Chapter 1

TI Overview

The tactical Internet (TI) is the tactical communications network in the digitized division that supports the warfighters' Army Battle Command System (ABCS) while on-the-move. The TI provides seamless situational awareness (SA) and command and control (C2) data exchange between maneuver, combat service support (CSS), and C2 platforms. This chapter provides a TI overview.

TI COMPONENTS

1-1. The TI is the integration of tactical radios, computers, and supporting communications equipment into a mobile voice and data network. It provides warfighters the ability to access the network with the ABCS at any location and send and receive information automatically in support of changing operational requirements and task organizations for tactical operations.

ABCS

1-2. The ABCS, although not part of the TI, is the primary user of the TI. The US Army division's enhanced capability to C2 is a significant force multiplier. For C2, the division functions as an element of the ABCS. The division signal battalion provides the communications paths over which the division exchanges battle command information within the larger ABCS operational environment. Figure 1-1 shows the ABCS architecture.

1-3. The Global Command and Control System-Army (GCCS-A) supports the warfighter at the theater level, including the joint environment.

1-4. The integration of the six principal ABCS automation components provides situational information and decision support to the battlefield operating systems (BOSs) at echelons corps and below (ECB). These components are the–

- Maneuver Control System (MCS).
- Advanced Field Artillery Tactical Data System (AFATDS).
- Air and Missile Defense Planning and Control System (AMDPCS).
- All Source Analysis System (ASAS).
- Combat Service Support Control System (CSSCS).
- Force XXI Battle Command – Brigade and Below (FBCB2).

