

Chapter 4
Communications

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PRINCIPLES AND DEVELOPMENTS IN COMMUNICATIONS SYSTEMS

Communications systems are essential for gathering and disseminating data. Personnel need them to plan and execute operations. Commanders use them to perform C2 functions and to supervise performance. Effective management of support battalion functions depends on adequate communications to keep abreast of changing situations and requirements.

The support battalion relies on both its organic communications assets and the support of the corps signal battalion. Communications equipment and systems in the corps are changing. The MSE system is replacing the old area communications system described below. SINCGARS and IHFR are replacing the current FM-VHF (AN/VRC-12) series radios and AM-SSB (AN/GRC-106) radios.

These changes affect how the support battalion units connect to the area system. Under the old area system, the brigade extension platoon in the area signal company provides signal facilities to the brigade. Services include –

- Automatic telephone central office and switching facilities for trunk and local telephone circuits. The area telephone system is common-user. It is automatically switched and designed as transparent to the users. Dial-up services include not only voice service but also data transfer and facsimile. The services also include other forms of electronically formatted information. Cable/wire installation teams install the internal cables and local telephone circuits. They lay cable/wire to tagged junction boxes. Subscribers install local telephone circuits to the junction boxes. If time permits, the

cable/wire teams help install wire in the brigade LOC/TOC.

- Secure multichannel LOS communications terminals for access to the automatic switched network. The LOS multichannel is the most common and most frequently used system in the brigade. The BSA is normally in the brigade multichannel system in the initial deployment of the multichannel system. However, this depends on the timing of the BSA moves through the operational area. It also depends on the BSA locations relative to the threat force.
- Net-radio interface facility for secure single-channel FM radio access into the brigade automatic switched network. The basic single-channel radio net which passes CSS information is the administrative and logistics net.
- Secure single-channel HF RATT terminals for entry into the GP RATT net. The GP RATT net provides hard-copy communications traffic and extended distance communications for the BSA.
- Secure multichannel TACSAT terminal at the brigade for access to the automatic switched network over extended distances. TACSAT assets supplement existing LOS multichannel systems. When tactical situations disperse the brigade beyond any service by LOS, the TACSAT communications network is essential. It is the primary means of connection between the forward elements of the brigade and the various support bases.

MOBILE SUBSCRIBER EQUIPMENT AREA COMMUNICATIONS SYSTEM

MSE is the new area common user voice communications system within the corps. It is the backbone of the corps system and deploys from the corps rear boundary forward to the maneuver battalion main CP. The MSE system is comprised of four functional areas:

- Area coverage.
- Wire subscriber access.
- Subscriber terminals.
- Mobile subscriber access.

AREA COVERAGE

Area coverage means MSE provides common user support to a geographic area as opposed to dedicated support to a specific unit or customer. Under MSE, signal elements deploy node centers across the corps. They are under the control of the corps signal officer.

At corps level, the area signal battalion operates four of these nodes. Connected to these nodes, via LOS radios, are small extension node switchboards and large extension node switchboards. The following switchboards are organic to the corps signal battalion

- 40 SEN switchboards capable of supporting 41 subscribers each.
- 1 LEN switchboard capable of supporting 176 subscribers.

There are an additional 24 SENs and 1 LEN in the corps signal brigade's signal support battalion.

The corps signal officer/signal brigade commander determines the location of switchboards based on the commander's intent, customer requirement and other factors of MEIT-T. A habitual relationship is established and maintained between extension nodes including LOS teams and the CPs of corps combat units, that is ACRs or artillery brigades. This is not the case if those units revert to a reserve mission. In that case, the supporting extension switch team is assigned another support mission until their habitually associated CP becomes active again.

COMBAT NET RADIO SYSTEM

Three separate radio systems determine the design of the combat net radio structure; each has different capabilities and transmission characteristics. The three systems are —

- Single-channel objective tactical terminal.

WIRE SUBSCRIBER ACCESS

Wire subscriber access points provide the entry point (interface) between fixed subscriber terminal equipment owned and operated by users and the MSE area system operated by signal units. The interface points are —

- The signal distribution panel (junction box) J-1077. Each panel provides up to 13 subscriber access points.
- The remote multiplexer combiners which provide up to eight subscriber access points.

Beyond these two interface points, the using units install and operate freed subscriber terminal instruments as well as install and maintain the WF 16-field wire from the instruments to the interface points into the area system.

FIXED SUBSCRIBER TERMINALS

The support battalion uses subscriber terminals that are digital nonsecure voice telephones. These provide full duplex digital, 4-wire voice and a data port for interfacing the AN/UNC-7 facsimile for informal record traffic, the TACCS computers for CSS STAMISs, the AN/UGC-144 (the single subscriber terminal) for formal record traffic and the unit-level computers for the unit-level logistics STAMISs.

