.

3-81. The headquarters company has a small network team that provides access to DISA services and DODIN connectivity for the battalion headquarters. The small network team includes additional network transport capabilities to support the expansion of critical mission nodes.

EXPEDITIONARY SIGNAL BATTALION-ENHANCED S-3

3-82. The S-3 plans, coordinates, and provides staff supervision of all battalion DODIN operations, intelligence, and security matters. All elements of the S-3 section can deploy as a complete section or as smaller elements to assist supported units. The S-3 section can provide direct support to a corps or division G-6, to include the establishment and operation of a NOSC. With augmentation, the section can establish a joint network operations control center for a JTF headquarters. The S-3 section—

- Performs all required DODIN operations functions and spectrum management operations for the ESB-E (see ATP 6-02.71 for DODIN operations and ATP 6-02.70 for spectrum management operations).
- Plans and engineers supported unit connections to the theater network, in coordination with the supported unit's G-6/S-6.
- Coordinates with spectrum management agencies.
- Manages frequencies allocated to the battalion for use by its operating elements.
- Resolves and reports interference problems and related spectrum issues.
- Tasks subordinate companies to fill mission requirements.
- Develops and oversees the battalion's training plan.
- Monitors and assists companies in conducting training
- Monitors the readiness of all assigned units.
- Manages the battalion communications security account.
- Supervises and manages the battalion's key management infrastructure.
- Plans, coordinates, and directs all battalion security and force protection activities.
- Manages personnel security and clearance processes associated with the battalion's classified systems, communications security, and information handling responsibilities.
- Oversees chemical, biological, radiological, and nuclear activities for the battalion.
- Task organizes subordinate units to meet mission requirements.

- Performs reset operations for communications support packages that return from deployment.

EXPEDITIONARY SIGNAL COMPANY-ENHANCED

3-83. The ESC-Es modular design facilitates efficient allocation and task organization of the company's resources to meet a broad range of network support missions. Each network support team can both deploy and perform a network support mission independently to create a medium communications node, downsize to create a small communications node, or join other network support teams to create a large communications node. When required, modularized network equipment can move from one network support team to another to tailor mission capabilities. This modular, interchangeable design enhances the ability to task-organize teams with assets from within the ESC-E as needed to meet specific mission requirements. An ESC-E consists of a company headquarters and two expeditionary signal platoons.

EXPEDITIONARY SIGNAL COMPANY-ENHANCED CAPABILITIES

3-84. The ESC-E provides network services to small, medium, and large command posts depending on the configuration. The ESC-E has the scalability to provide DODIN-A connectivity and access to DISA services for four small command posts, 16 medium command posts, and 2 large command posts depending on the configuration of modular communications enclaves. The number of command posts supported simultaneously is contingent on the requirements.

COMPANY HEADQUARTERS

3-85. The company headquarters conducts mission command and provides administrative, logistics, and limited maintenance support to the network support platoons. The headquarters oversees training, administration, and logistics functions; and supervises subordinate platoon leaders. The company headquarters does not have organic food service, fuel handling, or health service functions.

NETWORK SUPPORT PLATOON

3-86. A network support platoon consists of two network support sections. Each network support section consists of four network support teams. The network support platoon installs, operates, maintains, and protects modular communications systems, establishing network communications nodes for small to large command posts, depending on personnel and equipment configuration.

3-87. Each network support team can provide communications support for a very small entry package up to a medium command post. Two network support sections combined can support a large command post, such as a theater army command post or JTF headquarters, consisting of up to 350 end users. Each team provides supported units with access to the tactical network using communications equipment with a full suite of services providing DISA services and coalition communications interoperability.

3-88. Each network support team has satellite systems that provide primary beyond line-of-sight transmission at Ku, Ka, and X frequency bands using frequency-division multiple access, time-division multiple access, and network-centric waveforms, depending on modular configurations made to meet mission requirements. For large command posts, the ESC-E employs either a Phoenix-enhanced (Phoenix-E) terminal or a T2C2 heavy to provide more bandwidth to support more users. In addition to the capabilities like the legacy Phoenix (see paragraph 3-52), the Phoenix-E can transmit using the time-division multiple access waveform, providing an increased expeditionary capability, flexibility, and scalability. T2C2 heavy provides satellite capability and bandwidth to support a large command post in a SWaP package.

3-89. Light TROPO systems provide secondary beyond-line-of-sight communications, decreasing reliance on satellite usage while providing the ability to transmit in a satellite denied environment. These systems provide beyond line-of-sight communications transport and reduce satellite communications demands by offering an alternative long-haul communications transmission method. Light TROPO offers greater distance and bandwidth than the TRILOS or HCLOS systems and allows beyond line-of-sight communications transmission in a satellite denied environment. Light TROPO provides these capabilities in a SWaP package in comparison that is much more compact than the traditional TROPO systems.

3-90. Each network support team provides line-of-sight capability using a terrestrial TRILOS. TRILOS provides a substantial increase in bandwidth in comparison to the HCLOS radio system, with a significant reduction in size, weight, and power. TRILOS allows the ability to transport up to three line-of-sight transmissions from one antenna. The TRILOS (V)1 can transport up to six line-of-sight transmissions from two antennas attached to one antenna base. The TRILOS (V)2 can transport up to three line-of-sight transmissions from one antenna. The TRILOS can operate in a satellite denied environment. The TRILOS can transmit and receive three separate lines of sight transmissions with one antenna mast. The TRILOS allows line-of-sight transmissions between communications nodes throughout the theater AO. The TRILOS small form factor provides a significant reduction in size, weight, and power compared to the HCLOS radio. Employing the TRILOS results in using less satellite bandwidth while allowing dynamic routing.

3-91. Each network support section has modular coalition enclaves to provide communications integration with unified action partners during multinational missions. Modular communications systems can support MCN-AE or TROJAN Special Purpose Intelligence Remote Integrated Terminal belonging to intelligence users for sharing intelligence information and data throughout the AO, using the tactical network.

SECTION IV – EN ROUTE COMMUNICATIONS COMPANY

3-92. This section provides an overview of an en route communications company and its capabilities. It identifies the capabilities of an ESB-E and the roles and responsibilities of the S-3 staff. It describes the company headquarters, en route signal support platoon, command and staff palletized airborne node (CASPAN) platoon, and their capabilities.

Note. The 50th ESB-E is the only ESB-E assigned an en route communications company.

OVERVIEW

3-93. An ESB-E provides en route and early entry communications, allowing DISA services through all five phases of joint operations. En route communications enable C2 while in flight. En route communications allow aircraft-to-aircraft and aircraft-to-ground communications. Upon initial ground entry, an early entry team remains in place until the supported unit's organic communications support arrives. If the supported unit does not have organic communication assets, or network requirements exceeds the early entry team's capabilities, additional ESB-E teams can deploy to augment the early entry team to meet network requirements.

3-94. The en route communications company provides global response force units with critical in-flight C2 and mission command, plane-to-plane, and plane-to-ground network communications and situational awareness on board while en route to a mission objective.

3-95. The en route communications company supports up to twenty-nine early entry packages. The en route communications company provides network communications capabilities for small command posts consisting of 4 to 12 end users. The en route communications company consists of a company headquarters, two en route signal support platoons, and one CASPAN platoon.

EN ROUTE COMMUNICATIONS COMPANY CAPABILITY

3-96. The en route communications company provides connectivity to the tactical network, while in flight, with the same secure voice, data, and video capabilities as ground command posts. The en route communications company deploys the en route, mission command suite of systems using a fixed installed satellite antenna mounted on C-17 aircraft. The en route, mission command suite of systems are—the key leader en route node (KEN), the dependent airborne node (DAN), and the CASPAN. The company provides early entry tactical network communications support for small command posts consisting of 4 to 12 end users.

COMPANY HEADQUARTERS

3-97. The company headquarters provides personnel and facilities for mission command and support of the company mission. The company commander and first sergeant direct company operations; oversee company training, administration, and logistics functions; and supervise subordinate platoon leaders. Support functions include supply and limited light weapons maintenance. The company headquarters does not have organic food service, fuel handling, or health service support capabilities.

EN ROUTE SIGNAL SUPPORT PLATOON

3-98. Each en route signal support platoon consists of three KEN teams and nine DAN teams. Each KEN team installs, operates, and maintains a KEN system. The en route communications company deploys a KEN team to provide battalion commanders beyond line-of-sight, in-flight air-to-air C2 and mission command capabilities with company commanders, and allows air-to-ground reachback with a home station for real-time situational awareness, while en route to a mission objective. Each DAN team installs, operates, and maintains a DAN system that provides a company commander with the capability to maintain air-to-air communications with the KEN system that is collocated with the battalion commander while on separate but adjacent flights.

Note. The DAN requires connectivity with a KEN for air-to-air and air-to-ground communications capability. The DAN must be within 80km of a KEN. A KEN can handle up to three DANs.

