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FM 7-24

DEPARTMENT OF THE ARMY FIELD MANUAL

COMMUNICATION IN INFANTRY AND AIRBORNE DIVISIONS

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HEADQUARTERS, DEPARTMENT OF THE ARMY
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FIELD MANUAL

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DEPARTMENT OF THE ARMY
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COMMUNICATION IN INFANTRY AND AIRBORNE DIVISIONS

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CHAPTER I

GENERAL

Section I. INTRODUCTION

1. Purpose and Scope

a. This manual is a guide for commanders and staff officers of the "D" series divisions (TOE 7D and 57D) in the tactical employment of communication personnel and equipment for signal communication in infantry and airborne divisions. It describes the signal communications available to these divisions and gives information to assist commanders in supervising the installation, operation, and maintenance of their unit's communication systems. It serves signal and communication officers by providing guidance for supervising the signal communications system.

b. The communication principles in this manual apply equally to nuclear and nonnuclear warfare. Occasional differences are noted as they occur in the text. Commanders must keep in mind that the extended distances in the defense, the exploitation of nuclear weapons in the attack, and other tactical considerations of the nuclear battlefield demand communication planning in minute detail.

c. Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be forwarded direct to United States Army Infantry School, Fort Benning, Ga.

2. Responsibility for Communications

a. Each commander is responsible for the installation, operation, and maintenance of his unit's communication system and for its efficient functioning as a part of the next higher unit's communication system. Each commander exercises tactical and technical supervision over the communication systems of all units of his command.

b. The responsibility for communication between units is subject to the following general rules:

- (1) The higher unit is responsible for establishing communication with the lower (including attached) unit.

(2) A unit supporting another unit establishes communication with the supported unit.

(3) Lateral communication between adjacent units is established and maintained by the unit on the left to the unit on the right unless directed otherwise by their common commander.

c. Although one unit is specifically charged with establishing and maintaining communications with another unit, it is only through the mutual effort of all concerned that continual communication is assured.

d. Signal centers of the area system are responsible for establishing and maintaining all extension facilities except those to divisional and supporting corps artillery subordinate units. These units are responsible for the installation of field wire to connect into the nearest signal center.

3. Characteristics of Division Signal Communication system

The division's extensive and flexible communication system facilitates command, control, and administration. The system—

a. Uses a large number of vehicle-mounted radio sets to permit immediate personal contact between commanders and staff officers during tactical operations.

b. Uses numerous radio nets for separate and distinct purposes. Separate nets are established for command, operations, information and intelligence, fire support, administration, and logistics. The separate nets are necessary because of the nature and volume of traffic.

c. Has versatile electronic signal equipment that can be integrated into various types of communication systems. Radio can be used for voice, continuous wave, and radioteletype operation over great distances. Multichannel radio relay is integrated with wire for telephone and/or teletype operation. The system also provides radio wire integration.

d. Provides maximum efficiency for a division area communication system that is flexible enough to allow communication over alternate routes if portions of the system are damaged or destroyed. Interconnected signal centers in this system service all echelons of the division.

e. Demands close coordination of signal supply and maintenance support because of the configuration of the system and the complexity of the equipment which goes to make up the system.

4. Staff Coordination on Matters Affecting Communication

Details concerning the functions, procedures, authority, and responsibilities of the various components of the staff are outlined in FM 101-5. Staff coordination on communication matters is covered

in unit SOP pertaining to communication. SOP's may vary among different organizations, but they all usually prescribe that—

a. After the general location of the command post has been determined, the G1/S1 or headquarters commandant, and the signal officer/communication officer select the exact site and decide on the interior arrangement of the command post. The G1/S1 or headquarters commandant directs the placing of signs and guides to indicate its location. The headquarters commandant is responsible for the security of the command post, and he maintains order and enforces traffic and camouflage discipline in the command post area. He is responsible for the movement of command post personnel and equipment and for the displacement of the command post.

b. The intelligence officer (G2 or S2) informs the signal officer/communication officer of special security measures and arranges with him for communication with observation posts and other intelligence elements. He supervises the collection of information having signal intelligence value, exercises general staff responsibility in the area of communications security, and works in coordination with the signal officer in preparing cryptographic items (authorized by higher authority) to insure their adequacy from the communication security viewpoint.

c. The operations and training officer (G3 or S3) and the signal officer/communication officer coordinate communication with tactical operations. The G3 (S3) gives the signal officer/communication officer timely information relative to contemplated operations and displacement of the command post. The signal officer/communication officer submits his recommendations for paragraph 5 of operation orders to the G3 (S3) for the commander's approval. The G3 (S3) supervises the signal officer/communication officer in preparing cryptographic material (authorized by higher authority) to make sure it meets operational and training requirements. The G3 (S3) establishes priorities for the installation and use of the means of communication and the restoration of circuits after a major interruption. He may also authenticate signal orders, annexes, and instructions.

d. The supply officer (G4 or S4) arranges for communication with supply installations and sees that communication vehicles have the necessary road priority. He is responsible, in coordination with the signal officer/communication officer, for procuring, issuing, and maintaining signal equipment and supplies, and for collecting and disposing of salvage signal equipment.

e. The civil affairs officer (G5 or S3) arranges with the signal officer/communication officer for communication with CA units. He is responsible for coordinating civil-military signal assistance when required.

5. Equipment, Supplies, and Transportation

a. Tables of organization and equipment list the major items of signal equipment and transportation authorized for each unit. Expendable supplies are listed in tables of allowance. When a unit is assigned a special mission requiring more than authorized allowances, it requests additional supplies from higher commanders.

b. The equipment authorized for or available to similar units may vary, particularly during transition periods when new equipment is being procured.

6. Traffic Priority

Vehicles engaged in installing, operating, and maintaining wire or radio relay communication systems and those carrying messengers are given a high road priority. The priority designation should be displayed plainly on the vehicle. Other communication vehicles, including those carrying routine signal supplies, have no special traffic priority.

7. Communication Center

A communication center is charged with the responsibility for receiving, transmitting, and delivering official messages at a military headquarters or an echelon of a headquarters. The communication center normally is composed of a message center section, a cryptographic section, and one or more means of communication. Units lower than division normally do not operate communication centers as such, but establish and operate message centers to serve as a control and focal point for the various means of communication. For details of the operation of a communication center, see FM 11-17.

8. Message Center

a. The message center at a headquarters is charged with the effective utilization of all available means of communication in the handling of all official messages except—

- (1) Those transmitted directly by the originator, using a means of communication provided for such use.
- (2) Those handled by military or civil postal services.
- (3) Local messages.

b. The size and composition of message centers vary with the number of personnel authorized by tables of organization and equipment or designated by the commander.

9. Maintenance and Repair of Signal Equipment

Each unit maintains and repairs its signal equipment within the limits of its maintenance facilities, parts, authorized tools, test equipment available, and the capabilities of assigned repairmen. These functions are termed *organizational maintenance*. In the infantry

division, *field maintenance* is performed by the signal maintenance section and the forward repair sections of the forward communications company of the division signal battalion. In the airborne division, field maintenance, except third echelon maintenance of cryptographic equipment, is performed by the maintenance battalion of the support group. Signal equipment requiring repair beyond the capabilities of these units is turned in to a higher echelon for repair.

Section II. ORDERS AND INSTRUCTIONS AFFECTING COMMUNICATION

10. Signal Operation Instructions and Standing Signal Instructions

a. Signal Operation Instructions (SOI) are a type of combat order issued for the technical control and coordination of communication within a command: They include items covering codes and ciphers; radio call signs and frequencies; telephone directory; and visual and sound signals. Current items are listed in the index to the SOI. The division signal officer prepares the division SOI. They conform to the SOI of the next higher unit. Normally, units smaller than a division prepare only extracts from the division SOI.

b. Standing Signal Instructions (SSI) contain items of operational data not subject to frequent change and instructions for the use of the SOI. They are prepared by the division signal officer who may issue them in a separate publication or consolidate them in the SOI.

c. For details on the preparation of SOI's and SSI's, see FM 11-16.

11. Standing Operating Procedure

a. Standing Operating Procedure (SOP) pertaining to communication for the division is prepared by the division signal officer for the approval of the division commander. Communication SOP's for all divisional units are based on the division SOP and are prepared by unit signal/communication officers for the approval of their commanders. The division signal officer prepares the signal battalion SOP.

b. Standing operating procedure is particularly applicable to signal/communication units, since many of their operations are the same regardless of the type of tactical operation.

c. For details on the preparation of signal SOP's, see FM 11-16.

12. Paragraph Five of Operation Order

a. Paragraph 5 of an operation order contains instructions and information relative to communication and command posts. The signal/communication officer submits his recommendations for this paragraph to the G3 (S3). The contents of paragraph 5 vary with

the size of the command, the use of standing operating procedure, and the situation. As a minimum, paragraph 5 contains the location of the initial command post of the issuing unit or the place where messages are to be sent, and the index to the SOI in effect.

b. Paragraph 5 may be oral or written. Applicable portions of the following instructions are covered in the sequence indicated:

- (1) Paragraph 5a contains a reference to the signal annex or index to the SOI in effect; restrictions, if any, on the use of any means of communication; visual and sound signals; and any other information not contained elsewhere in paragraph 5, such as lateral lines to be constructed.
- (2) Paragraph 5b includes the location of the command post of the next higher unit and the prescribed locations of command posts of subordinate units. It may also give the time of opening of command posts. Paragraph 5c shows the axis of command post displacement. If the information relative to the axis of command post displacement is shown on an operation map or overlay, it need not be written out in paragraph 5.
- (3) The location and time of opening of an advance message center, march control point, or other place where messages may be sent, may be given in another subparagraph of paragraph 5.