MOBILE SUBSCRIBER TERMINAL

The MSE terminal is the AN/VRC-97 mobile subscriber radiotelephone terminal. This MSRT, which consists of a very high frequency radio and a digital secure voice terminal, is a vehicle-mounted assembly. It interfaces with the MSE system through a radio access unit. The MSRT provides mobile subscribers access to the MSE area network. MSRTs also operate in CPs to allow access to staff and functional personnel. The MSRT user has a KY68 telephone connected to the radio mounted in his vehicle. As long as the radio unit has LOS contact with the RAU, and the operator has properly affiliated, it connects to the area system. The operational planning range is 15 kilometers from any RAU.

- Improved high frequency radio.
- Single-channel ground and airborne radio.

SCOTT is a stand-alone transportable tactical satellite communications terminal which is transparent to the brigade. The other two systems, IHFR and SINCARS,

provide the primary means of voice transmission of C2 information and the secondary means for data transmission, which is required if data transfer requirements are not met by the MSE system or couriers.

Current CNR equipment in the support battalion consists of the AN/GRC-106 and the AN/VRC- 12 series radios. The IHFR and SINCGARS series respectively replace these radios. For a description of the new radios, refer to FM 24-24. SINCGARS is a new family

of VHF-FM radios. These radios are designed for simple, quick operation using a 16-element keypad for push-button tuning. They are capable of short-range or long-range operation for voice or digital data communications. The planning range is 8 to 35 kilometers. They also operate in a jam-resistant, frequency-hopping mode which is changed as needed. IHFR is a family of high frequency radios consisting of the AN/PRC-104 manpack radio and the AN/GRC-193 vehicular radio.

SUPPORT BATTALION RADIO NETS

This section discusses radio nets in the support battalion and support squadron. Tables 4-1,4-2, and 4-3 list the nodes in each net.

SUPPORT BATTALION
COMMAND/OPERATIONS NET

The principal radio net operated by the support battalion headquarters is the support battalion command/operations net. The headquarters uses the net to command and control the elements of the support battalion both from a command standpoint and from a CSS mission perspective. The net control station of this net

is the S2/S3 site in the CP. In addition, headquarters personnel/sections monitor the following nets:

- Support battalion commander – brigade command/operations net.
- S2/S3 – brigade administrative/logistics net. (Remote to support battalion command net radio in S2/S3 with AN-GRA 39.)
 - brigade operations/intelligence net.
 - COSCOM/DISCOM command/operations net (AM).

Table 4-1. Support battalion radio nets (heavy separate brigade).

Cmd/Ops	S & T Co	Maint Co	Med Co
NCS: S2/S3 Bn Cdr Bn XO/CSM S1 and S4 C-E Ofr Maint Mgt Ofr Ammo Tech Ammo Sup Sgt (ATP) Bde Ammo Ofr Mat Mgrs Mat Ofr, Maint Mgt Tech, Sup Mgt Tech HQ Co Cdr Maint Co S&T Co Med Co	NCS: Co Cdr Maint Sec Sup Plt HQ CI I and Water Sec Petrl Plt HQ Petrl Distr Sec TMT Plt HQ Light Cgo Trk Sqd Medium Cgo Trk Sqd HET Trk Sqd Rec, Stor, Iss Sec ATP Tankers	NCS: Maint Con Sec Co Cdr Autmv/Armt Plt HQ Autmv Maint Sec Armt Maint Sec Arty Spt Tm Gnd Spt Plt HQ Svc Sec Elct Maint Sec CCI Rep Sec Msl Spt Tm Sys Spt Tms GSE Rep Sec Storage Sec	NCS: Co Cdr Trmt Plt HQ Trmt Sqds MH Tm PVTMED Sec Amb Plt HQ Amb Sqds

Table 4-2. Support battalion radio nets (SIB/TDB).

Cmd/Ops	S&T Co	Maint Co	Med Co
NCS: S2/S3 Sec Bn Cdr Bn XO S1 and S4 S2/S3 Mat Mgt Ofr Retrans Tm Ammo Ofr Bde ATP NCO Mat Ofr HQ Co Cdr S&T Co Med Co Maint Co	NCS: Co Cdr Maint Sec Rcvy Opr Sup Plt Ldr Wtr Trmt Supv Wtr Purif Tms ATP Sec Ch POL Plt Ldr Tankers Petrl Distr Supv Trmt Plt Ldr Lt/Mdm Cgo Trk Sqds Rec, Stor, Iss Sec	NCS: Maint Con Sec Co Cdr Autmv Maint Plt HQ Autmv Maint Sec Armt/Elect Plt HQ Armt Maint Sec Maint Tech Msl Rep Sec Maint Spt Plt HQ Gnd Spt Rep Sec Svc/Rcvy Sec Maint Spt Plt Inf Spt Tms Arty Sys Spt Tm CI IX Sec	NCS: Co Cdr Motor Pool PVTMED Sec Trmt Plt HQ Trmt Sqds Amb Plt HQ Amb Sqds MH Tm Opt Tm

Table 4-3. Support squadron radio nets (ACR).