COMMAND AND STAFF PALLETIZED AIRBORNE NODE PLATOON

3-99. The CASPAN platoon consists of one CASPAN team, one KEN team, and three DAN teams. The KEN and DAN teams perform the same duties as the KEN and DAN teams in the en route signal platoon. The CASPAN team installs, operates, and maintains the CASPAN. The CASPAN is a more robust en route mission command suite capable of providing a task force commander the ability to conduct C2 and mission command while maintaining situational awareness with continuous air-to-ground reachback with the home station. The CASPAN has air-to-air communications capability with both the KEN and DAN systems. The CASPAN provides the task force commander's staff the capability to conduct staffing functions while en route to a mission objective. The CASPAN comes complete with seating and monitors for the task force commander and staff members.

SECTION V – TACTICAL INSTALLATION AND NETWORKING-ENHANCED COMPANY

3-100. This section provides an overview of a TIN-E company. It identifies the capabilities of a TIN-E company and its roles and responsibilities by organizational structure.

OVERVIEW

3-101. The TIN-E company engineers and installs large network infrastructure and rapidly installs and restores components of the Defense Communications System within an Army's AO, to include the defense switched network and the defense data network. Engineering conducted by the TIN-E company identifies the necessary work requirements, specific core competencies, an estimated bill of materials, and personnel requirements.

3-102. One TIN-E company deploys to an operational theater. The company may be under the OPCON or TACON of an SC(T) headquarters, an ESB, a TTSB, an Army Force, a joint forces land component command G-6, a J-6 staff section, or under an organization responsible for joint communications until an Army signal headquarters deploys into the theater. Platoons, sections, and teams can operate autonomously to support various locations, base clusters, and enclaves. The TIN-E company can deploy tasked organized teams, sections, or platoons to support contingencies in and outside the continental United States.

3-103. A TIN-E company has two platoons consisting of—

- Three inside plant teams.
- Two heavy outside plant teams.
- One light outside plant team.
- One information systems team.
- One local area network installation team.

TACTICAL INSTALLATION AND NETWORKING-ENHANCED COMPANY CAPABILITIES

3-104. The TIN-E company—

- Provides follow-on tactical support to communications packages for semi-permanent and permanent tactical automation, network installation, and information system support, where users provide bills of materials.
- Deploys to support combatant commands, JTFs, JFLCCs, theater army, and a signal command (theater).
- Supports other Army service components, multinational headquarters, and permanent or semi-permanent enclaves.
- Provides technical expertise to interpret and implement engineering plans for communications systems.
- Advises the supported commander on aspects of network installation, including inside plant, outside plant, and initialization.
- Performs quality assurance testing and handoff of installed and restored systems.
- Installs, maintains, and repairs aerial, buried, or underground cable, wire, and fiber-optic transmission systems.
- Repairs and maintains cable, wire, and fiber-optic cables installed by previous units or organizations.
- Constructs and repairs antennas and towers.
- Installs commercial and tactical network cabling networks using provided equipment and material.
- Provides automation support, including network initialization and security; organizational messaging system; Defense Red Switched Network; SIPRNET; NIPRNET; and video teleconferencing.
- Installs or restores a strategic to tactical interface path.

QUALITY CONTROL PERSONNEL

3-105. The quality control team conducts quality assurance, ensuring cable teams perform cable installation missions to the standards established by the commander's policies. The quality control team performs spot checks throughout the installation and ensures that the assigned platoon corrects any installation discrepancies. Upon installation completion, the quality control team and the customer conclude by having a final inspection before handoff and closing out the installation service.

INSIDE PLANT TEAM

3-106. The inside plant team is responsible for conducting inside plant operations. Inside plant operations consist of the installation and maintenance of all cabling, wiring, and alternating current and direct current power systems in a facility. Other accessories installed during inside plant operations include the main distribution frame, private automatic branch exchange for central office lines, central office equipment, main distribution frame, heat coil protectors, and grounding systems. See TC 6-02.20 for more information on inside plant operations.

HEAVY OUTSIDE PLANT TEAM

3-107. The heavy outside plant team is responsible for burying wire and cable, installing setting poles, and building A-frames for tactical aerial wire and cable runs. The heavy outside plant team uses heavy equipment for digging trenches to the necessary depth for buried cable and wire installation. Trenching to required depth ensures the protection of cable and wire from damage and electromagnetic interference. Heavy equipment is necessary for ground drilling and installing setting poles. The heavy outside plant teams use commercial off-the-shelf power tools and supplies to build the A-frames for tactical aerial wire and cable runs.

LIGHT OUTSIDE PLANT TEAM

3-108. The light outside plant team is responsible for running aerial cable and wire spans either on A-frames, setting poles, or across trees. The light outside plant teams install lance pole constructions for temporary aerial runs when setting poles, A-frames, trees, or other means for aerial support are not readily available. The light outside plant teams are responsible for antenna, cable, and wire installation on commercial and tactical towers. The light outside plant teams conduct cable and wire runs through utility holes and hand holes with assistance from the heavy outside plant teams when necessary.

3-109. The light outside plant team is responsible for testing, repairing, and replacing all cable and wire throughout their designated AO. The light outside plant teams splice, fan, label, test, and repair cables in communications substations. These cables include—coaxial, twisted-pair, unshielded twisted-pair, shielded twisted-pair, and fiber-optic.

LOCAL AREA NETWORK INSTALLATION TEAM

3-110. The local area network installation team, engineers and installs category 5 cable runs for computers, VoIP phones, printers, and other peripherals located throughout a facility. Local area network installation teams conduct category 5 cable runs using various types of conduits, ladder racks, and ducts. Local area network installation teams are responsible for cable splicing, fanning, labeling, testing, and repairing in facilities. Cables included are—coaxial, twisted-pair, unshielded twisted-pair, shielded twisted-pair, and fiber-optic.

INFORMATION SYSTEMS TEAM

3-111. The information systems team is responsible for baselining and configuring all computers and peripherals in a facility. The information systems team works with medium or small network teams, network enterprise centers, or with commercial service providers to ensure all network computers, phones, printers, and video teleconferencing systems are operational.

Chapter 4

Organizations Requiring Tactical Communications Support for Theater Operations

Some organizations in the U.S. Army are tasked to perform tactical missions in a theater but do not have the organic tactical communications assets necessary to attain access to the tactical network. These organizations must request non-organic tactical communications support that provides DODIN-A connectivity and access to DISA services. Other organizations have organic tactical communications assets but require augmentation to meet various tactical missions that require tactical communications support beyond the scope of the organization.

SECTION I – ORGANIZATIONS WITHOUT ORGANIC TACTICAL COMMUNICATIONS ASSETS

4-1. This section discusses organizations that do not have organic tactical communications assets and require communication support packages from a TTSB. Communications support packages provide these organizations with connectivity to the tactical network and access to DISA services.

4-2. Organizations without organic tactical communications assets request communications support through the RFF process when conducting theater operations. FORSCOM meets those requirements by designating a TTSB to design and deploy a communications support package that meets the requesting organization's communications requirements.

THEATER ARMY MAIN COMMAND POST

4-3. The theater army's main command post is a large command post that includes the command group, personal staff, chief of staff, special staff, coordinating staff, and functional cells. A theater army main command post requires the following communications support:

- A communications support package that can provide bandwidth to support up to 1000 end users.
- Connectivity to the tactical network, access to the DISA services, and private branch exchange.
- Capability for intelligence users to share top secret/sensitive compartmented information and data while receiving information and data from multiple locations simultaneously.
- Capability to transmit beyond line-of-sight communications in a satellite denied environment using TROPO technology.
- Capability to transmit beyond line-of-sight communications in a contested environment where radio frequency jamming, signal detection, and geographic threats are imminent.
- Reliable communications in a chemical, biological, radiological, or nuclear environment.
- Capability to expand the network by employing small command post clusters throughout the AO if required.
- Enclave boundary protection.
- Joint and coalition communications interoperability.

4-4. A theater army's main command post receives communications support based on a joint manning document or individual augmentation requests for Army and other Service forces to accomplish the mission using the RFF process (see Appendix C, Request for Forces). The theater army's main command post submits the RFF through the GCC to the Joint Chiefs of Staff, ensuring the identification of all necessary

communications requirements. For more information on the theater army's main command post, see FM 3-94.

THEATER ARMY CONTINGENCY COMMAND POST

4-5. The theater army contingency command post is lean and deployable. As part of the theater army headquarters, it specifically meets the GCC's requirements for limited control during operations. The contingency command post enables the theater army to conduct small-scale operations, commanding up to two BCTs or equivalent for 30 days or less. When designated as a JTF headquarters or JFLCC for limited intervention or peace operations, the theater army deploys a theater army contingency command post. A theater army contingency command post is typically medium in size. When this happens, the theater army deploys the theater army contingency command post while the theater army's main command post remains at home station and provides reachback support. A theater army contingency command post has the same organizational structure as a theater army's main command post but with less personnel.

4-6. A theater army contingency command post receives communications support based upon a joint manning document or individual augmentation requests for Army and other Service forces to accomplish the mission using the RFF process (see Appendix C, Request for Forces). The theater army contingency command post identifies all necessary communications requirements and submits its RFF to the theater army headquarters, through the GCC to the Joint Chiefs of Staff. For more information on the theater army contingency command post, see FM 3-94.