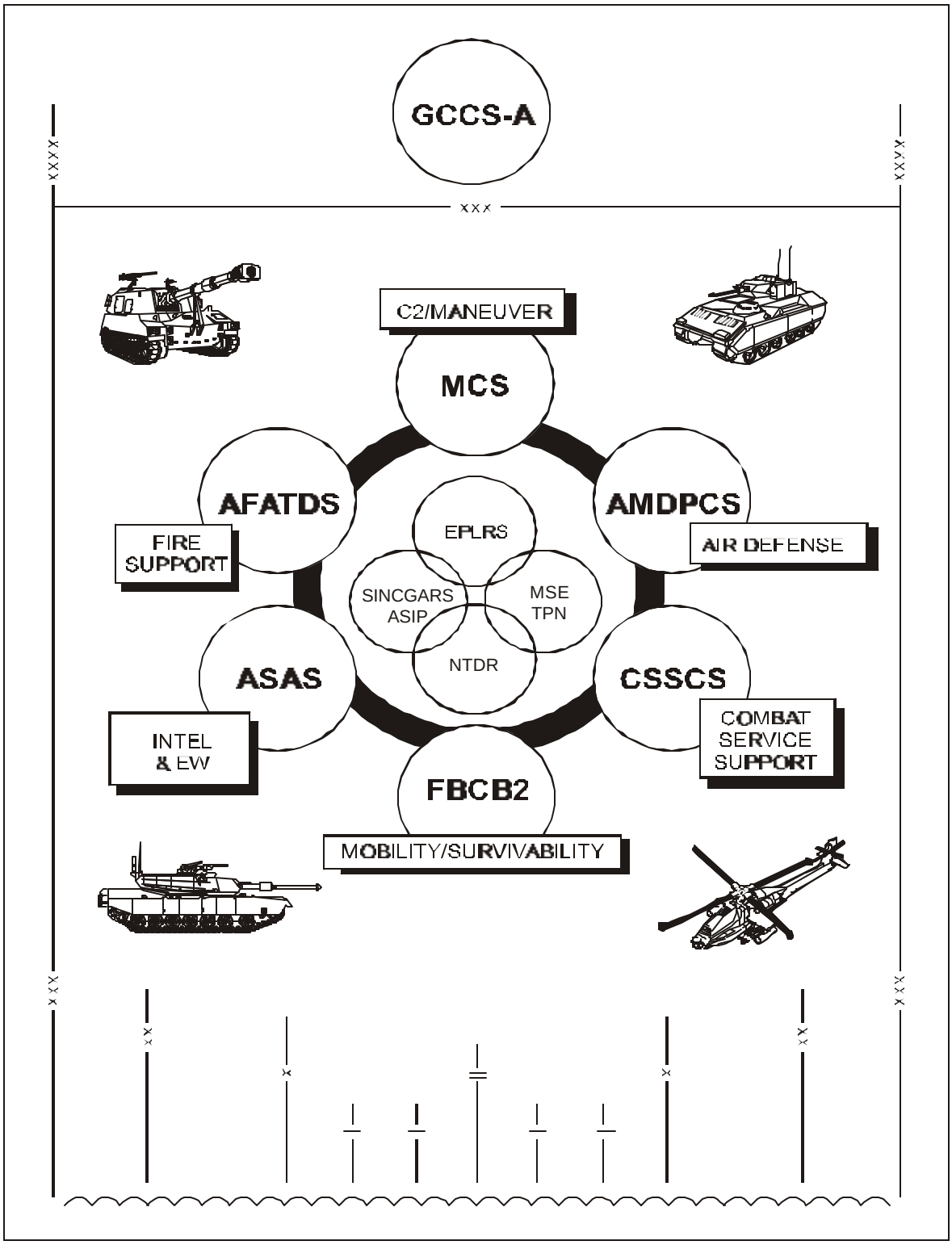


Figure 1-1. ABCS Architecture

COMMUNICATIONS COMPONENTS

1-5. The principal communications components supporting the TI and ABCS are the–

- Enhanced Position Location Reporting System (EPLRS).
- Near-Term Digital Radio (NTDR).
- Single-Channel Ground and Airborne Radio System-System Improvement Program/Advanced System Improvement Program (SINCGARS SIP/ASIP).
- Enhanced mobile subscriber equipment (MSE).

1-6. The TI is integrated with the total ABCS through an interface at tactical operations centers (TOCs). It enhances the necessary information for battle command at brigade and below. The FBCB2 functionality of the TI is integrated into the TOC local area networks (LANs) at battalion and brigade echelons using embedded battle command (EBC). This enables information flow between the soldier/platform level and the division echelon and throughout the ABCS.

1-7. The NTDR links the TI to the ABCS at division, brigade, and battalion TOCs. The NTDR network provides the primary data transmission system for the TOCs ABCS at the battalion level.

SYSTEMS ARCHITECTURE AND EMPLOYMENT

1-8. The TI architecture consists of C2 and SA subarchitectures that provide C2 data exchange and SA information (friendly and enemy locations), respectively. C2 and SA subarchitectures also provide a means for secure voice transmission. They can operate simultaneously when the platform is setup for data and voice. They are transparent to the user and are governed by the type of service the host requests.

1-9. The TI supports the employment of the major command, control, communications, and computers (C4) systems. Component systems that constitute the TI architecture are the–

- FBCB2 system.
- EPLRS.
- NTDR.
- SINCGARS SIP/ASIP with Internet controller (INC).
- Precision Lightweight Global Positioning System Receiver (PLGR).
- Global Broadcast Service (GBS).
- G6/S6 vehicle.
- Employment.
- Gateway router.
- LAN Ethernet switches.
- C2 platforms.
- Domain name server (DNS).

These systems are discussed in detail in the following chapters.

NOTE: For consistency, the use of the term "system" in this manual is based on the concept of a total system that is all inclusive of the automation system(s), communication system(s), and selected platforms. These provide shelter and/or mobility for the automation and communication systems.

TI AT DIVISION

1-10. The following systems support the TI at division by providing network management, bandwidth relief, and in the case of EPLRS, a TI backbone.

G6/S6 VEHICLE

1-11. The G6/S6 vehicle is located at the tactical command post (TAC). The Integrated Systems Control Version4 (ISYSCON (V)4), installed in the G6/S6 vehicle, plans and manages the TI. Using the ISYSCON (V)4, the G6 tracks TI effectiveness and supports battle command information flow between the TI and the ABCS. The G6/S6 vehicle uses the following integrated capabilities:

- EPLRS.
- SINCGARS SIP/ASIP.
- MSE-tactical packet network (TPN) X.25 interface.
- NTDR interfaces, TOCs, and TAC LANs.