13. Oral Orders of a Signal/Communication Officer

After a signal/communication officer obtains approval of his communication plan, he issues oral orders to appropriate communication personnel, supplementing them, if desired, with an operation map. This practice expedites the establishment of communication. He omits detailed orders for routine operations that are governed by SOP. Oral orders include—

- a. Information of enemy and friendly forces required for the efficient operation and security of the communication system.
- b. The mission of the unit.
- c. Any or all of the following instructions to operating personnel:
 - (1) Instructions concerning the location of the message center and messenger station; schedules and routes; use of codes and ciphers; location and routes to the command posts of subordinate, attached, supporting, and adjacent units, and the next higher headquarters.
 - (2) Instructions concerning the location of radio installations; operation instructions and schedules; employment of voice radios; special visual and sound communication instructions; location of panel display and message drop and pick-

up sites; and restrictions, if any, on the use of radio and visual means of communication.

- (3) Instructions concerning the location of the switchboard; number and location of local telephones (including long locals, such as lines to the observation posts); use of sound-powered telephone equipment; number and routes of trunk-lines; and applicable special instructions (may be clarified with a circuit diagram and a line-route map).

d. Administrative details, including the location of the motor park, bivouac area, and signal supply point.

Section III. COMMAND POST

14. General

a. The headquarters of a unit in the field is called the command post. When the headquarters is divided into a forward and a rear echelon, the forward echelon is the command post and the rear echelon is primarily administrative. An alternate command post is always designated. A tactical command post will be established as required. The command post consists of personnel and equipment required to furnish immediate assistance to the commander in tactical operations. All communications facilities center at the command post.

b. The commander keeps higher, lower, and supporting units informed of his command post's location.

c. Details concerning the echelonment, composition, and location of command posts is outlined in FM 7-100 and FM 57-100.

15. Selection

The G3 (S3), after coordinating with the signal/communication officer, recommends the general location of the command post. His recommendations are based on the following factors, the relative importance of which depends upon the situation.

a. Type of Tactical Operation. During movement to contact, the command post moves by bounds along a designated route, or it is located at a specified place in the formation. In offensive operations, it is located well forward to avoid early displacement. In the defense, it is located well to the rear. In other types of tactical operations, it is located at the place from which the commander can most effectively control his unit.

b. Disposition of Troops and the Plan of Operation. A command post remote from its units places an unnecessary burden on the communication system, delays the transmission of orders and information, and makes tactical control difficult. The locations of the higher headquarters and the unit making the main effort influence the location of the command post.

c. Communication Requirements. Command posts are located to facilitate communication. An improperly located command post may delay the establishment of communication at a critical time or make maintenance of effective communication impossible. The principal considerations for the location of the command post with respect to communication requirements are the—

- (1) Effect of power lines, electrical stations, hill masses, dense woods, and distance on radio communication.
- (2) Effect of distance and terrain on wire and messenger communication.
- (3) Necessity for wire routes to the front and rear.
- (4) Routes of communication and traffic conditions. Since all communication facilities center at the command post, roads into and out of the CP and the traffic to be expected on these roads influence the selection of the command post location. Messengers, wire teams, command vehicles, and other control and supply vehicles constantly use the routes of communication from the command post forward to lower units and back to higher units. The lack of suitable routes causes delays and makes tactical control difficult.

d. Space for Command Post Installations. The various installations within the command post are given enough space to operate efficiently and to avoid unnecessary casualties from enemy action. The minimum distance between staff sections and other activities, except for those in buildings, is sufficient to preclude simultaneous destruction of more than one agency by nonnuclear artillery. Space is provided for other command posts which may be located in the vicinity and for liaison personnel from other units. A predesignated alternate command post location must be provided when a nuclear threat is involved.

e. Cover, Concealment, and Security. Consideration is given to the availability of natural concealment, cover, and defensive positions. The command post is located away from any landmark or terrain feature likely to attract hostile fire or air attack. A location which cannot be seen from main roads is preferable. For security reasons the command post may be located with a lower unit.

f. Aircraft. Facilities should be available near the command post for message panel display and aerial pickup and delivery of messages.

16. Designation, Marking, and Time of Opening

a. The general location of the command post is designated at some convenient landmark, such as a village or road junction easily identified on the map and on the ground. In terrain lacking easily recognized landmarks, a unit is usually directed to report the location of the command post it selects. The map symbol for a command post is a

rectangular flag on a staff. See FM 21-30 for appropriate map symbols.

b. The route leading from the general location to the exact site is marked by signs or posted with guides. For security reasons, only guides may be used. If signs are used, they are large enough to be seen and read from a rapidly moving vehicle. If the command post is in a town, the main roads leading into the town are marked, beginning at the entrance to the town.

c. The command post is opened at the time designated, or if no time is designated, as soon as practicable after the order to move the command post is issued.

d. Coded signs may be used for security. Usually, a division-wide code will be prescribed.

17. Interior Arrangement

a. The commander and his staff are located to facilitate conferences and for convenience in entering and leaving the command post. Each means of communication is considered and then located so it best serves the commander and his staff.

b. The message center is located near the natural entrance to the command post so incoming messengers may find it easily and outgoing motor messengers may be dispatched quickly. A messenger station is selected nearby. Motor vehicles used by messengers are located conveniently with respect to the message center and messenger station.

c. The radio stations are located at sites that provide maximum efficiency in transmission and reception. Other considerations in selecting these sites include the location of the panel display and message drop and pickup areas, mutual interference between radio sets, and the possibility of radios being located by enemy direction-finding equipment. Where applicable, remote control equipment should be used with radio sets so that desirable sites for radio transmission and reception can be used without regard to the user's position.

d. The panel display and message drop and pickup grounds are more convenient when their locations coincide. They should be near the radio station whose personnel are used for their operation. The ground should be level, open, free from high weeds and brush, and not near bodies of water. The panel display ground should be situated so observers can read displays at wide angles from the vertical. Shadows are avoided where possible. Unobstructed approaches to the message pickup ground are required so planes may pick up messages without danger, and this field may serve as a landing strip for light aircraft.

e. The switchboard is installed in a location which is convenient to incoming wire circuits and free from noise and interference.

f. Telephones are installed according to the priority established in the unit SOP.

g. The motor park is established in a covered location accessible to vehicles and at a convenient distance from the command post. It is located so that its detection from the air will not disclose the command post.

h. Headquarters troops are located away from the main part of the CP where their operations will not interfere with the operation of the CP.

18. Operation

The command post is organized for 24-hour operation. During periods of little activity, all personnel take every opportunity to rest and prepare for more active periods. Duty personnel are rotated to insure that all have an opportunity to rest. Communication personnel are continuously prepared to establish new channels of communication and maintain existing channels.

19. Local Defense and Security

a. A command post defense plan is prepared and all personnel instructed in their parts in the plan. Installations are dug in to protect the equipment and permit continuous operation.

b. The secrecy of the command post location is maintained through such passive measures as dispersion, concealment, cover and camouflage, enforcement of sound and light discipline, and the control of movement into and out of the area.

20. Displacement

Changes in the location of the command post are coordinated to avoid disrupting communication and losing control. Before a command post is displaced, communication is established in the new position. This requires that the signal/communication officer be notified well in advance of the estimated time of displacement. Other units concerned are notified of the contemplated change.

21. Axis of Command Post Displacement

The axis of command post displacement is the route along which future command posts of a unit will be established. It is prescribed by the next higher commander or by the unit commander concerned. It is designated by giving successive probable command post locations in the direction of movement or by specifying a route along which the command post will move. The route method normally is used in rapidly-moving situations.

Section IV. COMMUNICATION SECURITY

22. General

a. Communication security is the protection resulting from all measures designed and put into effect to prevent or delay unauthorized persons from gaining information of military value from a study of communications. It includes physical, cryptographic, and transmission security. Every commander has the responsibility for communication security in his unit. Each commander is responsible for the execution of all procedures prescribed by higher headquarters to give security to his signal communications and to safeguard against compromise those cryptographic systems which are used in his communication. He discharges this responsibility through his G2 (S2) and signal/communication officer.

b. The commander establishes communication security measures by stating general principles in the unit SOP, by announcing before an operation the extent to which security is to be practiced in that operation, and by making security decisions during an operation.

c. In actual or simulated combat operations, messages of any classification, except TOP SECRET, may be transmitted in the clear over any circuit when, in the judgment of the commander or his authorized representative, time cannot be spared for encryption and the enemy cannot exploit the information contained in the text. Such classified messages will carry the words, AUTHORIZED TO BE TRANSMITTED IN THE CLEAR (SEND IN CLEAR when using Message Book M-210()) over the signature of the commander or his authorized representative. When such messages are received, they will be marked RECEIVED IN THE CLEAR before they are delivered. These messages are handled as CONFIDENTIAL material and will not be retransmitted. If the information must be transmitted to another addressee, a separate message will be originated and handled as the situation dictates.

d. The instructions in *c* above do not apply to messages that are not normally encrypted, such as enemy contact reports and other type reports which are authorized to be sent in the clear.

23. Physical Security

a. Physical security is the protection resulting from all measures taken to safeguard classified signal communication equipment and materials from access by unauthorized persons. Each commander must issue adequate instructions on the priority and procedures for the destruction or evacuation of this material to prevent its capture or use by the enemy.

b. Special attention must be given to SSI/SOI items and cryptomaterial, including their production, distribution, storage, and final disposition when superseded or no longer needed. A complete SOI

item should not be taken forward of a battle group or separate battalion command post. When an SOI item or an extract of an SOI item is compromised, the fact must be reported and the item replaced immediately. The division commander must specify in the unit SOP precisely how the report is to be made. As a minimum, he normally requires security violations to be reported immediately through communication and command channels.

c. The sensitivity of cryptomaterial arises from the double requirement of protecting Department of Defense crypto-principles against exploitation, and of protecting classified defense information encrypted in a given cryptosystem. While it is essential to preserve a common-sense attitude toward security, it is equally essential to recognize the special sensitivity of cryptomaterial. The attainment of the desired balance between security and operational effectiveness requires intelligent direction by those in responsible positions, and constant vigilance by all subordinates in the performance of duty.

d. Direct responsibility for safeguarding classified cryptomaterial rests *both* on the commander and the individual who is in a physical position to exercise direct security control.

24. Cryptographic Security

a. Cryptographic security is the protection resulting from the development of technically sound cryptographic systems, their proper use, and the application of proper crypto techniques. The use of unauthorized cryptosystems is strictly forbidden under the principle that a weak code or cipher is worse than none.

b. For additional information, see AR 380-40, KAG-2-1(-)-TSEC, Allied Communication Publications 256 and 257.