FORWARD-DEPLOYED SIGNAL COMMAND (THEATER)

4-7. An SC(T) provides communications engineering and system control capabilities for its assigned theater's strategic network. Although an SC(T) is not deployable, it can deploy various capabilities to support theater mission requirements. An SC(T) may require a communications support package in a theater AO for conducting staff functions. Depending on the mission and the number of personnel deployed, an SC(T) may require a communications support package with the capability to accommodate a small to medium command post.

4-8. A forward-deployed SC(T) receives communications support based upon a joint manning document or individual augmentation requests for Army and other Service forces to accomplish the mission using the RFF process (see Appendix C, Request for Forces). The SC(T) identifies all necessary communications requirements and submits its RFF to the theater army headquarters, through the GCC to the Joint Chiefs of Staff. For information on the capabilities of an SC(T), refer to FM 3-94.

JOINT TASK FORCE HEADQUARTERS

4-9. The GCC may use the theater army contingency command post as the nucleus of a JTF headquarters. If this happens, the theater army contingency command post receives a communications support package based upon a joint manning document or individual augmentation requests for Army and other Service forces to accomplish the mission using the RFF process (see Appendix C, Request for Forces). When a corps or division headquarters arrives on site, is operational, and assumes command of the JTF headquarters, the theater army contingency command post redeploys back to the theater army headquarters.

4-10. A JTF conducts small-scale joint operations to accomplish a specific mission. The corps or division headquarters that assumes command of the JTF headquarters has organic communications assets, but depending on the mission, may require continued OPCON or TACON of the communications assets attained by the theater army contingency command post through the RFF process. These are the communications assets requested by the GCC for the theater army contingency command post during a temporary assignment as the JTF headquarters. As the mission matures, the JTF headquarters may eventually require additional communications support packages as the joint mission expands.

4-11. If the GCC designates either an Air Force or Marines headquarters as the JTF headquarters, the Army becomes responsible for providing communications support packages to provide communications support for land components. In this instance, a designated corps or division headquarters assuming the responsibilities as the joint land force component orders its ARFOR headquarters to submit an RFF that

meets all the JTF headquarters communications requirements necessary for conducting unified land operations.

4-12. The joint force commander and his subordinate commanders traveling in adjacent aircraft require en route communications, both air-to-air and air-to-ground, to maintain real-time situational awareness, C2, and mission command. If there are no immediate communications assets in the theater AO, the joint force commander uses early entry communications teams. Early entry communication teams provide communications support to the JTF headquarters during the shape phase of large-scale combat operations. Early entry communications teams could additionally be required to extend communications support throughout other phases of operations until organic and non-organic communications assets are on the ground and operational. For more information on a JTF headquarters, see JP 3-33.

4-13. A JTF headquarters receives communications support based upon a joint manning document or individual augmentation requests for Army and other Service forces to accomplish the mission using the RFF process (see Appendix C, Request for Forces). The JTF headquarters identifies all necessary communications requirements and forwards the RFF to the joint force commander. The joint force commander submits the RFF to the Joint Chiefs of Staff.

JOINT FORCES LAND COMPONENT

4-14. During limited contingency operations, a joint force commander may organize a JTF with either a corps or division headquarters designated as the subordinate joint force land component. When designated as the joint forces land component, the corps or division designates one of its subordinate units to conduct the mission of ARFOR headquarters. The designated ARFOR headquarters may not have the necessary organic communications assets to provide communications support for its assigned support and sustainment brigades. The ARFOR headquarters request deployment of a communications support package provided from FORSCOM's available force pool.

4-15. Depending on the scale of the mission, the joint forces land component may require communications support for multiple small, medium, and large network nodes. If the corps or division headquarters assumes control as joint forces land component established by a theater army contingency command post, it retains those communications assets that the theater army contingency command post received through the RFF process.

4-16. The JFLCC and his subordinate commanders traveling in adjacent aircraft require en route communications, air-to-air and air-to-ground, to maintain real-time situational awareness, C2, and mission command. If there are no immediate communications assets in the theater AO, the JFLCC uses an early entry communications team to establish communications support until the requested communications support package arrives. Early entry communication teams provide communications support to the joint forces land component during the shape phase of large-scale combat operations but could be required to extend communications support throughout other phases until organic, and non-organic communications assets are on the ground and operational.

4-17. A JFLCC receives communications support based upon a joint manning document or individual augmentation requests for Army and other service forces through the RFF process (see Appendix C, Request for Forces). The JFLCC identifies all necessary communications requirements and submits its RFF to the JTF headquarters to the Joint Chiefs of Staff.

FUNCTIONAL BRIGADES AND GROUPS

4-18. Functional support brigades and groups are under OPCON of the ARFOR headquarters during joint operations. When providing support for a corps or division not designated as a JTF headquarters or JFLCC and conducting theater operations, functional brigades are either attached or under OPCON of the corps or division. Functional brigades and groups provide a single function or capability in support of a theater mission. The following are types of functional support brigades and groups:

- Air defense brigades.
- Chemical, biological, radiological, and nuclear brigades.
- Engineer brigades.

- Military intelligence brigades.
- Military police.
- Criminal investigation division.
- Signal brigades.
- Army field support brigades.
- Contracting support brigades.
- Medical brigades.
- Explosive ordnance disposal groups.
- Regional support groups.
- Theater aviation groups.

4-19. Functional support brigades and groups do not have organic communications assets that allow connectivity to the upper tier of the tactical network. Connectivity to the upper tier of the tactical network is an enabling function that allows the functional support brigades and groups to support commanders with conducting four of the warfighting functions: C2, intelligence, protection, and sustainment during theater operations.

4-20. Functional support brigades and groups receive communications support packages based on a joint manning document or individual augmentation requests for Army and other Service forces using the RFF process (see Appendix C, Request for Forces). The ARFOR, corps, or division submits the requesting functional support brigade's RFF to the JFLCC. The JFLCC forwards the RFF through the JTF headquarters to the Joint Chiefs of Staff. When submitting the RFF, the ARFOR, corps, or division for which the functional support brigades are attached requests communications support to meet each assigned functional support brigade's or group's unique communications requirements.

SECTION II – ORGANIZATIONS REQUIRING TACTICAL COMMUNICATIONS SUPPORT FOR AUGMENTATION

4-21. This section discusses organizations that have organic tactical communications assets but may require communications support packages for augmentation. Communications support packages provide additional communications capabilities for connectivity to the tactical network and access to DISA services.

4-22. Some organizations have organic upper-tier tactical communications assets. When assigned a theater mission that requires communications support beyond the scope of its communications capabilities, an organization requests communications support using the RFF process. FORSCOM meets those communications needs by designating a TTSB to design and deploy a communications support package that meets the requesting organization's communications requirements.

CORPS

4-23. A corps may be assigned an AO in the theater during large-scale combat operations, yet not be designated as a JTF headquarters or joint force land component command. In this instance, the JFLCC or its subordinate ARFOR headquarters designates the corps' AO. A corps organizes its AO into four distinct areas during large-scale combat operations—consolidation area, support area (located in the consolidated area), close area, and deep area.

4-24. Corps headquarters' organic communications assets are a part of the signal intelligence sustainment company. The intelligence sustainment company has enough WIN-T at-the-halt communications assets to support the corps headquarters and one tactical command post. Corps requires augmentation of the communications assets necessary to provide tactical network communications for assigned or attached multifunctional and functional support units and groups, providing direct or general support for protection, sustainment, and intelligence capabilities throughout the corps' consolidation and support areas. Multifunctional support units protecting the main supply routes may require communications augmentation for assigned or attached battalions conducting operations in the corps close and deep areas. If a corps headquarters forward-deploys a tactical command post into its deep area, augmentation of communications may be necessary.

4-25. A corps receives communications support packages based on a joint manning document or individual augmentation requests for Army and other Service forces using the RFF process (see Appendix C, Request for Forces). The corps submits its RFF to the JFLCC. The JFLCC forwards the RFF through the JTF headquarters to the GCC. The GCC validates the RFF and forwards it to the Joint Chiefs of Staff. When submitting the RFF, the corps request communications support to meet each assigned multifunctional brigades and functional support units and groups' unique communications requirements.

DIVISION

4-26. During large-scale combat operations, a division is the tactical unit of execution for a corps. A corps not assigned as a JTF headquarters or JFLCC but conducting a theater mission further divides its AO among its divisions. Divisions conduct operations in a corps' close area and organize into four distinct areas during large-scale combat operations—close area, consolidation area, support area, and deep area.

4-27. A division's organic communications assets are in its headquarters and headquarters battalion with enough WIN-T at-the-halt communications assets to support the division headquarters and two small command posts. A division requires augmentation of communications assets to provide tactical network communications for assigned or attached functional units conducting protection, sustainment, and intelligence operations throughout the division's consolidation, and support area. A division commands up to five BCTs. A division has multifunctional support units that provide support to the BCTs.