GBS

1-12. The GBS at division consists of the theater injection point (TIP) and the receive suite of equipment. The division signal battalion operates and maintains the TIP. The TIP is normally located at a node center (NC). It allows the commander to broadcast large volumes of critical tactical information throughout the operational area. The receive suite is located at the division TAC, brigades, and battalions. It consists of a receive terminal and one or more receive broadcast managers (RBMs). The commander has the ability to select what information is to be received at the RBM. Signal personnel operating the G6/S6 vehicle operate and maintain the receive suite.

EPLRS

1-13. EPLRS is an integral communications system that provides the backbone for the TI. The G6 operates EPLRS divisionwide. EPLRS consists of network control stations (NCS-Es) and numerous radio sets (RSs) deployed with all division units throughout the division area.

ENHANCED MSE

1-14. Enhanced MSE is a common-user, asynchronous transfer mode (ATM) switch-enabled communications system. Switching nodes are linked together with high capacity line of sight (LOS) radio systems and ECB units are linked with an Area Common User System (ACUS). The ACUS is digital, secure, and flexible. It contains features that compensate for outages in linking or functional elements, overloads in traffic, and rapid movement of users. It provides voice and data communications on an automatic, discrete-

addressed, fixed directory basis. The ACUS supports both mobile and wire subscribers with a means of exchanging command, control, communications, and intelligence (C3I) information. Organic tactical satellite (TACSAT) equipment and tropospheric scatter (tropo) equipment provide an extension that improves enhanced MSE's employment capability.

Components

1-15. Enhanced MSE system's major components include–

- NCs.
- Large extension nodes (LENs).
- Small extension nodes (SENs).
- All ATM-enabled system control centers.
- Radio access units (RAUs).

1-16. NCs serve as an access point for LENs, SENs, RAUs, and system control centers. Each NC site operates as an automatic switching point that receives and routes transmissions to other switches. The LEN provides access to the ACUS for large groups of users in areas where mobility and dispersion are not primary considerations. The SEN provides ACUS access for smaller units such as battalion or brigade TOCs. The RAU gives mobile subscribers secure, wireless access to the ACUS.

Capabilities

1-17. The enhanced MSE supports and links mobile and wire subscribers for the exchange of C3I information in the tactical environment. An extension node serves as a local call-switching center and provides access to the network by connecting to the node center switch at an NC. Each LEN can service a TOC of 164 wire subscribers. The SEN (V)1 can service 26 wire subscribers and the SEN (V)2 can service 41. Some LENs and SENs equipped with combat net radio (CNR) interface provide a capability for CNR users to enter the enhanced MSE network and give them access to commercial networks.

Employment

1-18. The enhanced MSE is employed at division, brigade, and selected battalions. The enhanced MSE network is made up of four NCs that support the battlespace. Within the division area of operation, radio or wire connects subscriber to SENs/LENs.

TACSAT

1-19. TACSAT terminal communications support provides multichannel range extension for critical node paths within the ACUS to support rapid and lengthy force movement in the area of operation. The terminals are compatible with the triservice tactical communications and enhanced MSE systems. They support missions at echelons from the theater/joint task force level down to the maneuver brigade. The TACSAT system currently uses the military portion of the super high frequency spectrum via the Defense

Satellite Communications System network. See FM 24-11 for tactical satellite capabilities.

RESPONSIBILITIES

1-20. The division signal battalion planning and operation elements are important in the successful operation of the TI. A close working relationship must exist between the G6 and S6 to ensure the satisfaction of user requirements and the proper allocation of communications resources. The two primary signal battalion elements involved are the G6 and the system control (SYSCON).

G6

1-21. The G6 plans communications for the division units. The subordinate unit S6s provide their communications requirements to the G6. This includes enhanced MSE and EPLRS communications systems requirements, frequency modulated (FM) and high frequency (HF) radio net requirements, and communications security (COMSEC) key management. These requirements have a direct impact on the performance of the TI. In some cases, depending on the theater of operation, resource requirements supporting the TI may be available at division. At other times, the division G6 may require support from the corps G6. This is especially true regarding radio frequency and COMSEC key list availability and utilization.

1-22. The automated key management system (AKMS) provides an automated capability for communicators to develop unit signal operating instructions (SOIs) and SINCGARS SIP/ASIP fill data. To ensure continuity throughout the division, the deputy G6 must also plan the TI naming convention. See Appendix A for more information on the TI naming convention. Since the TI links to the ABCS, the G6 must ensure proper LAN management for the ABCS network within the division TOCs and TACs. The G6 must ensure that the ACUS provides an adequate wide area network (WAN), via MSE, to support information flow from the TI.