25. Transmission Security

a. Transmission security is that part of communication security which results from all measures designed to protect transmissions from interception, traffic analysis, and imitation deception. Radio is particularly susceptible to interception and resulting traffic analysis, direction (position) finding, jamming, and deception by imitative transmissions. Thus, radio is considered the most insecure means of communication. Messenger is considered to be the most secure. The commander must always consider the comparative need for speed versus security. When security is paramount, the use of messengers is indicated. When speed is paramount, as in the attack, the use of radio is indicated.

b. Transmission security can be attained by an aggressive training and monitoring program within each unit. Each commander is responsible for monitoring his means of transmission to determine the efficiency of all personnel who use them. An aggressive training and monitoring program—

- (1) Thoroughly indoctrinates individual users of radio and wire equipment, to include correct operating procedures.
- (2) Thoroughly trains communication personnel in procedures, safeguards, and general efficiency.
- (3) Insures supervisory effort at all levels is continuous process.
- (4) Insures directed nets are used where applicable.
- (5) Insures all nets are monitored by their respective units to guard against operator errors, unauthorized procedures, and violation of security.
- (6) Insures the principles of authentication are followed and the procedure for their use and implementation is specified by the commander.

Section V. COMMUNICATION TRAINING

26. Individual Training Phase

Communication training is conducted in three phases—individual, unit, and field exercise and maneuver. During the individual training phase, communication personnel are instructed in basic military subjects including combat training. They also receive some specialist training in their primary duties. This training is conducted best in division and lower unit schools. Certain specialists, such as signal and communication officers, communication chiefs, and radio and radar repairmen should receive their training at service schools. Commanders insure that appropriate personnel (in addition to assigned communication personnel) receive communication training.

27. Unit Training Phase

During the unit training phase, specialist training is completed and personnel are trained in communication techniques for all types of tactical operations. Units are trained in installing, operating, and maintaining communication systems in fast-moving situations, under all conditions of weather and visibility, and over all types of terrain. Before exercises involving units are held, command post exercises are conducted with commanders and staffs to develop skill in the procedures for installing, operating, and moving command posts.

28. Field Exercise and Maneuver Phase

In the field exercise and maneuver phase, the tactics and techniques of the communication units working with higher, supporting, supported, attached, and adjacent units are perfected. This phase includes field exercises and maneuvers involving units of the combined arms. As specialists become proficient in their primary duties, they are rotated through different positions so they can learn the communication duties of other selected key members of their unit.

CHAPTER 2

SIGNAL AND COMMUNICATION PERSONNEL

29. General

a. Each subordinate unit in the infantry and airborne divisions has personnel whose primary duties are to install, operate, and maintain communication systems. Others concerned with communication include commanders and their staffs, those who operate signal equipment for which no communication personnel are provided (such as tank crews), and anyone else who is designated and trained to assist or take the place of communication personnel. For details on communication personnel, see appropriate table of organization and equipment.

b. Communication personnel are organized into teams for installing, operating, and maintaining communication systems. Considerations which influence the number of teams formed and their organization include the task to be performed; the availability of personnel, equipment, and transportation; and requirements for future tasks, including provisions for continuous operation. Communication teamwork demands a flexible team organization; men are trained in more than one specialty to facilitate the formation of teams and to increase team proficiency.

30. Duties of Division Signal Officer

The division signal officer is a special staff officer. In addition, he is commander of the division signal battalion. As a special staff officer, he performs the following duties:

a. Advises the division commander and staff in all signal communication matters.

b. Plans and supervises the installation and operation of the division communication system. He also plans and coordinates special communication requirements.

c. Coordinates the details of signal planning and other technical signal matters such as frequency management (allocation, assignment, control, and procedures for resolution of interference) with signal communication officers of higher, lower, and adjacent echelons of command.

d. Under the staff supervision of G3, prepares the signal portions of division operation plans, orders, and standing operating proce-

dures, and publishes the division SOI and SSI. He also coordinates with other division staff officers, as necessary, on these matters.

e. Under the staff supervision of G3, conducts division signal communication schools, prepares signal communication portions of division training directives, and prepares and supervises training programs of signal units.

f. Makes recommendations to G3 regarding the location of the division command post to facilitate signal communications requirements, and makes recommendations to the headquarters commandant as to the command post layout to facilitate internal communication.

g. Under the staff supervision of G2, supervises activities pertaining to signal technical intelligence and photographic services as they affect the division. He maintains liaison with other interested signal agencies in these matters.

h. Under the staff supervision of G2, plans, coordinates, and supervises communication security within the division, including the procurement, storage, and distribution of codes and ciphers and cryptographic devices.

i. In the infantry division, prepares under the staff supervision of G4, the signal portion of the division administrative plan, orders, and supply standing operating procedure; and supervises the procurement, storage, distribution, and maintenance of signal supplies and equipment for the division. In the airborne division these functions are performed by the division supply officer and division maintenance officer as appropriate.

j. Under the staff supervision of G5, provides signal assistance to civil authorities as directed, and coordinates with G5 when assistance from civil authorities is required.

k. Exercises operational control over attached signal troops when so directed by his commander.

l. Advises the commander and staff on matters pertaining to the signal aspects of electronic warfare (EW) operations. Under the general staff supervision of assistant chiefs of staff, G2 and G3, he plans signal EW operations and prepares the EW annex to operation plans and orders. (The phrase, "signal aspects of electronic warfare," is employed here to differentiate from the Army Security Agency (ASA) aspects of electronic warfare outlined in FM 24-150, Electronic Warfare (U).)

31. Responsibilities of the Signal Battalion Commander

As signal battalion commander, the division signal officer exercises direct control over all matters of battalion administration, intelligence, operations, and supply which are the normal responsibilities of command. For details of his responsibility and the organization and operation of the division signal battalion, see FM 11-10 and FM 11-57.

32. Duties of Unit Signal/Communication Officer

The duties of the unit signal/communication officer generally are the same, within his unit, as those performed by the division signal officer. He bases his actions upon the policies of his commander and the division standing operating procedure. His principal duties include—

a. Advising the commander and staff on communication matters and making plans and recommendations for establishing the communication system.

b. Supervising the installation, operation, and maintenance of the communication system with organic, attached, and supporting units.

c. Coordinating with the supporting elements of the signal battalion and the division signal officer for communication with higher and adjacent units.

d. Preparing plans for the displacement or extension of the existing communication system.

e. Submitting recommendations relative to the procurement and replacement of communication personnel.

f. Supervising the care, maintenance, and repair of signal equipment.

g. Supervising the maintenance of communication security, including the employment of codes, ciphers, and authentication systems.

h. Submitting recommendations for paragraph 5 of operation orders, including initial and subsequent command post locations.

i. Assisting in the preparation of training directives pertaining to communication and supervising the technical training of all communication personnel and others designated by the commander.

j. Determining the requirements for signal equipment and supplies and collaborating with the supply officer in their procurement and distribution.

k. Securing current signal operation instructions and standing signal instructions from higher headquarters and preparing extracts for use in his unit.

l. Preparing for the commander's approval the orders and standing operating procedure needed to insure tactical and technical control of the communication system.

m. Assisting in selecting the exact location for the command post and selecting locations for communication installations within the command post.

CHAPTER 3

MEANS OF SIGNAL COMMUNICATION

33. General

Signal communication includes any means of transmitting messages in plain or encrypted text other than by direct conversation or mail. Within infantry and airborne divisions, the means of communication available are radio, wire, messenger, visual, and sound. The composition of the means in each unit depends on the personnel, equipment, and transportation provided by its table of organization and equipment and by the unit or higher commander. The various means of communication have different capabilities and limitations. They are employed so they complement each other, and entire dependence is never placed upon any one means. The reliability of communication systems is greatly increased by the use of all the means available. The failure of one, or all, available means does not relieve a commander of his communication responsibility. The means employed in a given situation are generally those that provide the maximum reliability, flexibility, security, and speed with a minimum of effort and material.

34. Wire Communication

a. General. Wire is a means of communication and includes the use of field wire, wirelaying and recovery equipment, cable, battery-operated and sound-powered telephones, switchboards, teletypewriter, and associated equipment. It affords person-to-person conversation with break-in operation (capability of interrupting the conversation). Wire is more secure than radio communication, but the security of classified information is never assured when transmitting in the clear over wire circuits. The decision to establish wire communication depends on the need for it and the time available to install and use it and the capability to maintain it. The supply of wire on hand, the expected resupply, and future needs are also considered. Wire communication can be used in most terrain and situations. Tables of organization and equipment provide units with equipment to install and maintain wire communication systems. For the employment of wire communication in various units, see the type wire system diagrams in the appropriate chapters of this manual.

b. Range. The range of wire communication varies, depending principally on the equipment used, type and condition of the wire,

and the weather. Wet weather, poor splices, and damaged insulation reduce the range appreciably.

c. Time Required for Installation. It takes longer to install wire communication than any other means. The time required depends mainly on the length of the line and the method of laying it (vehicle, aircraft, or man-pack). In estimating the time required, it is also necessary to consider the number of personnel available, their training, the type of terrain, routes, weather, and visibility.

d. Installation.