4-28. BCTs and multifunctional support brigades conduct operations in corps close area, corps deep area, and the division's deep area. BCTs have organic WIN-T on-the-move communications assets for continued upper tier connectivity while maneuvering throughout the division's close and deep areas. Some multifunctional support units providing support to BCTs have organic WIN-T at-the-halt communications assets for their brigade and battalion command posts. Other multifunctional support brigades do not have upper tier communications capabilities (see Multifunctional Support Brigade Section). BCTs and multifunctional support brigades may require additional communications support for small to medium command posts established while conducting missions in close and deep areas.

4-29. A division receives communications support packages based on a joint manning document or individual augmentation requests for Army and other Service forces using the RFF process (see Appendix C, Request for Forces). The division submits its RFF to the corps headquarters. The corps headquarters forwards the RFF to the JFLCC. The JFLCC forwards the RFF through the JTF headquarters to the GCC. The GCC validates the RFF and forwards it to the Joint Chiefs of Staff. When submitting the RFF, the division requests communications support to meet each BCT, multifunctional, and functional support unit's unique communications requirements.

MULTIFUNCTIONAL SUPPORT BRIGADE

4-30. Multifunctional support brigades provide support to a division's BCTs. Usually, multifunctional support brigades are either attached or under OPCON to divisions but may be attached to a corps, or ARFOR. Multifunctional support brigades are modular combined arms units that complement and reinforce the BCTs when conducting operations in close and deep areas. The multifunctional brigades are—

- Combat aviation–conducts air attacks and other operations.
- Military intelligence brigade-theater-regionally focused collection and analysis in support of the theater.
- Maneuver enhancement–provides ground protection.
- Field artillery–accomplishes fires missions.
- Sustainment–plans, prepares, executes, and assesses sustaining operations.

4-31. Multifunctional support brigades receive communications support packages based on a joint manning document or individual augmentation requests for Army and other Service forces using the RFF process (see Appendix C, Request for Forces). The division submits the multifunctional support brigade's RFF through the corps to the JFLCC. The JFLCC forwards the RFF through the JTF headquarters to the GCC. The GCC validates the RFF and forwards it to the Joint Chiefs of Staff. When submitting the RFF, the division requests

communications support to meet each assigned multifunctional support brigade's unique communications requirements.

COMBAT AVIATION BRIGADE

4-32. A combat aviation brigade is the primary integrator of aviation assets within a division and tailored for specific aviation missions. A combat aviation brigade's mission includes reconnaissance, security, movement to contact, attack, air assault, air movement, aerial medical evacuation, and casualty evacuation operations; personnel recovery operations; downed aircraft recovery; forward arming and refueling operations; aviation maintenance; and air traffic services.

4-33. A combat aviation brigade receives organic upper tier tactical communications assets from its support battalion. The support battalion has enough WIN-T at-the-halt communications assets to support the brigade headquarters, the support battalion, and one of the combat aviation brigade's five battalion tactical command posts. A combat aviation brigade may require a communications support package if assigned multiple aviation missions that require the employment of additional tactical command posts beyond the scope of its support battalion's capabilities. A communications support package may be required to support up to four regiment tactical command posts.

MILITARY INTELLIGENCE BRIGADE—THEATER

4-34. The military intelligence brigade-theater (MIB-T) is the intelligence integration anchor point for regionally aligned forces and global response forces. The MIB-T is the GCC's ground intelligence organization. The organization and capacity of each MIB-T depend on enduring theater requirements and relative prioritization within the Defense Planning Guidance. The MIB-T can provide divisions and brigades with initial intelligence databases and products for familiarization with the threat throughout the AO. (See FM 2-0 for more information about the role and functionality of MIB-Ts.)

4-35. A MIB-T does not have organic upper tier tactical communications assets and requires communication support packages to attain connectivity to the DODIN-A, for access to DISA services and the TROJAN network control center. Access to the TROJAN network control center is necessary for forwarding and receiving intelligence data with the corps and division headquarters using the MCN-AE or TROJAN Special Purpose Intelligence Remote Integrated Terminal. A communications support package may be required to provide communications support to a MIB-T headquarters and three or more assigned or attached battalion headquarters.

MANEUVER ENHANCEMENT BRIGADE

4-36. A maneuver enhancement brigade provides area security, a line of communications, mobility, and counter-mobility within its assigned AO. Its area of responsibilities encompasses the division support area and main supply routes. A maneuver enhancement brigade accomplishes its mission by receiving and controlling forces provided by the division.

4-37. A maneuver enhancement brigade receives organic, upper-tier tactical communications assets from its organic signal company. The signal company has enough WIN-T at-the-halt communications assets to support the brigade headquarters and two of its four organic subordinate units. A maneuver enhancement brigade may require a communications support package with the capability to provide small to medium network communications nodes for its additional assigned or attached units.

Note. The 67th and 648th Maneuver Enhancement Brigades only have a headquarters and headquarters company and do not have organic upper tier tactical communications assets.

FIELD ARTILLERY BRIGADE

4-38. The field artillery brigade, also known as the fires brigade, conducts operations to provide shaping and decisive fires for the division. The field artillery brigade accomplishes this by employing Army and joint

fires throughout the corps and division's deep areas. The field artillery brigade supports special operations forces, electronic warfare, and airspace control elements by providing fires support when requested.

4-39. A field artillery brigade has organic upper tier tactical communications assets to support the brigade headquarters and one of its subordinate battalions. A communications support package may be required to provide communications support for two or more small to medium command posts established by battalions assigned or attached to the field artillery brigade.

SUSTAINMENT BRIGADE

4-40. Sustainment brigades are subordinate to an expeditionary sustainment command and may be attached to a division. Sustainment brigades provide support to a corps or division, including logistics, health service support, personnel services, and financial management. Each sustainment brigade may be task organized differently and may require additional communication support to meet its specific requirements.

4-41. A sustainment brigade receives organic upper tier tactical communications support from its signal company. The brigade signal company has enough WIN-T at-the-halt communications assets to support the brigade headquarters, the support battalion headquarters, and one additional company, unit, or detachment assigned to the brigade. A communications support package may be required to provide small to medium network communications nodes for remaining assigned or attached battalions, companies, or units.

BRIGADE COMBAT TEAMS

4-42. BCTs are the fighting forces for the division. BCTs maneuver against and destroy the enemy in corps and division's close and deep areas. Each BCT has organic combined arms capabilities, including battalion-sized maneuver, field artillery, reconnaissance, and sustainment units. They receive combat arms augmentation from the multifunctional support brigade when the mission requires. The three BCTs are—armored, infantry, and Stryker.

4-43. BCTs receive communications support packages based on a joint manning document or individual augmentation requests for Army and other Service forces using the RFF process (see Appendix C, Request for Forces). The division submits the BCT's RFF through the corps to the JFLCC. The JFLCC forwards the RFF through the JTF headquarters to the GCC. The GCC validates the RFF and forwards it to the Joint Chiefs of Staff. When submitting the RFF, the division requests communications support to meet each assigned BCT's unique communications requirements.

ARMORED BRIGADE COMBAT TEAM

4-44. An armored BCT has organic WIN-T at-the-halt communications assets to provide upper tier tactical network connectivity for the brigade headquarters and up to seven battalions and squadrons. An armored BCT may require communications augmentation to support attached multifunctional support units or battalions establishing command posts throughout the corps or division's close and deep areas to support the armored BCT's organic combined arms assets. A TTSB designated with providing communications support to an armored BCT determines the amount and type of communications assets necessary to support the mission from information from the OPORD or OPLAN received from its higher headquarters.

INFANTRY BRIGADE COMBAT TEAM

4-45. An infantry BCT has organic WIN-T on-the-move communications assets providing upper tier tactical network connectivity for its brigade headquarters and up to seven battalions and squadrons. WIN-T on-the-move communications provide the infantry BCT the maneuverability to conduct combat operations in the corps and division's close and deep areas.

4-46. An infantry BCT may require communications augmentation to support one or more of its battalions or squadrons establishing command posts when conducting operations. Communications augmentation may be necessary to support attached multifunctional support units or battalions establishing command posts throughout the corps or division's close and deep areas to augment the infantry BCT's organic combined arms assets. A TTSB designated with providing communications support to an infantry BCT determines the

amount and type of communications assets necessary to support the mission from the information from the OPORD or OPLAN received from its higher headquarters.

STRYKER BRIGADE COMBAT TEAM

4-47. A Stryker BCT has organic WIN-T at-the-halt communications assets that provide upper tier tactical network connectivity for its brigade headquarters, the engineer battalion, and the support battalion. A Stryker BCT has organic WIN-T on-the-move communications assets within each of its regiments for upper tier tactical network connectivity for each subordinate battalion and squadron. WIN-T on-the-move communications provide the infantry BCT the maneuverability to conduct combat operations in the corps and division's close and deep areas.

Note. 1-2ID SBCT has replaced all its WIN-T at-the-halt communications assets for tactical communications nodes—WIN-T on-the-move communications assets.

4-48. A Stryker BCT may require communications augmentation to support one or more of its battalions or squadrons establishing command posts when conducting operations. Communications augmentation may be necessary to support attached multifunctional support units or battalions establishing command posts throughout the corps or division's close and deep areas to augment the Stryker BCT's organic combined arms assets. A TTSB designated with providing communications support to a Stryker BCT determines the amount and type of communications assets necessary to support the mission from the OPORD or OPLAN received from its higher headquarters.