SYSCON

1-23. Once the G6 has started planning, the SYSCON manages the signal resources that support the systems on which the TI rides to ensure operational continuity. This is especially important with enhanced MSE and EPLRS because detailed planning for predeployment will make future deployment easier. The signal battalion and maneuver brigades S6 section must establish a close working relationship to support the SYSCON functions.

TI AT BRIGADE AND BELOW

1-24. The TI at brigade and below is an automated, router-based communications network consisting of routers, EPLRS, SINCGARS SIP/ASIP, and other supporting communications equipment. The network uses commercial Internet standard protocols to move data vertically and horizontally throughout the brigade area. ISYSCON (V)4 at the brigade and

maneuver battalion levels provides TI planning, monitoring, and reconfiguring capabilities.

1-25. The TI supports the operational areas deployment of host FBCB2s, supporting communications, networks, and integrated management at each echelon. Terms associated with the TI are–

- **Autonomous system (AS)** – a collection of networks, under a common administration, that share a common routing strategy. An AS consists of one or many networks, and each network may or may not have an internal structure.
- **Routing area (RA)** – a network within an AS. RAs and the AS to which they belong share the same routing strategy.

1-26. Figure 1-2 shows the complexity of the TI architecture required at brigade and below. It shows the echelons of brigade, battalion, company, and platoon. It indicates the TI employment that supports them in terms of hosts, communications, networks, and management elements. This representation of the TI focuses on the operational aspects of operating and managing the advanced systems that will provide enhanced data transfer and communications support to the digitized brigade.

FUNCTIONS

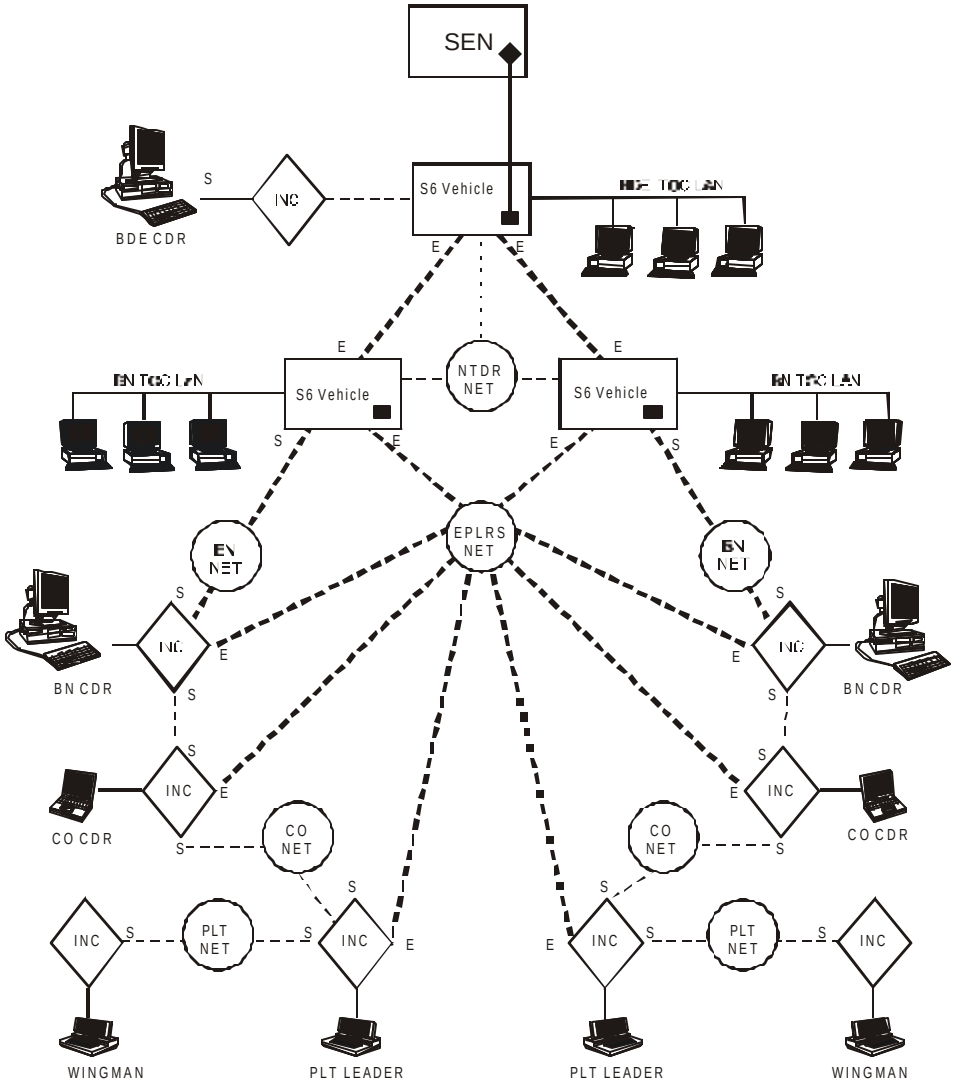
1-27. The TI is the primary communications architecture supporting the warfighter at brigade and below. It enhances the sharing of C2 data by commanders, staffs, units, soldiers, and weapon platforms. It also improves force lethality, operational tempo (OPTEMPO), and survivability, while providing near real-time SA. The FBCB2 exchanges information with the other components of the ABCS, including those installed in selected platform-based C2 systems such as the–