- (1) Wire lines are usually laid by wire teams. The size of the team varies with the factors noted in *c* above. Teams usually consist of 3 to 5 men, exclusive of the personnel needed to carry extra wire when transportation is not available. One man can lay a wire line by using a wire dispenser or light reel. In addition to normal methods of installation, wire may be laid from dispensers attached to light aircraft and may be cast a short distance over an obstacle (such as a stream) by attaching it to a rifle grenade or rocket and firing it over.
- (2) Wire lines are laid off roads with 15 to 20 percent slack. They are strung overhead in areas such as command posts, where it is impracticable to bury them or leave them lying on the ground. In crossing roads, wire is buried, placed overhead, or run under bridges and through culverts. Areas are avoided where wire is likely to be damaged by traffic or enemy fire. Part of a wire team lays the wire and the remainder of the team polices it (throws it off the road, makes road crossings, etc.). The laying of a line is not delayed for the purpose of policing it, except at critical points.
- (3) Wire, after it is installed, must be maintained. Wire circuits are susceptible to action by infiltrators and guerrilla forces.

e. Switchboards. Switchboards are used to increase the flexibility of wire systems and to reduce the number of wire lines needed. The line capacity of switchboards varies; by using party lines the capacity can be increased.

f. Use of Telephones. Telephones are reserved for occasions where there is a need for discussion and speed. They are not used for long reports or orders when another means can be used effectively. To insure calls will be brief and to facilitate the entry of messages in the unit or staff journal, the essential parts of a message should be reduced to writing before a conversation begins. During critical periods the use of telephones may be restricted to designated personnel, except for emergency calls.

g. Use of Teletypewriter. Teletypewriter communication is another means of transmitting messages within the division. The

teletypewriter furnishes both parties a written record of messages exchanged. It can be used on wire or radio circuits. Major divisional units are equipped to provide switched teletypewriter service much in the manner that telephone switching is done. This system provides direct contact from user to user on a call basis.

35. Radio Communication

a. General. Radio is a means of communication. Enough radios are provided to make radio communication available to all commanders, including squad leaders. Additional radios are provided for command posts, fire control, and other uses. All radio sets issued within the infantry and airborne divisions are capable of voice operation. The types of radio equipment used in infantry and airborne divisions are listed in appendix II. For the employment of radio communication in various units, see the type radio net diagrams in the appropriate chapters of this manual.

b. Capabilities and Limitations. Radio communication is subject to interference from static, jamming, and other radio stations. Its reliability depends largely on the skill of the operators. The tactical situation and the characteristics of the radio sets dictate their employment. The most important characteristics of radio sets used in the infantry and airborne divisions are shown in appendix II. To be capable of operating together, radio sets must have a common or overlapping frequency range, be of the same type modulation, transmit and receive the same type of signal, and the stronger set must be kept within the transmitting range of the weaker set. The operating ranges shown in appendix II are for average conditions; the ranges obtained may be more or less, depending on the skill of the operators, weather, terrain, interference, and the locations from which the sets are operated. Powerlines and steel structures close to operating sites reduce operating ranges.

c. Security. Radio is the least secure means of communication. It is assumed that interception takes place every time a transmitter is placed in operation; therefore, radio communication security is a constant consideration. The enemy obtains information merely by knowing that radios are operating. His analysis of the number of radios in operation, the volume of traffic, or the location of sets is particularly valuable. The use of radio may be restricted or prohibited for security reasons. Two important measures for defense against enemy radio intelligence are listening silence and cryptography. Messages transmitted by radio are encrypted as required by their content. After all the factors have been carefully considered, decisions may be made to silence radios or to send messages in the clear. For example, radios are not silenced when the need for radio communication outweighs the value of the information the enemy

might gain. Radios usually are not silenced within units in contact with the enemy. A message is sent in the clear when prompt action is called for and the urgency of sending the message in the clear outweighs the value of the information to the enemy.

d. Net Message-Handling Capacity. The message-handling capacity of a radio net is limited, since only one station can transmit at a time. The time required to transmit a message depends primarily on the volume of traffic of similar or higher precedence awaiting transmission. The speed and message-handling capacity of a radio net is increased by training all operating personnel in radiotelephone, radiotelegraph, and radioteletype procedure, net discipline, and by training using personnel in message writing. When possible, messages should be reduced to writing before transmission.

e. Radio Relay System. Radio relay may be installed more quickly over a long distance than equivalent wire facilities. This system is provided by the division signal battalion (ch. 4).

f. Power Supply. Power supply is essential to radio communication. Old dry batteries may reduce the ranges of sets or make them inoperative; therefore, an adequate supply of new batteries is needed for dry-battery-operated sets. Vehicle-mounted sets use the vehicle battery as the primary source of power.

g. Remote Control. By using certain types of remote-control equipment, a radio operator may be located at a distance from the set he operates. Other remote-control units connect a radio set to a switchboard which makes the radio available to commanders and staff officers through telephones.

h. Antenna. The antenna is one of the most important parts of the complete radio set. Careful attention given to proper type, length versus frequency of operation, and overall siting of the set and its antenna will pay dividends in increased range and reliability of radio communication.

36. Messenger Communication

a. General.

- (1) Messenger communication is a means available to all units. The efficiency of messenger service depends on the selection and training of the individuals who serve in this capacity.
- (2) Messenger communication is the most secure means of transmission. It is flexible and reliable; its speed depends on the mode of travel, which may be by foot, motor vehicle, or aircraft. It is the only means available within infantry and airborne divisions for transmitting maps and documents. Messenger service has some limitations. It is vulnerable to enemy action in forward areas and does not afford person-to-person conversation.

- (3) Messengers are used when security dictates or when they can deliver a message faster than it can be transmitted by other means. They are the best means for delivering long messages over short distances.

b. Double Messengers. Double messengers are used when the mission involves great personal risk. They keep within sight of each other, but far enough apart to avoid simultaneous ambush or exposure to the same shell or burst of fire. Very important messages may be sent over two different routes either by single or double messengers. Messengers are briefed on their route, rate of travel, and location of delivery points. They are told whether an answer is expected. Day reconnaissance of routes that are to be traveled at night is desirable. Oral messages are kept short and simple; they are not used when time and security permit their being written.

c. Types of Messenger Service. Scheduled messenger service is established when locations are fixed and the amount of traffic warrants a fixed schedule. Special messengers are employed whenever required by the urgency of the message. Messenger relay posts may be established when messages are carried frequently between the same points or units and, because of the distance, difficulties of terrain, or hostile activity, other messenger service is ineffective.

37. Visual Communication

a. General. Visual communication is a means available to all units. Visual signals are transmitted by flags, lights, pyrotechnics, panels, arm-and-hand signals, and other prearranged visual means such as aircraft maneuvers. They are suitable for transmitting prearranged messages rapidly over short distances. Visual signals are easily misunderstood. They are very vulnerable to interception, and the enemy may use similar signals for purposes of deception and confusion. Their use is restricted during periods of poor visibility or when line-of-sight locations are not available, and may be prohibited for security reasons.

b. Flags. Flags are issued to some armored units of the division. Other units may improvise flags. Messages may be sent with flags by using prearranged signals.

c. Lights. Although lights for communication purposes only are not TOE items of issue, there are various types available. They may be used to send prearranged messages such as the identity of friendly units. The meanings are given in the unit SOI or are prescribed by the commander. International Morse Code messages may be transmitted with lights.

d. Pyrotechnics. Pyrotechnics, including smoke, are issued in various colors and types. The meanings of certain signals are given in the unit SOI. Signals usually are included for the identification of friendly units, for lifting or calling for fire, marking targets, and

reporting an objective reached. The transmission and reception of pyrotechnic signals is preplanned to insure effectiveness. Pyrotechnics may be used for communication within and between ground units, between ground units and aircraft, and between ground units and ships offshore.

e. Panels. Two general types of panels are issued for communication with aircraft: marking and identifying panels and those for transmitting messages. Marking and identifying panels are made in bright fluorescent colors. They may be used to mark positions and identify units as friendly. Black and white sets of panels for transmitting messages are issued for use on light and dark backgrounds respectively. They are used to transmit brief messages or to identify a particular unit. This is done by using the combined panel system and panel recognition code which is included in the unit SOI.

f. Infrared Devices. Infrared devices are used for signaling and as landing and assembly aids. In amphibious operations, they are used as landing aids. Airborne units employ them as assembly aids.

38. Sound Communication

Sound is a means of communication available to all units. Sound signals are transmitted by whistles, bugles, horns, gongs, klaxons, weapons, and other noise-making devices. They are used chiefly to attract attention, transmit prearranged messages, and spread alarms, and are kept simple to prevent misunderstanding. They are a rapid means of communication over short distances. Their range and reliability are greatly reduced by battle noise. Sound signals are very vulnerable to interception and their use may be prohibited for security reasons.

39. Integration of Wire and Radio Communication Systems

Wire and radio have been discussed as two separate and distinct means of communication. In operations, they may be closely integrated by using remote control equipment, radio relay equipment, and wire communication equipment. For details on remote control equipment and the interconnection of radio and wire systems, see TM 11-5135-15.

CHAPTER 4

INFANTRY DIVISION SIGNAL BATTALION

Section I. MISSION, CAPABILITIES, AND ORGANIZATION**40. Signal Battalion**

a. Mission. The infantry division signal battalion functions—

- (1) To provide signal communications, including communications to subordinate units for the division headquarters and headquarters company (exclusive of staff vehicle radio sets), division trains headquarters and the headquarters and headquarters detachment, infantry division trains and infantry division band (exclusive of staff vehicle radios), division administration center and the infantry division administration company (exclusive of staff vehicle radios), and brigade headquarters (exclusive of staff vehicle radio sets).
- (2) To establish and operate a division area communication system of signals centers, wire and radio trunk and local lines, and radio-wire integration stations to provide general and direct communications support for units in the division area.
- (3) To operate the division area ground messenger service.
- (4) To perform photography (except aerial photography) for the division, and still picture laboratory service for all divisional units.
- (5) To provide signal supply and field maintenance of signal equipment for the division.

b. Capabilities. The signal battalion—

- (1) Provides (on a full-time basis) message center, messenger, cryptographic, teletypewriter, telephone, radio (except staff vehicle radio sets) and other communication facilities for all echelons of division headquarters, and for division trains headquarters, brigade headquarters, and the division administration center.
- (2) Establishes and operates a division-area type communication system, consisting of up to 8 signal centers utilizing 12-channel radio relay or field cable (spiral-four) links, and field wire lines as required. These facilities provide—
 - (a) Trunklines and signal center service for the headquarters and units designated in (1) above.