GLOBAL RESPONSE FORCE

4-49. A global response force conducts operations as the lead ground element for a JFLCC by strategically deploying and conducting forcible entry for follow-on operations. The global response force rapidly responds to unforeseen or unplanned operations. The global response force is flexible, versatile, and rapidly deployable. A global response force is a joint task force with the core of its formation comprising of an airborne infantry brigade combat team, a Stryker company, an armor company, a combat aviation battalion, and combined arms assets.

4-50. A global response force has en route communications that allow the commanders the capability to conduct C2, mission command, staffing, and planning while receiving real-time situational awareness in flight. En route communications provide commanders with aircraft-to-aircraft and aircraft-to-ground communications using satellite transport, thus allowing commanders to have continuous reachback to the home station while inflight.

4-51. The airborne infantry BCT, Stryker Company, and Armor Company deploy with organic WIN-T communications assets to provide upper tier tactical network connectivity for the global response force when conducting forcible-entry operations. ESBs in FORSCOM's available force pool is in a constant state of rotation to support the global response force's mission with WIN-T at-the-halt communications.

4-52. Instead of using an ESB, a TTSB may assign an ESB-E to support a global response force mission to provide augmentation to the global response force's organic en route communications assets, along with the capability to support small to large command posts. A TTSB designated to provide communications support to a global response force determines the amount and type of communications assets necessary to support the mission from the OPORD or OPLAN received from its higher headquarters.

SECURITY FORCE ASSISTANCE BRIGADE

4-53. An SFAB only has limited organic communications capabilities for upper tier tactical network communications using T2C2 heavy located at the brigade headquarters and each battalion. T2C2 heavy provides the SFAB with voice and data communications, allowing the SFAB to obtain situational awareness, C2, and mission command. An SFAB may require augmentation for organic upper tier communications assets when the mission requires more robust communications capabilities. The TTSB designs a communications support package using one of its tactical signal battalions to meet the SFAB's requirements.

4-54. If an ESB provides communications support to an SFAB, it deploys small network teams to install, operate, and maintain CPNs. The brigade headquarters and each of its assigned battalion headquarters receive a small network team that provides DISA services. If an ESB-E provides communications support to an SFAB, it deploys the necessary network support teams to meet the equivalent requirements of an ESB.

4-55. An SFAB receives communications support based upon a joint manning document or individual augmentation requests for Army and other Service forces to accomplish the mission using the RFF process (see Appendix C, Request for Forces). The SFAB submits the RFF to the SC(T). The SC(T) forwards the RFF through the GCC to the Joint Chiefs of Staff, ensuring the identification of all the SFABs communications requirements.

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Appendix A

Expeditionary Signal Battalion Communications Equipment Allocation

This appendix depicts the communications allocation tables for an ESB's subordinate expeditionary signal companies and joint/area signal companies. Each communications equipment allocation table shown in this appendix includes equipment types and line item numbers for each major communications assemblage in its defined company.

EXPEDITIONARY SIGNAL COMPANY

A-1. An expeditionary signal company consists of two expeditionary signal platoons. Each expeditionary signal platoon consists of the following communications teams—

- One medium network team.
- Two line-of-sight V(3) teams.
- One tactical satellite team.
- Five small network teams.

A-2. The company commander task organizes as necessary to design a communications support package to meet mission requirements. Each expeditionary signal platoon has a cable team. The cable team does not have communications equipment relevant to the allocation table. Table A-1 depicts the communications equipment allocations for an expeditionary signal company.

Table A-1. Expeditionary signal company communications equipment allocations

Type of Team	*Equipment*	*Line Item Number*	*Amount*
	1st Platoon		
Medium Network Team	Joint node network (JNN) Central OFC telephone auto: AN/TCC	J05001	1
Line-of-sight (LOS) (v)3 Team	Radio terminal: LOS multi-channel 190F(V)3	R90587	2
Tactical Satellite (TACSAT) Team	Satellite communication system: AN/TSC-156	S23268	1
Small Network Team	Battalion command post switching group: OM-XXX	B67234	5
	Radio terminal: LOS multi-channel AN/TRC-190E(V)1	R90451	5
	Computer group: tactical OL-761A(V)8T	C05046	5

Table A-1. Expeditionary signal company communications equipment allocations (continued)

Type of Team	*Equipment*	*Line Item Number*	*Amount*
	2nd Platoon		
Medium Network Team	JNN Central OFC telephone auto: AN/TCC	J05001	1
LOS (V)3 Team	Radio terminal: LOS multi-channel AN/TRC-190F(V)3 or *AN/TRC-238 (V)1	R90587 or *R05029	2
TACSAT Team	Satellite communication system: AN/TSC-156	S23268	1
Small Network Team	Battalion command post switching group: OM-XXX	B67234	5
	Radio terminal: LOS multi-channel AN/TRC-190E(V)1 or *AN/TRC-238 (V)2	R90451 or *R05031	5
	Computer group: tactical OL-761A(V)8T	C05046	5

LEGEND:
JNN joint network node
LOS line-of-sight
SMART-T secure mobile anti-jam reliable tactical terminal
TACSAT tactical satellite
TROPO tropospheric scatter

Note. ESBs are in the process of replaced the AN/TRC-190F (V)3 and AN/TRC-190E (V)1 HCLOS systems with the AN/TRC-238 (V)2 TRILOS systems. For this reason, the table includes the model number and line item number of the TRILOS system, denoted by an asterisk (*).

JOINT/AREA SIGNAL COMPANY

A-3. A joint/area signal company consists of two heavy signal platoons. Each heavy signal platoon consists of the following communications teams—

- One large network team.
- One line-of-sight (V)3 team.
- One tactical satellite team.
- One light TROPO team.
- One SMART-T team.
- Two small network teams.

A-4. The company commander task organizes as necessary to design a communications support package to meet mission requirements. Each heavy signal platoon has a cable section consisting of two cable teams. The cable section does not have communications equipment relevant to the allocation table. Table A-2 on page A-3, depicts the communications equipment allocations for a joint/area signal company.

Table A-2. Joint/Area signal company communications equipment allocations

Type of Team	*Equipment*	*Line Item Number*	*Amount*
	1st Platoon		
Large Network Team	Communications system-AN/TYQ-167(V)2	Z05461	1
LOS (V3) Team	Radio terminal: LOS multi-channel 190F(V)3 or *AN/TRC-238 (V)1	R90587 or *R05029	1
TACSAT Team	Satellite communication system: AN/TSC-156	S23268	1
SMART-T Team	Terminal: satellite communication AN/TSC-154	T81733	1
Light TROPO Team	Radio terminal set: AN/TRC-170 (V)3	R93035	1
Small Network Team	Battalion command post switching group: OM-XXX	B67234	2
	Radio terminal: line-of-sight multi-channel AN/TRC-190E(V)1 or *AN/TRC-238 (V)2	R90451 or *R05031	2
	Computer group: tactical OL-761A(V)8T	C05046	2
	2nd Platoon		
Large Network Team	Communications system-AN/TYQ-167(V)2	Z05461	1
LOS (V3) Team	Radio terminal: line-of-sight multi-channel 190F(V)3 or *AN/TRC-238 (V)1	R90587 or *R05029	1
TACSAT Team	Satellite communication system: AN/TSC-156	S23268	1
SMART-T Team	Terminal: satellite communication AN/TSC-154	T81733	1
Light TROPO Team	Radio terminal set: AN/TRC-170 (V)3	R93035	1
Small Network Team	Battalion command post switching group: OM-XXX	B67234	2
	Radio terminal: line-of-sight multi-channel AN/TRC-190E(V)1 or *AN/TRC-238 (V)2	R90451 or *R05031	2
	Computer group: tactical OL-761A(V)8T	C05046	2

LEGEND:
JNN joint network node
LOS line-of-sight
SMART-T secure mobile anti-jam reliable tactical terminal
TACSAT tactical satellite
TROPO tropospheric scatter

Note. The ESB-E currently does not have communications equipment established as a program of record items. This publication only describes an ESB-E's capabilities.

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Appendix B

Tactical Regional Cyber Center Integration Program

Communications equipment used to employ the tactical network should remain in a constant state of employment using the TRIP. There are five stages of transitions to ensure the tactical network remains employment ready. This appendix describes those five stages.

STAGES OF THE TACTICAL REGIONAL CYBER CENTER INTEGRATION PROGRAM

B-1. The tactical network transitions through the five stages of TRIP based on mission requirements. These stages are not always sequential or required and include pre-deployment preparation and training at home station, training at combat training centers, exercises, experiments, and deployments. The unit's connection to the DODIN changes relative to the stage. Figure B-1 on page B-2 illustrates the five stages of TRIP. The stages are—

- Stage one—Preparation.
- Stage two—IaaDS.
- Stage three—Coordination.
- Stage four—Combat training center deployment.
- Stage five—Deployment.

Note. Army National Guard and Army Reserve TTSBs and associated ESBs do not use TRIP for operational readiness and deployment preparation. See AR 140-145 for information regarding preparing the Army National Guard and Army Reserve units for mobilization.