Cmd/Ops	S&T Trp	Maint Trp	Med Trp
NCS: S2/S3 Sec Sqdn Cdr Sqdn XO S1 S3 Comm Ofr S4 HQ Trp Cdr S&T Trp Cdr Med Trp Cdr Maint Trp Cdr Mat Ofr, Maint Tech, Mat Mgt Supv Ammo Tech Regt Ammo Ofr	NCS: Trp Cdr Sup Plt Ldr ATP Sec Ch Wtr Sup Supv Wtr Sup Sps Petrl Plt Cdr Petrl Distr Sec TMT Plt HQ Lt Cgo Sqds HET Sqd Mdm Trk Sqd Maint Sec CI I-IV-VII Sec Tankers	NCS: Maint Con Sec Trp Cdr ACS Maint Spt Plt HQ ACS Maint Spt Tms Autmv/Svc Plt HQ Autmv Maint Secs Svc Sec Msl/Armt Plt HQ Msl Spt Sec Armt Maint Sec Gnd Spt Plt HQ Elct Maint Sec Gnd Spt Equip Rep Sec ADP Maint Sec F&E Sec	NCS: Trp Cdr Trmt Plt HQ Trmt Sqds Amb Plt HQ Trmt Plt HQ Amb Sqds

Collocation of the support battalion CP and the brigade rear CP helps to overcome perpetual shortfalls in radios. This collocation allows the support battalion access to the brigade administrative/logistics net and to the brigade command net.

SUPPLY AND TRANSPORTATION COMMAND NET

This command net provides C2 for the S&T company headquarters and the supply, petroleum, and TMT platoons. In the petroleum platoon, every third tanker unit has a radio for control purposes. In the ATP, the section chief and each forklift have radios to expedite the transloading of Class V to units. Due to the isolation of the ATP and the requirement for corps management of Class V, additional CNR capability is located at the ATP. The BAO representative at the ATP has an FM radio (AN/VRC-46 or AN/VRC-90) to coordinate the flow of Class V with the BAO located at the BMMC. When MSE is deployed, an MSRT also locates at the ATP thus providing access to the corps Class V structure.

MAINTENANCE COMPANY COMMAND NET

The maintenance company net provides C2 for its maintenance elements which operate throughout the brigade area. Elements of this net enter customer nets to coordinate mission requirements.

MEDICAL COMPANY COMMAND NETS-FM/AM

The medical company net provides C2 for medical treatment and evacuation throughout the brigade sector. The medical company's dual net capability at platoon and squad level provides for coordination with supported units and medical air evacuation. The company also has an AM-IHFR combat net radio that nets with the division medical operations AM net. If the company is not deployed with a division, medical regulating and aeromedical evacuation coordination require a high-frequency radio (long range) net. At a minimum, it needs to tie into a medical group or medical brigade regulating net.

SIGNAL SECURITY

As part of the overall operations security program, support battalion elements consistently practice signal security. A vital consideration is siting of transmitting antennas. Sites enable communications while minimizing the enemy's ability to intercept and locate transmissions. Considerations include –

- Remote antennas away from CPs by at least 1 kilometer.
- Construct and use directional antennas.
- Use terrain features, such as hills, vegetation, and buildings, to mask transmissions.

Other guidelines on signal security include the following:

- Maintain radio or radio listening silence, using radio only when absolutely necessary.

- Distribute codes on a need-to-know basis.
- Use only authorized call signs and brevity codes.
- Use wire and messengers whenever feasible.
- Use available secure voice/RATT devices.
- Maintain net discipline and control.
- Use authentication and encryption codes specified in the current SOL.
- Keep transmissions short (less than 20 seconds).
- Report all COMSEC discrepancies to the net control station.
- Use lowest transmitter power output consistent with good communications.
- Avoid significant surges in traffic on single-channel radio nets.

COURIERS

Courier service, although slow, is a reliable means of exchanging information. A support battalion element performs this service, not a signal unit. Due to the length of CSS transmissions and the high density

of elements in the BSA, personnel use couriers and wire communications when practical. This lessens the security risks of substantial radio use.