- (b) Trunkline service for service and combat support units in the division area.
 - (c) Field wire, FM radio/wire integration, radio relay, or field cable links to connect using units into the division area communication system.
 - (d) Signal center service for unit elements and installations in the division area as required to supplement organic communication means.
- (3) Operates the division area ground messenger service within the general capabilities of up to six motor messenger teams.
 - (4) Performs photographic service for the division, including—
 - (a) Ground still and motion picture coverage for the division and, as required, aerial still and motion picture coverage (using ground cameras).
 - (b) The processing of ground still and Army aerial still photographs for all divisional units.
 - (c) Provision and operation of two mobile photographic laboratories and the processing of ground and Army aerial still photographic coverage (except aerial combat surveillance) for all divisional units as required.
 - (5) Provides signal supply and field maintenance (to include avionics maintenance) of those signal equipments authorized for the division.
 - (6) This unit will be attached to, or is dependent upon:
 - (a) Other units for medical, dental, and religious services and supplemental transportation.
 - (b) Infantry division aviation company or other units for aircraft and pilots for signal operations.
 - (c) Corps and army to provide and operate division terminals of radio relay and field cable (spiral-four) circuits from corps and army.
 - (d) Army and other higher echelons for processing motion picture and air force aerial photographic coverage.

c. *Organization.* The signal battalion organization is shown in figure 1.

41. Headquarters and Headquarters Company

a. *Mission.* The functions of this unit are—

- (1) To direct and coordinate operations and training of the battalion, and to provide the headquarters facilities with which the battalion commander exercises control.
- (2) To provide the division with a signal officer and his staff and staff facilities.

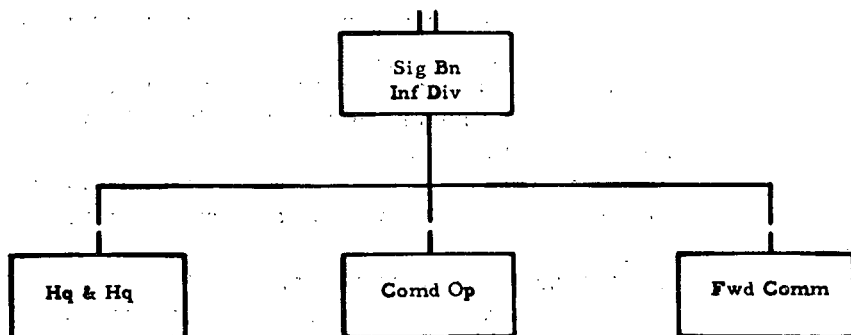


Figure 1. Organization infantry division, signal battalion.

- (3) To provide consolidated personnel management and administration and supplemental supply and maintenance support for the battalion.
- (4) To perform field cable construction and provide an augmentation of radio relay terminal and repeater stations and telephone carrier terminals for the battalion.
- (5) To perform photography (except aerial photography) for the division and to perform photographic still laboratory service for all divisional units.
- (6) To provide signal supply and field maintenance of signal equipment for the division.

b. *Capabilities.* The company—

- (1) Plans, controls, and coordinates the training and operations of the infantry division signal battalion.
- (2) Provides administrative and logistic support for the battalion and in so doing, it—
 - (a) Consolidates personnel management and administration and performs organizational maintenance of generators, armament, and cryptographic equipment for the battalion.
 - (b) Provides electronic and motor maintenance support to supplement the capabilities of the operating companies.
- (3) Performs field cable (spiral-four) installation and recovery for battalion. Each of the three 8-man teams used for this function is capable of installing an average of 4 to 7 miles of cable per 12-hour day on the ground or on existing poles or other supports.
- (4) Provides up to four radio relay terminal and repeater station teams or telephone carrier terminal station teams to augment battalion operating companies as required.
- (5) Performs photographic service for the division. This includes—

- (a) Still and motion picture coverage for the division (except aerial photography).
 - (b) Provision and operation of two mobile photographic laboratories to process ground still and Army aerial still photographs (except aerial combat surveillance) for all divisional units, as required.
 - (6) Performs field maintenance on signal equipment (to include avionics equipment) for the division.
 - (7) Provides signal supply for the division.
 - (8) Provides personnel for the division signal officer section of division headquarters.
- c. *Organization.* Headquarters and headquarters company is organized as is shown in figure 2.

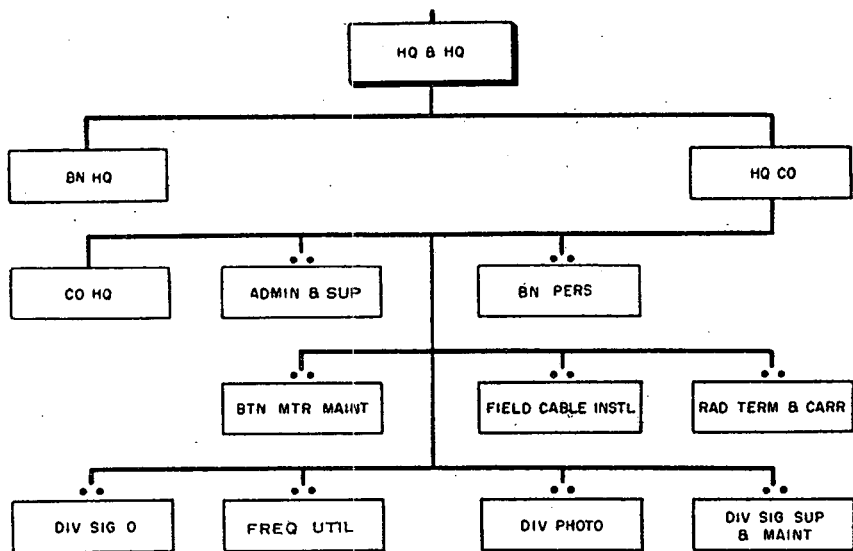


Figure 2. Organization of headquarters and headquarters company, infantry division signal battalion.

42. Command Operations Company

a. *Mission.* Command operations company functions—

- (1) To provide signal communications for the echelons of division headquarters, the brigade headquarters, the division trains headquarters, the division administration center, and the division FSCC.
- (2) To provide signal communications (except internal radio nets) for the division headquarters and headquarters company, the headquarters and headquarters detachment, infantry division trains, and infantry division band, exclusive of staff vehicle radios.

- (3) To provide area signal center service to units located in the vicinity of the division headquarters echelons and in the division rear area, supplemental to organic facilities.
 - (4) To establish and operate an assigned portion of the division's area communications system.
 - (5) To establish and operate facilities to connect division artillery headquarters into the division area communications system.
 - (6) To provide and operate net control and other stations as required in division and higher echelon radio nets, to include division and army air request nets and a division warning net.
 - (7) To operate the division area ground messenger service.
- b. Capabilities.* At full strength, this unit provides the following facilities:
- (1) Establishes and operates signal facilities for the division headquarters command posts, to include simultaneous operation on a 24-hour basis of—
 - (a) Message center, cryptographic and teletypewriter facilities for up to two echelons of the headquarters.
 - (b) Manual telephone central offices and local telephone systems.
 - (c) Teletypewriter, CW/Voice and FM/Voice radio stations in army/corps and division radio nets and FM radio/wire integration stations.
 - (d) Twelve-channel radio relay or telephone carrier terminal stations in the division area communication system and to connect division artillery and brigade headquarters into the system.
 - (e) Telephone and air request communications at the division FSCC, to include a radio teletypewriter station in the army air request net and the net control station in the division air request net.
 - (f) UHF receivers in the spot report receiver system.
 - (g) Area signal center service to units located in the vicinity of division echelon signal centers, to include the handling of message traffic and provide telephone switching service and connecting lines, within the capabilities stated above.
 - (2) Establishes and operates signal facilities for the division brigade headquarters, to include simultaneous operation on a 24-hour basis of—
 - (a) Message center, cryptographic, teletypewriter, and limited rear area motor messenger service.
 - (b) Manual telephone switchboard and local telephone service.
 - (c) A radio teletypewriter station for operation in division or other radio nets as required.

- (d) A radio receiver station in a division, corps, or army warning net.
- (3) Establishes and operates signal facilities for the headquarters and headquarters detachment, infantry division trains, and infantry division band; and to provide general and direct communications support for other units and installations in the division rear area, to include the simultaneous operation on a 24-hour basis of—
 - (a) Message center, cryptographic, teletypewriter and limited rear area motor messenger service.
 - (b) Manual telephone switchboard and local telephone system.
 - (c) A radio teletypewriter station, a radio receiving station in the division warning net, and an FM radio/wire integration station.
 - (d) Twelve-channel radio relay or telephone carrier terminal station in the division area communication system.
- (4) Establishes and operates signal facilities for the division rear echelon, administration center and administration company, to include simultaneous operation on a 24-hour basis of—
 - (a) Message center, cryptographic, teletypewriter, and limited local motor messenger service.
 - (b) Manual telephone switchboard and local telephone system.
 - (c) A radio receiver station in a division, corps, or army warning net.
 - (d) A radio teletypewriter station for operation in division or other radio nets as required.
- (5) Operates the division area ground messenger service.
- (6) Provides and operates patching and switching facilities for wire and radio relay trunk circuits in the division area communication system.

c. Organization. The command operations company is organized as shown in figure 3.

43. Forward Communications Company

a. Mission. Primary functions of this unit are—

- (1) To provide direct and general support signal center service to units in the division forward area, supplemental to organic capabilities.
- (2) To establish and operate an assigned portion of the division area communication system.
- (3) To connect battle group headquarters and other units in the area into the division area communication system.
- (4) To provide signal field maintenance support for units in the division forward area.