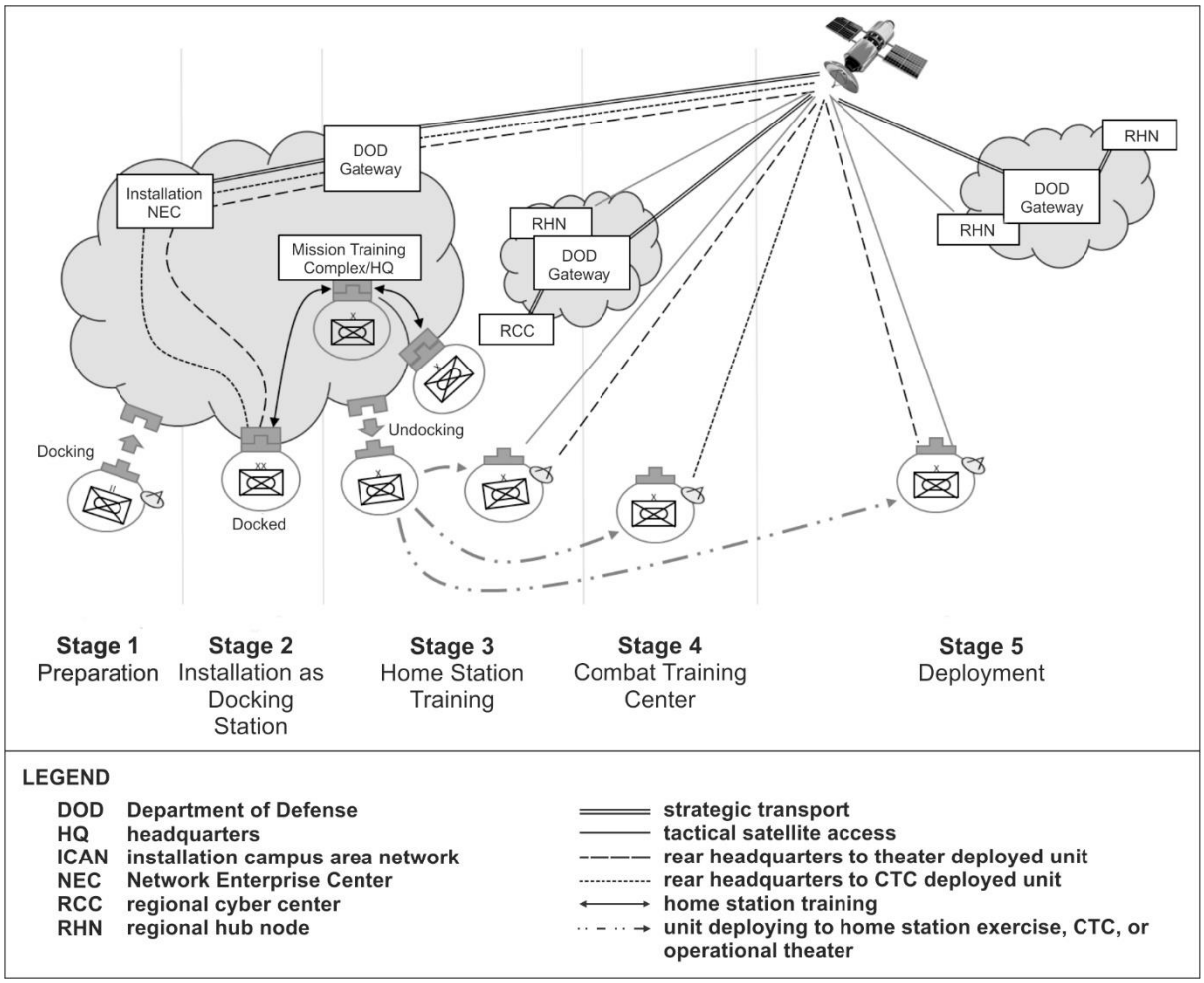


Figure B-1. Stages of a tactical regional cyber center integration program

STAGE 1–PREPARATION

B-2. Stage 1 is the preparation stage in which units undergo reset activities, begin new equipment and new user training, manage personnel moves, and conduct individual training. The S-3 coordinates with the network enterprise centers to determine connection requirements while establishing plans of action and milestones for conducting software updates and training.

STAGE 2–INSTALLATION AS A DOCKING STATION

B-3. Once a unit meets all connection requirements, they connect their tactical networks to the DODIN through the network enterprise center. IaaDS enables individual and collective training while supporting the Sustainable Readiness Model. It also enables a TTSB to establish a NOSC at home station and conduct DODIN operations and mission command for forward-deployed communications support packages.

B-4. Using IaaDS, a TTSB's tactical battalions can ensure that communications assets maintain mission readiness by ensuring that communications systems can download and install the latest software updates without using satellite resources. Software downloads happen by gaining access to GAIT using the installation's network enterprise center. Additionally, the TTSB is also able to attain the necessary software updates for its mission command information systems.

B-5. IaaDS allows a TTSB the ability to conduct global C2 from home station during theater missions, home station training, or combat training center events. Before GAIT, TTSBs were limited in their ability to conduct C2 due to latency from the numerous satellite hops required to communicate with communications support packages in the theater. Home station organizations use GAIT to establish communications to forward-deployed communications support packages with only one satellite hop. Home station organizations send and receive data center services through the installation's network enterprise center, which in turn forwards the data through the multiprotocol label-switching network to a GAIT network support center, collocated with an RHN servicing the forward-deployed communications support package.

B-6. A TTSB can conduct DODIN operations from its home station by establishing a tactical NOSC using the network operations suite. The TTSB establishes connectivity to the GAIT through the installation's network enterprise center. The networks operation element in a TTSB is limited with its ability to conduct DODIN operations. Typical when a TTSB is conducting DODIN operations in theater, it is only as oversight for its communications support package that's conducting a contingency mission, home station training, or combat training center events.

B-7. IaaDS provides additional opportunities to train while building competency and trust in the network and overall mission readiness. IaaDS provides a platform that enables—

- Trained and ready Soldiers proficient with C2 systems.
- Configured, updated, patched, and cybersecurity-compliant command post information systems.
- Sustained proficiency with connecting, disconnecting, and reconnecting from any installation or Army network, enabling the transport of tactical network traffic while at home station, within a training environment, or when deployed.
- Access to the distributed cloud-based integrated training environment and training resources to enable live, virtual, and constructive training.
- Distributed C2.

STAGE 3–HOME STATION TRAINING

B-8. Home station training incorporates field-training exercises and other training events conducted throughout the installation. Home station training requires a disconnection from the network enterprise center and the establishment of DODIN-A connectivity using tactical satellite transmission through the RHN. The S-3 coordinates with the RHN for DODIN-A connectivity, including spectrum access for all required communications transmission terminals before conducting home station training.

B-9. The TTSB headquarters requests GAIT access if conducting DODIN operations, C2, or both in garrison. The S-3 coordinates for access to required training areas through installation channels. Commanders and staff design home station training using mission and operational variables aligned with current theater missions.

STAGE 4–COMBAT TRAINING CENTER

B-10. Before conducting stage 4 of TRIP, commanders and staff task organize to design a communications support package that meets a specified theater mission requirement. The TTSB headquarters coordinates with the RHN and regional cyber center to determine roles that support DODIN operations training objectives, identifying specific network connectivity, and monitoring requirements specific to the communication support package's mission.

B-11. The tactical signal battalion plans logistics and sustainment provisions for the communications support package with assistance from the TTSB headquarters. The TTSB headquarters coordinates for GAIT access if the TTSB headquarters plans to conduct DODIN operations and mission command from the garrison.

B-12. Communications support packages deploy to a combat training center to conduct exercises, or events designed to simulate operations in a deployed operational environment. The communications support package accesses the DODIN through the RHN. The regional cyber center provides network oversight, DODIN operations capabilities, and defensive cyberspace operations activities for overwatch against cyberspace threats.

STAGE 5–DEPLOYMENT

B-13. Stage 5 starts when a unit is notified to deploy. The brigade commander, subordinate commanders, and staff conduct C2 activities of the operations process while planning to deploy a communications support package for a specified theater mission.

B-14. This stage culminates with the redeployment of the communications support package, conducting reset operations, and transitioning back to stage 1 of TRIP.

Appendix C

Request for Forces Process

Units that require tactical communications support to conduct theater operations make requests using the request for forces process. The request for forces is an enabling function of the force generation process. Force generation for a joint force commander in a joint operations area ensures the Army is responsive to the requirements for additional or specialized land forces.

OVERVIEW

C-1. A joint force commander requiring a communications support package for theater operations uses the RFF process to fulfill those requirements. The joint force commander identifies the necessary capabilities required of the communications support package and submits the RFF through two channels as follows:

- The joint force commander first submits the RFF for validation through the GCC to the Joint Chiefs of Staff.
- The joint force commander submits the same RFF through its subordinate ARFOR to the supporting theater army.