- Battle command vehicle (BCV).
- C2 vehicle (C2V).
- Helicopter-based Army Airborne C2 System (A2C2S).

1-28. This information exchange consists of selected, interoperable, joint variable message format (JVMF) messages used in communicating between the ABCS automated components.

1-29. Key communications systems that the TI employs at maneuver brigade and below are the–

- EPLRS.
- SINCGARS SIP/ASIP with INC.
- NTDR.
- MSE TPN (brigade level only).
- Enhanced MSE (brigade level only).



Note: Does not show all connectivity.

LEGEND:

INC - Internet Controller
NTDR - Near Term Data Radio
S - SINCGARS
E - EPLRS
■ - Gateway Switch
◆ - Gateway Router to TPN

Figure 1-2. TI Generic Connectivity at Brigade and Below

RESPONSIBILITIES

1-30. The paragraphs below discuss the specific duties and functions of personnel at brigade and below responsible for the installation, operation, and maintenance of the TI.

S6

1-31. The S6 is the staff signal expert supporting the maneuver commander. The S6–

- Advises the commander and other staff members on all signal support matters, including TI employment and operation.
- Coordinates with the G6 or brigade S6 for the exchange of communications information and assets, as required.
- Interacts primarily with the S3 and takes a proactive part in the staff planning and operations process.
- Writes the signal annex to the brigade order to support the TI. (See Appendix B for a sample annex to the brigade operations order.)
- Organizes, trains, and controls the brigade S6 section.
- Maintains continuous dialogue with other S6s assigned or attached to the brigade to ensure successful communications.

S6 Staff Section

1-32. The S6 staff section at brigade and battalion supports the planning, engineering, integration, and maintenance of the TI and all other communications systems supporting the commander and staff. The S6 staff section functionally plans, monitors, and changes the TI to support the units' scheme of maneuver.

1-33. The brigade S6 staff section consists of the S6, systems automation manager (area of concentration 53A), data-processing technician (military occupational specialty [MOS] 251A), and signal support section. The battalion S6 staff section consists of the S6 and the signal support section. The signal support section is equipped with G6/S6 vehicle and is deployed to support the maneuver TOC. Each G6/S6 vehicle crew consists of three information systems integrator-analysts (MOS 74B) for TI/LAN management functions within the battalion.

Unit Signal Support Systems Specialists

1-34. The unit signal support systems specialists assigned to all maneuver, combat support (CS), and CSS units accomplish TI system organizational level maintenance and initialization/reinitialization functions, as required.

Mission Applications Administrator

1-35. The mission applications administrator is a functional expert that has overall operation and use of the mission application and associated software and hardware.

Mission Applications User

1-36. The mission applications user installs, operates, and maintains the user application software (common software and Battlefield Functional Area Control System-unique software) and hardware (including LAN hardware). He is also responsible for terminal level information assurance.

NOTE: See Chapter 10, TI Management, for more information on TI responsibilities.