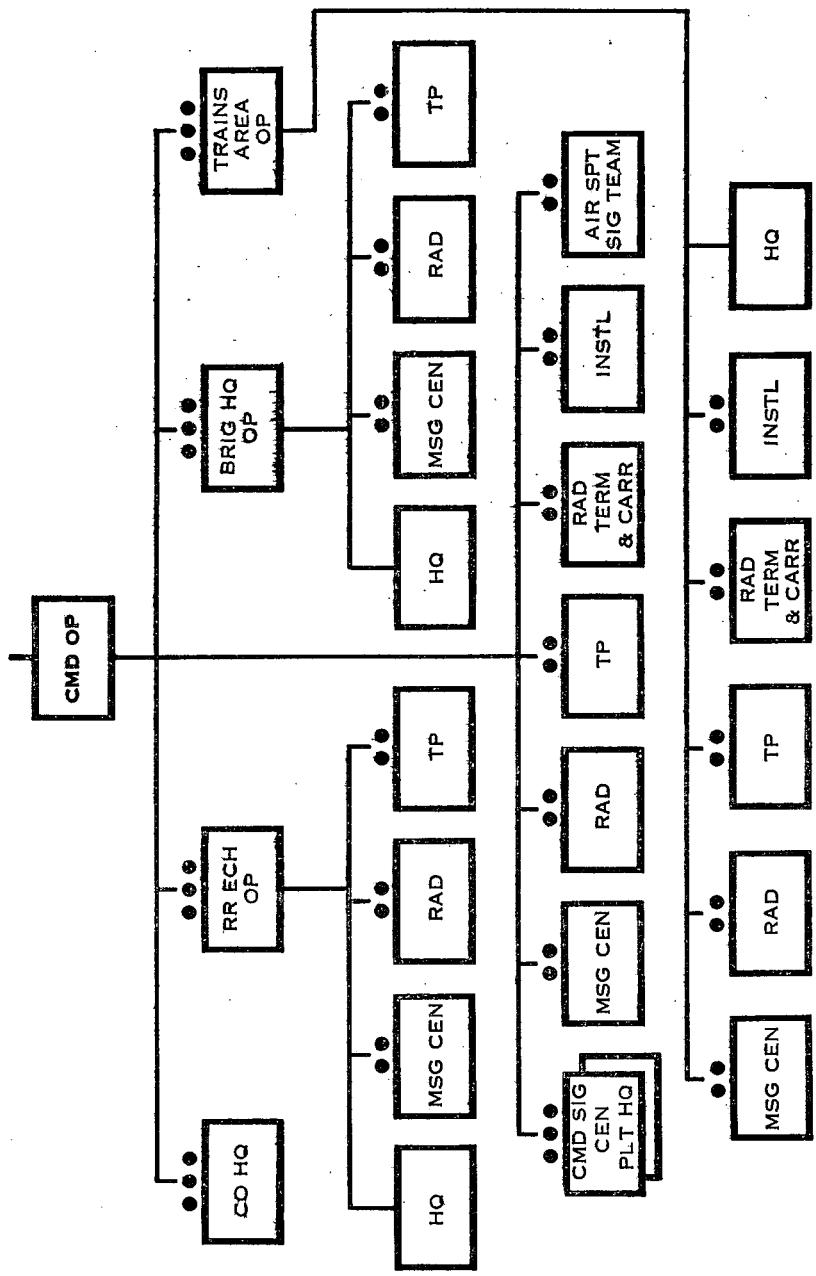


Figure 8. Organization of command operations company, infantry division signal battalion.

b. Capabilities. The company—

- (1) Installs and operates five forward area signal centers to provide signal communication to units in the division forward area, supplemental to the unit's organic capabilities. The following are provided in each signal center on a fulltime basis:
 - (a) Message center, cryptographic, and teletypewriter terminal, and switching service.
 - (b) Manual telephone central, installation of telephone lines to users and provision of instruments if otherwise not available to users.
 - (c) A radio receiving station in the division warning net.
- (2) Establishes and operates at each forward signal center radio relay or telephone carrier terminal stations in the division area communication system.
- (3) Establishes and operates at each forward signal center, patching and switching facilities for wire and radio relay trunk circuits in and from the division area communication system.
- (4) Establishes and operates at each forward signal center, an FM radio/wire integration station to connect mobile FM radio stations into the division area communication system.
- (5) Establishes and maintains radio relay, telephone carrier, or field wire circuits as necessary to connect battle group headquarters into the division area communication system.
- (6) Provides third echelon maintenance of wire and radio equipment for units in the division forward area.

c. Organization. The forward communications company is organized as shown in figure 4.

Section II. DIVISION AREA COMMUNICATION SYSTEM

44. General

The organization and the concept of operation of the infantry division with its structure of five battle groups and its incorporation of a brigade headquarters and a division trains organization, along with its principle of frequent attachment of supporting units from higher echelons, and the emphasis on operational flexibility, dispersion, and operation over great distances on a potential nuclear battlefield, place challenging demands on the division communication system and signal unit.

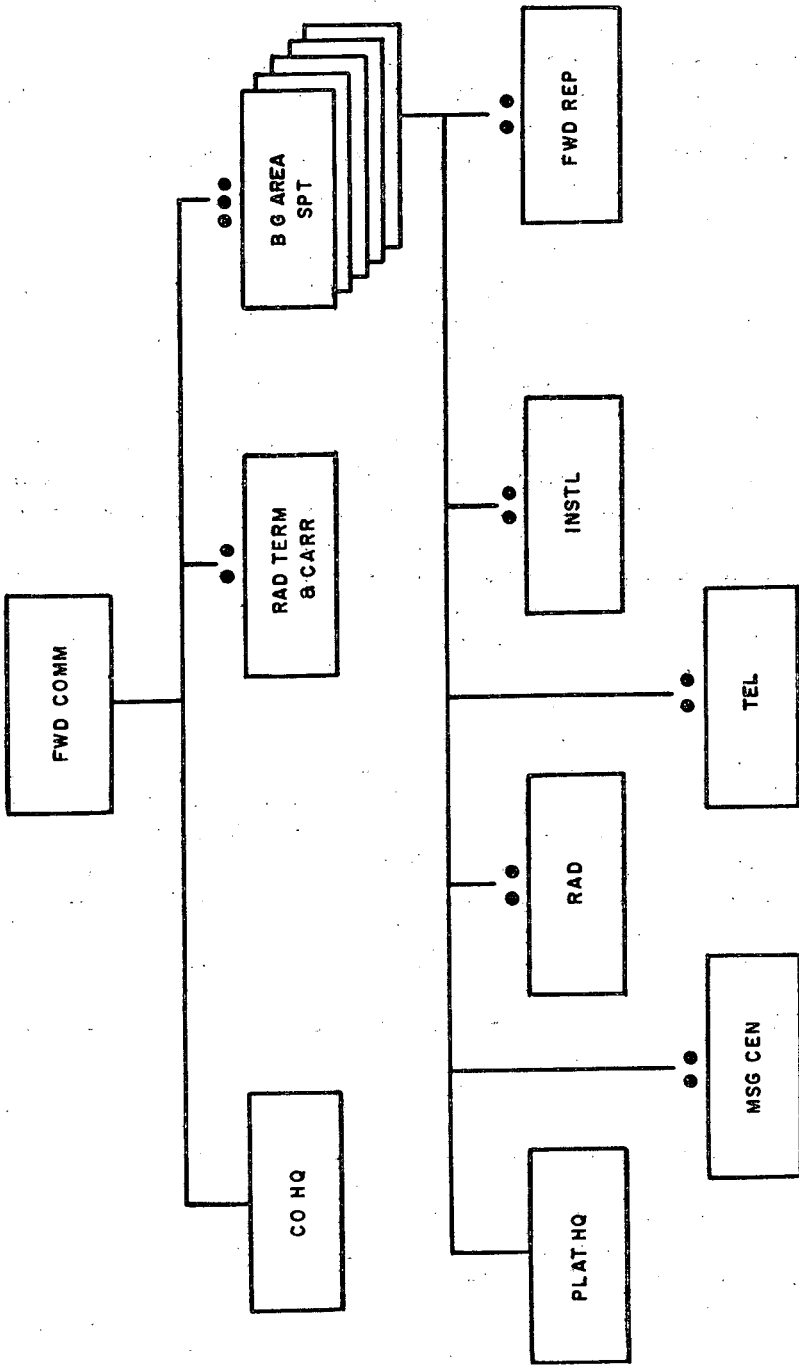


Figure 4. Organization of forward communication company, infantry division signal battalion.

45. Division Area Communication System

a. Composition. The division area communication system consists of—

- (1) Command and forward signal centers established by the division signal battalion and linked together by multichannel communications (fig. 5).
- (2) A signal messenger service linking the division headquarters and its echelons with the division major subordinate commands.
- (3) AM and FM radio communication nets.
- (4) Radio/wire-integration stations linking mobile FM radio stations with the telephone system at command and forward signal centers.

b. Employment.

- (1) *General.* The many variations of the operational environment in which the division signal battalion provides communications to the division preclude a fixed employment of personnel and equipment authorized by TOE or a fixed pattern of operation. The system will vary in configuration, size, and composition according to many factors. Some of the more important of these factors are listed below:
 - (a) Division mission and organization for combat.
 - (b) Characteristics of the division area of operations.
 - (c) Enemy capabilities.
 - (d) Attachment of forces by higher headquarters.
- (2) *Trunk lines.* The trunk lines in the division area communication system provide a means of communication from the echelons of division headquarters to immediate subordinate elements and between these elements. They also provide a means of communication for the use of other divisional elements in lieu of or to supplement the organic communications of these elements on a common-user or sole-user basis.
- (3) *Common- and sole-user circuits.* The division area communication system is comprised mainly of common-user circuits. To meet special requirements, sole-user circuits may be provided. Sole-user circuits are those that are allocated for fulltime use to provide point-to-point communication. Sole-user circuits are provided on a basis of traffic volume or traffic precedence. In the first instance, traffic volume must be great enough to keep the circuit busy around the clock. That is to say, the circuit must be required so much of the time that it would be impracticable to attempt further use of the circuit for other purposes. In the second instance, the tactical urgency of certain types of traffic warrant sole-user service, as in the case of fire direc-