C-2. The ARFOR notifies the Department of the Army and FORSCOM of the submission of the RFF to the Joint Chiefs of Staff for validation. Once the Joint Chiefs of Staff validates the RFF, the Joint Chiefs of Staff tasks the Department of the Army to provide or source necessary communications support to the joint force commander. Headquarters, Department of the Army, then tasks FORSCOM to source, mobilize, and deploy a communications support package that meets the joint force commander's requirements. Under current policy, the Secretary of Defense signs all unit deployment orders (see figure C-1).

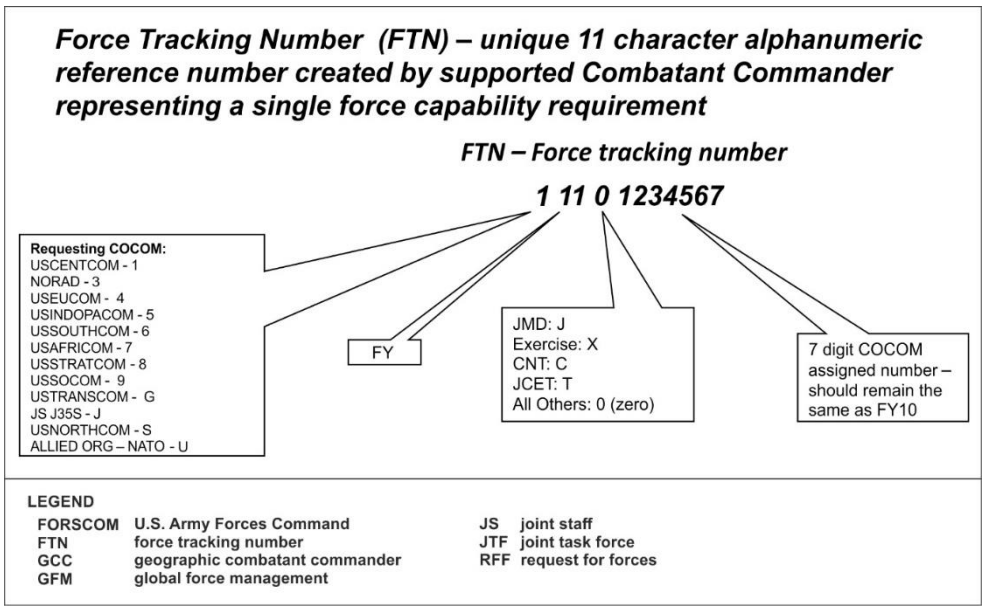


Figure C-1. Force tracking number format

STEPS IN CONDUCTING THE REQUEST FOR FORCES PROCESS

C-3. There are four steps that occur during the RFF process:

- **Step 1-Request for forces**. The JTF headquarters identifies the necessary communications requirements, to include those need by its organic and non-organic subordinate units, throughout its assigned AO. The JTF headquarters then forwards the RFF to the GCC and ARFOR.
- **Step 2-GCC validation.** The GCC validates the RFF. Once the GCC as validated the RFF received from the joint force commander, the GCC's staff is responsible for generating a force tracking number before submitting the RFF to the Joint Chiefs of Staff. A force tracking number is a unique 11-character reference number used to track the submitted RFF. The GCC then forwards the RFF to the Joint Chiefs of Staff.
- **Step 3-Joint staff Approval**. The RFF is validated and approved by the joint staff J-35 South and then forwarded to the J-35 North for provisioning and sourcing.
- **Step 4-Issuing of deployment orders**. Global force management allocates the necessary communications requirements and forwards the request to FORSCOM. FORSCOM identifies the unit(s) that will provide communications support and issue orders (see Figure C-2).

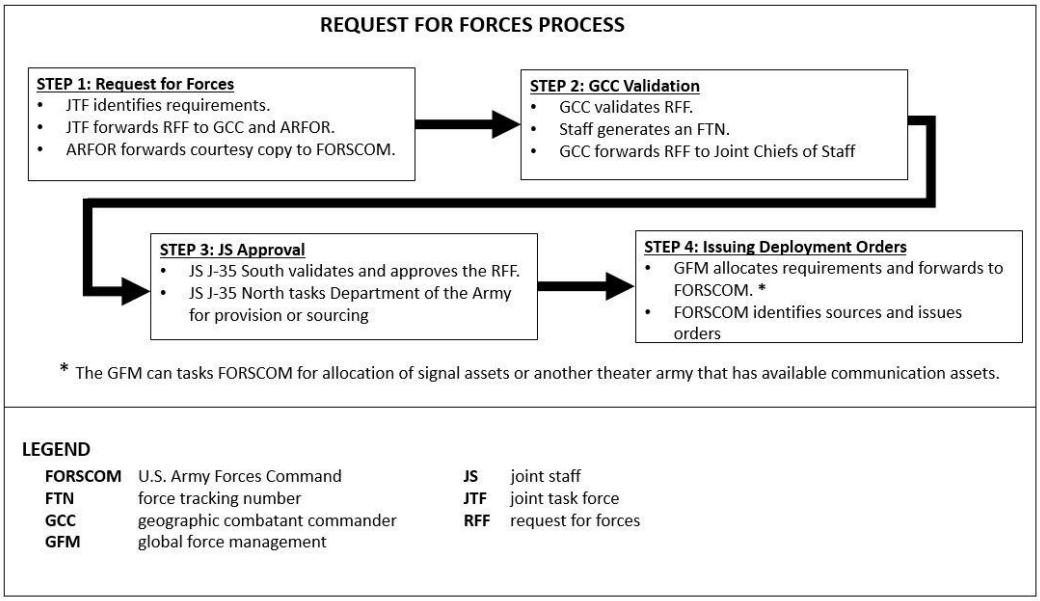


Figure C-2. Request for forces process

Appendix D

Communications & Electronics Maintenance Support

Communications support packages require maintenance support from its supported unit or organization. Commanders include maintenance support for attached communications support packages when conducting the operations process. Communications & electronics maintenance support requires specialized personnel and equipment to meet a communications support package's maintenance requirements.

MAINTENANCE SUPPORT FOR TACTICAL SIGNAL BATTALIONS IN THEATER

D-1. Communications support packages under OPCON or TACON to units in support of theater operations receive field-level maintenance support from the supported organization. If the supported organization is unable to provide maintenance services and repairs for unit-unique equipment, the mission may require the deployment of the communications support package's organic maintenance assets to fulfill the maintenance requirement. The designated TTSB is responsible for coordinating the maintenance and logistics support of its deploying communications support package in advance. During maintenance planning, consideration for such factors as funding, locations (the continental United States or outside the continental United States), and communications assemblages for deployment are critical.

NON-ORGANIC SUSTAINMENT-LEVEL COMMUNICATIONS AND ELECTRONICS MAINTENANCE REQUEST

D-2. Communication support packages request sustainment-level maintenance support when maintenance services are beyond the scope of field-level maintenance, as described in the maintenance allocation chart. A communications support package may also require sustainment-level maintenance if tools and test equipment are not available or if proprietary testing is required. The communications support package's maintenance personnel coordinate sustainment-level C&E maintenance with the theater Army field support brigade (AFSB). The AFSB does not perform sustainment-level maintenance organically; instead, the AFSB coordinates with the nearest logistics assistance representative that either uses field service representatives to conduct sustainment-level maintenance; exchange the faulty equipment with a serviceable replacement; or evacuate the equipment to the nearest depot.

NON-ORGANIC SUSTAINMENT-LEVEL MOTOR AND GENERATOR MAINTENANCE

D-3. Communication support packages include tactical vehicles for maneuvering personnel, communications systems, and ancillary equipment throughout the AO. Additionally, communications support packages have tactical generators for supplying electrical power to communications systems. Communications support packages may require sustainment-level maintenance in the theater and will use an area maintenance and supply facility. The communications support package coordinates for assistance from the area maintenance and supply facility through the AFSB. For more information on the Army maintenance program, see ATP 4-33.

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Glossary

The glossary lists acronyms and terms with Army, multi-Service, or joint definitions. Where Army and joint definitions are different, (Army) precedes the definition. The proponent publication for other terms is listed in parentheses after the definition.