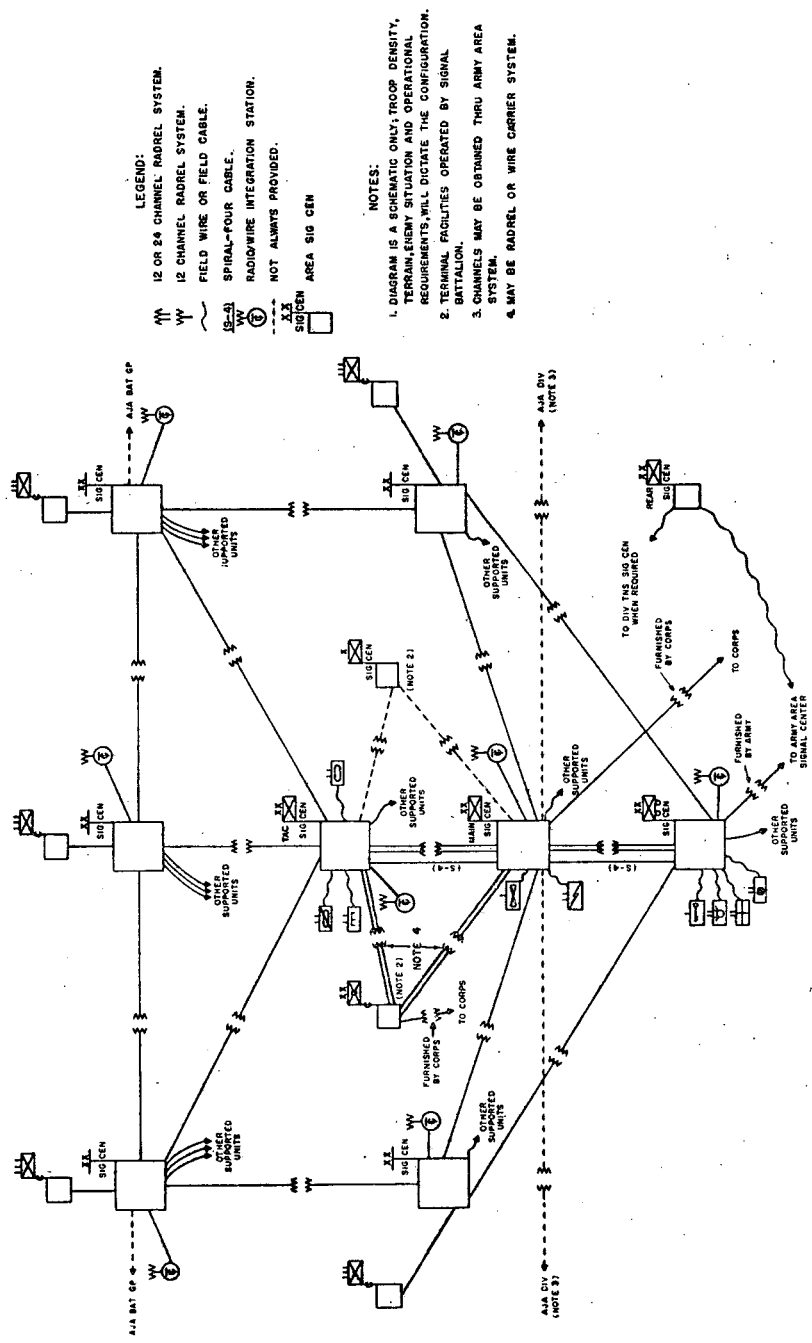


Figure 5. Type multichannel communication system, infantry division.

tion and air request circuits wherever short delays cannot be tolerated.

c. Signal Centers. A signal center is a groupment of signal communication facilities installed, operated, and maintained by signal corps units. Each signal center normally provides the following: communication center messenger service, telephone and teletypewriter switching, and circuit testing and routing facilities. Other facilities such as facsimile and automatic data processing may be provided when authorized. Two types of signal centers employed are:

- (1) Command signal centers established by the command operations company of the division signal battalion. They provide signal center support for the division headquarters, its echelons and for the brigade headquarters. In addition, these command signal centers provide combat signal support to units located in the immediate vicinity. This supplements the organic communications capability of the nearby units.
- (2) Forward (area) signal centers established by the forward communication company of the division signal battalion. Each center is capable of providing combat signal center support to units within a specific geographic area. Primarily, forward signal centers will be located to tie the battle groups into the division area communication system. The forward signal centers will also provide combat signal center type support to units as indicated above.

46. FM Radio/Wire Integration

Radio/Wire Integration Stations (fig. 6) form an important part of the division area communications system. At division level, an FM voice radio/wire integration station is operated at each signal center (except at division rear) to connect FM radio stations into the division area communications system on a push-to-talk basis. The interconnection between the radio set at a division radio/wire integration station and an area communications system switchboard is made through a remote control unit and an SB/22-PT switchboard in the integration station vehicle. The operation of radio/wire integration systems is standardized throughout the division by SOP's for radio operators, radio/wire integration station operators, and switchboard operators; it is standardized for users by division signal instructions (SSI). The signal operations instructions (SOI) refer to controls, such as radio station call signs and telephone directory names. The radio/wire integration system is provided to the commanding general, division staff, and other designated key personnel in the division to contact division elements connected to the division area communications system. Whenever circumstances dictate, it may be used—

a. To establish emergency communication between mobile FM radio stations and elements connected to the division area telephone system by telephone.

b. To establish communication between FM radio stations separated by distances that are beyond the direct operating range of their FM radio sets.

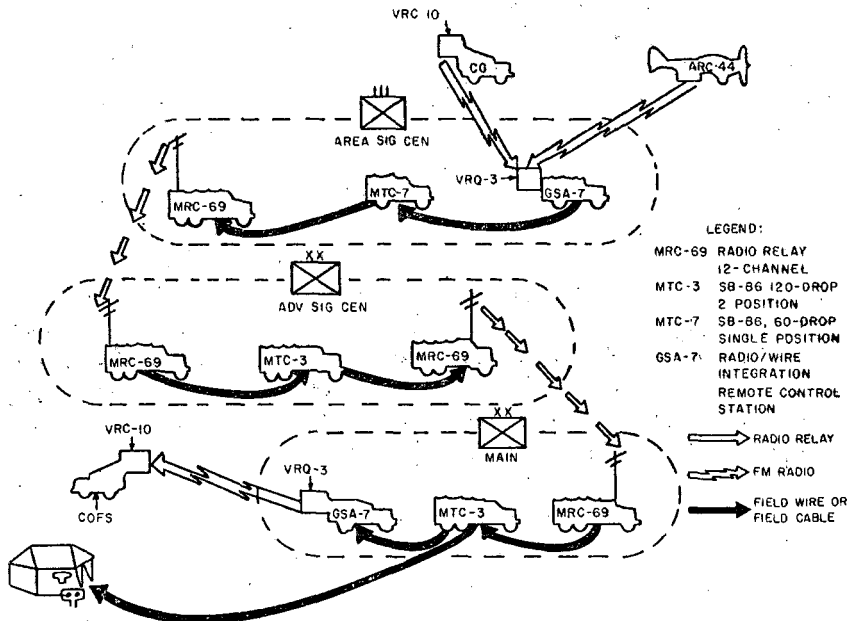


Figure 6. Type utilization radio/wire integration, infantry division.

c. For initial establishment (until wire links can be installed) of telephone service from the division area communication system to using units.

d. For voice communication between mobile combat elements in the division forward area and supporting division logistic elements in the rear area.

e. For communication between low-flying Army aircraft operating in distant parts of the division area and airstrips or flight control elements connected to the division area communication system when direct FM radio contact cannot be maintained.

f. For communication between forward air controllers and the air liaison officer's communication facilities (normally at the division FSCC), when these facilities are connected with the division area communication system.

g. To keep commanders and staffs in contact with subordinate and higher headquarters, as required, during the displacement of command posts.

- h. To connect two switchboards and to span a break in a wire line between units.
- i. For communication in river crossings.

Section III. COMMUNICATION, DIVISION HEADQUARTERS

47. Division Command Posts

Command posts are the nerve centers of the division and its headquarters. The manner in which they function determines the effectiveness of command and the degree of control exercised by the division commander. A sound standing operating procedure must be developed for the location, organization, operation, movement, and internal arrangement of command posts. Command posts are operated continuously and moved as often as the situation requires to maintain control and reduce the possibility of detection. Their continuous operation is insured by planning moves in coordination with the signal officer and by echeloning the movements. The major echelons of the division headquarters are division main and tactical command posts and the division rear echelon.

a. Division Main. Division main is the principal command post of the division. It consists of those staff agencies required by the commander to assist him in the supervision and control of tactical operations. Through the facilities of its signal center, it maintains signal communication with higher, adjacent, supporting, and subordinate headquarters. Division headquarters company, division signal battalion command posts, and CA units normally are located near division main. Communication facilities within the signal center serving division main should be located conveniently to using staff sections. The message center serving division main's signal center should be so located as to provide access to all communication facilities within the signal center. When division main is on the march, the communication facilities (especially messengers) within the signal center should be placed in the column where they are conveniently accessible to the staff sections having primary interest in them.

b. Brigade. The brigade command post is established by the brigade headquarters under the direction of the assistant division commander. Signal communication for this command post is established through the facilities of the nearest division area signal center by the brigade headquarters operations platoon of the signal battalion.

c. Tactical. The division tactical command post may be used by the division commander to permit close supervision of the division's forward units. It is manned by a small, highly mobile group prescribed by the division commander. Signal communication is established through the division advance signal center or, when this is impracticable, through the nearest available communication facility.

d. *Division Rear*. See paragraphs 60 and 61.

e. *Division Alternate Command Post*. The alternate for the division main command post is designated by the division commander. Depending upon the situation, he may prescribe one of the following as the alternate:

- (1) Brigade command post.
- (2) Division artillery command post.
- (3) A battle group command post.

48. Radio Communication

a. *General*. Radio nets within division headquarters and divisional units are primarily for internal organizational communication and for communication between major divisional units. Other radio equipment is provided for air warning systems and communication with echelons above division.

- (1) In an emergency and in a fast-moving situation, radio can be used to supplement a segment of the multichannel links connecting division signal centers.
- (2) FM and AM radios normally are used as an initial means of communication, particularly when other means such as wire or radio relay, are unavailable or unsuitable. As other means become available, the use of radio may be curtailed and, as soon as possible, radio stations are placed on standby or on listening silence as dictated by the situation.
- (3) Figure 7 shows a typical arrangement of nets in which radio stations operate for division headquarters.
- (4) Although radio nets are designated functionally (command, intelligence, etc.) traffic and other considerations will frequently dictate that the nets be combined and used for more than one type of traffic.