SECTION I – ACRONYMS AND ABBREVIATIONS

AFSB	Army field support brigade
AO	area of operations
BCT	brigade combat team
C2	command and control
CASPAN	command and staff palletized airborne node
C&E	communications and electronics
CPN	command post node
DAN	dependent airborne node
DISA	Defense Information Systems Agency
DOD	Department of Defense
DODIN	Department of Defense information network
DODIN-A	Department of Defense formation network-Army
ESB	expeditionary signal battalion
ESB-E	expeditionary signal battalion-enhanced
ESC-E	expeditionary signal company-enhanced
FORSCOM	United States Army Forces Command
G-6	(Army) assistant chief of staff, signal
GAIT	global agile integrated transport
GCC	geographic combatant commander
HCLOS	high capacity line-of-sight
IaaDS	Installation as a Docking Station
INE	inline network encryptor
JFLCC	joint force land component commander
JNN	joint network node
JTF	joint task force
KEN	key leader en route node
MCN-AE	modular communications node-advanced enclave
MDO	multi-domain operations
MIB-T	military intelligence brigade-theater
NIPRNET	Non-classified Internet Protocol Router Network
NOSC	network operations and security center

OPCON	operational control
OPORD	operation order
OPLAN	operation plan
RFF	request for forces
RHN	regional hub node
S-6	(Army) battalion or brigade signal staff officer
S-3	battalion or brigade operations staff officer
SC(T)	signal command (theater)
SFAB	security force assistance brigade
SIPRNET	SECRET Internet Protocol Router Network
SMART-T	secure mobile anti-jam reliable tactical-terminal
SSS	single shelter switch
STT	satellite transportable terminal
SWaP	size, weight, and power
T2C2	transportable tactical command communications
TACON	tactical control
TDMA	time division multiple access
TIN-E	tactical installation and networking-enhanced
TRILOS	terrestrial transmission line-of-sight
TRIP	Tactical Regional Cyber Center Integration Program
TROPO	tropospheric scatter
TTSB	theater tactical signal brigade
VoIP	voice over internet protocol
WIN-T	Warfighter Information Network-Tactical

SECTION II – TERMS

adversary

A party acknowledged as potentially hostile to a friendly party and against which the use of force may be envisaged. (JP 3-0)

ARFOR

The Army component and senior Army headquarters of all Army forces assigned or attached to a combatant command, subordinate joint force command, joint functional command, or multinational command. (FM 3-94)

cyberspace

A global domain within the information environment consisting of the interdependent network of information technology infrastructures and resident data, including the Internet, telecommunications networks, computer systems, and embedded processors and controllers. (JP 3-12)

Department of Defense information network

The set of information capabilities, and associated processes for collecting, processing, storing, disseminating, and managing information on demand to warfighters, policymakers, and support personnel, whether interconnected or stand-alone, including owned and leased communications and computing systems and services, software (including applications), data, security services, other associated services, and national security systems. Also called DODIN. (JP 6-0)

Department of Defense information network operations

Operations to secure, configure, operate, extend, maintain, and sustain Department of Defense cyberspace to create and preserve the confidentiality, availability, and integrity of the Department of Defense information network. Also called DODIN operations. (JP 3-12)

Department of Defense information network–Army

An enclave of the DODIN that encompasses all Army information capabilities that collect, process, store, display, disseminate, and protect information worldwide. Also called DODIN-A. (ATP 6-02.71)

enemy

A party identified as hostile against which the use of force is authorized. (ADP 3-0)

information environment

The aggregate of individuals, organizations, and systems that collect, process, disseminate, or act on information. (JP 3-13)

insider threats

A person with placement and access who intentionally causes loss or degradation of resources or capabilities or compromises the ability of an organization to accomplish its mission through espionage, providing support to international terrorism, or the unauthorized release or disclosure of information about the plans and intentions of U.S. military forces. (AR 381-12)

operational environment

A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. Also called OE. (JP 3-0)

operations process

The major mission command activities performed during operations: planning, preparing, executing, and continuously assessing the operation. (ADP 5-0)

peer threat

An adversary or enemy with capabilities and capacity to oppose United States forces across multiple domains worldwide or in a specific region where they enjoy a position of relative advantage. (ADP 3-0)

reachback

The process of obtaining products, services, and applications, or forces, or equipment, or material from organizations that are not forward deployed. (JP 3-30)

threat

Any combination of actors, entities, or forces that have the capability and intent to harm United States forces, United States national interests, or the homeland. (ADP 3-0)

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References

All URLs accessed on 23 September 2019.

REQUIRED PUBLICATIONS

These documents must be available to intended users of this publication.

DOD Dictionary of Military and Associated Terms. July 2019.

ADP 1-02. *Terms and Military Symbols*. 14 August 2018.

RELATED PUBLICATIONS

These documents contain relevant supplemental information.

JOINT PUBLICATIONS

Most joint publications are available online: http://www.jcs.mil/doctrine.

JP 3-0. *Joint Operations.* 17 January 2017.

JP 3-12. *Cyberspace Operations.* 8 June 2018.

JP 3-13. *Information Operations.* 27 November 2012.

JP 3-30. *Command and Control of Joint Air Operations*. 25 July 2019.

JP 3-33. *Joint Task Force Headquarters*. 31 January 2018.

JP 6-0. *Joint Communications System.* 10 June 2015.

ARMY PUBLICATIONS

Most Army doctrinal publications are available online: https://armypubs.army.mil.

ADP 3-0. *Operations*. 31 July 2019.

ADP 5-0. *The Operations Process*. 31 July 2019.

AR 140-145. *Individual Mobilization Augmentation Program.* 21 March 2016.

AR 381-12. *Threat Awareness and Reporting Program.* 1 June 2016.

AR 525-93. *Army Deployment and Redeployment.* 12 November 2014.

ATP 4-33. *Maintenance Operations*. 9 July 2019.

ATP 6-02.60. *Techniques for Warfighter Information Network-Tactical*. 9 August 2019.

ATP 6-02.70. *Techniques for Spectrum Management Operations*. 16 October 2019.

ATP 6-02.71. *Techniques for Department of Defense Information Network Operations.* 30 April 2019.

FM 2-0, *Intelligence.* 06 July 2018.

FM 3-0. *Operations.* 6 October 2017.

FM 3-94. *Theater Army, Corps, and Division Operations*. 21 April 2014.

FM 6-02. *Signal Support to Operations*. 13 September 2019.

FM 6-27. *The Commander's Handbook on the Law of Land Warfare*. 7 August 2019.

TC 6-02.20. *Cable and Wire Systems Handbook.* 23 January 2018.

PRESCRIBED FORMS

This section contains no entries.

REFERENCED FORMS

Unless otherwise indicated, DA forms are available on the Army Publishing Directorate website: https://armypubs.army.mil

DA Form 2028. *Recommended Changes to Publications and Blank Forms.*

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This section contains no entries.

Index

Entries are by paragraph number unless indicated otherwise.

C

Colorless Core, 2-1

E

En Route Communications Company, 3-18
 Capabilities, 3-19
 Overview, 3-18

Expeditionary Signal Battalion, 3-5
 Capabilities, 3-6
 Signal Section, 3-7

Expeditionary Signal Battalion Overview, 3-5

Expeditionary Signal Battalion-Enhanced, 3-15
 Capabilities, 3-15
 Overview, 3-15
 S-3, 3-16

Expeditionary signal Company, 3-9

Expeditionary Signal Company Capabilities, 3-9

Expeditionary Signal Company-Enhanced, 3-17
 Capabilities, 3-17

J

Joint/Area Signal Company, 3-12
 Capabilities, 3-12

N

Network Service Center
 Data Center, 1-4
 Regional Cyber Center, 1-4
 Regional Hub Node, 1-4

Network Transport Capabilities, 2-3, 2-4
 Line Of Sight Transport, 2-3
 Satellite Communications Transport, 2-4
 Tropospheric Scatter Transmission, 2-3

O

Operational Domains, 1-1

Operations Process, 3-3
 Execution and Assessment, 3-5
 Planning, 3-3
 Preparing, 3-4

Organizations Requiring Communications Augmentation, 4-4
 Corps, 4-5
 Division, 4-5
 Global Response Force, 4-8
 Multifunctional Support Brigade, 4-6
 Security Force Assistance Brigade, 4-9

Organizations Requiring Communications Augmentation Brigade Combat Teams, 4-7

Organizations Without Organic Communications
 Forward Deployed Signal Command (Theater), 4-2
 Functional Brigades and Groups, 4-4
 Joint Land Forces Component Commander, 4-3
 Joint Task Force Headquarters, 4-2
 Theater Army Contingency Command Post, 4-2
 Theater Army Main Command Post, 4-1

Organizations Without Organic Tactical Communications Assets, 4-1

R

Reachback Communications, 2-3

S

Stages of TRIP, B-1
 Combat Training Center, B-3
 Deployment, B-4
 Home Station Training, B-3
 Installation as a Docking Station, B-2
 Preparation, B-2

T

Tactical Installation and Networking-Enhanced Company, 3-19
 Capabilities, 3-20
 Overview, 3-20

Tactical Network, 1-3
 Lower Tier, 1-3
 Network Service Center, 1-4
 Upper Tier, 1-3

The Information Environment, 1-1
 Congested Environment, 1-1
 Contested Environment, 1-2
 threats, 1-2

Theater Tactical Signal Brigade, 3-1
 Operations Staff, 3-3

Theater Tactical Signal Brigade Roles and Responsibilities, 3-2

Threats
 Adversary, 1-2
 Enemy, 1-2
 Insider, 1-2
 Peer Threat, 1-2
 Threat Actors, 1-2

Top Secret and Sensitive Compartmented Information Networks, 2-2

TROJAN Network Control Center, 2-3

Types of WIN-T at-the-halt Systems, 2-5
 Command Post Node, 2-6
 Commercial Coalition Equipment, 2-6
 High Capacity Line-of-Sight, 2-7
 Joint Network Node, 2-6
 Regional Hub Node, 2-8
 Satellite Transportable Terminal, 2-7

Single Shelter Switch, 2-6
Tactical Hub Node, 2-9

W

WIN-T Waveforms, 2-4
Frequency Division Multiple Access Waveform, 2-4
Network Centric Waveform, 2-5
Time Division Multiple Access Waveform, 2-4

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