Internal Radio Nets. The division's internal radio nets are described below:

- (1) *Division command/operations net, AM-RATT* (fig. 7). This net is used for the operational command and control of the division. The net control station is located at division main. The station and its operating personnel are furnished by the division signal battalion. Other stations normally operating in the command/operations net are brigade headquarters, division advance, division artillery, aviation company, engineer battalion, each of the five battle groups, armor battalion, and cavalry squadron.
- (2) *Division intelligence net, AM-RATT* (fig. 7). This net is used for transmission of information and intelligence of the enemy. The net control station is located at division main and serves primarily as a communication means for G2's

UNITS	ARMY AIR REQ RATT	ARMY LOG RATT	CORPS COMD #1 RATT	DIV COMD/OP RATT	DIV INTEL RATT	DIV CG COMD FM	DIV ADMIN LOG RATT	DIV AIR REQ AM CW-VOICE	DIV WARNING AM VOICE
ARMY	GRC 26	GRC 26							
CORPS	GRC 26		GRC 26						
DIV TACTICAL				GRC 46 (S)	GRC 46 (S)	VRQ 3 (S)			GRR 5 1 (S)
DIV MAIN		GRC 26 (S)	GRC 26 (S)	GRC 26 (S)	GRC 46 (S)	VRQ 3 (S)	GRC 46 (S)		GRC 19 (S)
DIV REAR							GRC 26 (S)		GRR 5
DIV ESCC	GRC 26 (S)							GRC 19 (S)	GRR 5 3 (S)
BRIGADE				GRC 46 (S)		VRQ 3 (S)			GRR 5 3 (S)
DIV ARTY				GRC 46	GRC 46	VRC 10	GRC 46 2		GRC 19
BG (S)				GRC 46	GRC 46	VRQ 3	GRC 46 2	GRC 19	GRR 5 1
ARMOR BN				VRC 29		VRQ 3	VRC 29	GRC 19	GRR 5 1
CAV SQDN				VRC 29	VRC 29	VRQ 3	VRC 29	GRC 19	GRR 5 1
AVN CO				GRC 46	GRC 46	AN/ VRQ-2/3	GRC 46 2		GRR 5 3
DIV TRAINS		GRC 26		GRC 46 (S) 2		VRC 18 (S)	GRC 46 (S)		GRR 5 5
ENGR BN				GRC 46 2		VRC 10	GRC 46		GRR 5 3
ORD BN						VRC 18	GRC 46		GRR 5 3
MED BN						VRC 18	GRC 46		GRR 5 3
TRANS BN					VRC 29	VRC 10	GRC 46		GRR 5 3
QM CO						VRC 10	GRC 46		GRR 5 3

1-Monitors net; enters by switching set from another net.
2-Enters net as required by switching set from another net.

3-Monitors only.
(S)-Personnel and equipment furnished by div sig bn.

Figure 7. Typical infantry division radio nets.

message traffic. It may also pass command or logistical message traffic, if the command or logistical nets are either inoperative or overloaded. The station and its operating personnel are furnished by the division signal battalion. Other stations normally operating in the intelligence net are division tactical and main CP's, division artillery, each of the five battle groups, cavalry squadron, aviation company, and transportation battalion.

- (3) *Division administrative/logistical net, AM-RATT* (fig. 7). This net is used for transmission of administrative and logistical message traffic. The net control station is located at division main and serves primarily as a communication means for G4's message traffic. The station and its operating

personnel are furnished by the division signal battalion. Other stations normally operating in the administrative/logistical net are division rear, division artillery, each of the five battle groups, armor battalion, cavalry squadron, aviation company, division trains, engineer battalion, ordnance battalion, medical battalion, transportation battalion, and quartermaster company.

- (4) *Division air request net, AM-voice/CW* (fig. 7). This net is used to forward requests for immediate tactical air support directly to the division fire support coordination center (FSCC) and for disseminating information and instructions to units on all types of air strikes that may affect the command. The net control station is operated by personnel of the division signal battalion at the division FSCC, where it is located with G3 air. Other stations in the net are each of the five battle groups, the armor battalion, and cavalry squadron. The radio sets used in this net have secondary roles, such as the transmission of information in the division warning/broadcast net.
- (5) *Division warning/broadcast net, AM-voice* (fig. 7). This net is used to broadcast air alerts, CBR attack warning, fallout warning, rad-safe data,¹ nuclear strike warnings, and similar information of an urgent operational nature. This information is required by all divisional units, and the requirement for timeliness prohibits handling through command channels. The net control station operates at division main, with personnel and equipment furnished by the divisional signal battalion. Radio receiving sets are provided throughout the division for monitoring this net. Each battalion and separate company and, in some instances subordinate elements of these units, are equipped with an AN/GRR-5 for receiving the information broadcast over this net. Certain organizations may switch radio equipment from other nets to transmit in this net. These are division advance, each of the five battle groups, the armor battalion, and cavalry squadron. Division artillery usually broadcasts all air alerts, while the cavalry squadron usually broadcasts urgent reconnaissance information of immediate interest to elements of the division.
- (6) *Division CG/command net, FM-voice* (fig. 7). This net provides a direct channel of communication between the division commander and the commanders of all units operating directly under division control. The use of this net is restricted because of its large number of stations, but staff

¹ Data transmitted relative to the amount of radioactivity in a specified area.

officers may monitor or operate in it if necessary. While specific employment of the net is governed by the division commander's desires, normal procedure is that lateral communication between subordinate unit commanders is established by the calling commander entering the unit FM net of the called commander. Liaisons officers of the division, when operating with adjacent or higher headquarters, may operate in this net to facilitate close coordination between units. The division signal battalion furnishes the net control station at division main on a fulltime operating basis. The signal battalion is equipped to establish relay stations in the net, either with the AN/VRQ-3 radio sets provided for this purpose or with the radio/wire integration station facilities. Airborne relay stations, when required, are established by coordination with the division aviation company. Other headquarters represented by stations in this net are division advance, brigade, division artillery, each of the five battle groups, the armor battalion, cavalry squadron, signal battalion, military police detachment, aviation company, division trains, engineer battalion, ordnance battalion, medical battalion, transportation battalion, quartermaster company, and attached units directly under division control.

- (7) *Division headquarters company command and staff radio sets.* Division headquarters company furnishes radio sets to the division commander, assistant division commander, and the division staff. The sets are used in division nets as indicated in (1) through (6) above.
- (8) *Security platoon net, FM-voice.* This net is established to provide communication for the security platoon of division headquarters. Two radio sets are furnished by division headquarters company to operate in this net.
- (9) *Military police detachment radio nets, FM-voice.* The military police detachment is equipped with FM radios for operation in the CG/command net, the military police detachment command net and utility control nets, FM. An AN/GRR-5 radio receiving set is authorized for monitoring the division warning/broadcast net.

c. *External Radio Nets.* The external radio nets in which the infantry division is a transmitting station (fig. 7) are described below:

- (1) *Corps command net, AM-RATT.* This net is used by the corps commander for the command and operational control of his major subordinate units. The division station, which is furnished by the signal battalion, operates in conjunction with the signal center at the division main command post.

The station employs AM-radioteletypewriter equipment that is additionally capable of operating on voice or CW.

- (2) *Army logistical net, AM-RATT.* The division signal battalion also furnishes the radioteletypewriter station that operates in this net. The net is used for administrative and logistical traffic between the division and army headquarters. The equipment used in this net is also used, as required, in a secondary role to support the displacement of other radioteletypewriter stations in the division. Since other means of communication with logistical support agencies normally are available, this station is used to a great extent in its secondary role.
- (3) *Army air request net, AM-RATT.* This net is used to obtain air support for the division. An AM-RATT radio set is used in this net to provide communication between the division G2 Air and G3 Air at the division tactical operation center and the field army tactical operation center at Army. The radio set is furnished by the division signal battalion.
- (4) *Spot report receiver system, UHF-voice.* The signal battalion is equipped to operate a radio UHF-voice station in the spot report receiver system for monitoring Air Force close support missions flown for the division. The station is mounted in the same vehicle as the division station in the Army air request net. It has two UHF-voice radio sets, the second one serving as an alternate. The station may be used to monitor Air Force reconnaissance missions flown for the division, but a separate set is provided in the division headquarters TOE for the use of G2 for this purpose.

49. Wire Communication

a. General. The division signal battalion has a limited field wire and cable construction capability, since radio relay is the primary means of trunkline communication throughout the division area communication system. When circumstances require an extensive wire trunk system, the signal battalion is reinforced, upon request, by corps or Army signal organizations that have the capability for providing the necessary augmentation. Wire and cable installation within the division is accomplished by eleven 3- to 5-man installation teams and three 8-man installation teams. Although the allocation of these teams among the companies and platoons of the signal battalion is fixed in the unit TOE's, the teams may be shifted temporarily from one unit to another or pooled for a major wire construction effort. The switchboard facilities at the echelons of division headquarters are established by the command operations company. The switchboards are operated in vehicles, and each is part of the signal center serving

an echelon of division headquarters. The switchboard furnishes telephone switching service within its echelon (over local field wire lines) and between echelons (over trunk facilities). The trunk facilities, primarily radio relay circuits that are backed up by field cable circuits when practicable, are provided at the trains, main, and advance signal centers by the command operations company. They form the basic network of the division area communication system when connected to the trunk facilities established at the forward area signal centers by the forward communication company. When practicable, wire communication is established between corps (or army) and division, and between division and major subordinate commands. It may be extended to an extremely limited degree by the establishment of the FM radio/wire integration system.

b. Division Wire Communication With Higher Headquarters. The next higher headquarters is responsible for maintaining wire communication to division headquarters. However, it is only through constant coordination of the signal units of both headquarters that adequate communication can be maintained. Normally, cable circuits from higher headquarters are terminated at the signal center serving the division trains or division rear signal center. Radio relay trunk facilities from higher headquarters normally are terminated at division main's signal center. Both telephone and teletypewriter switching services are provided.

c. Wire Communication to Subordinate and Adjacent Headquarters.

- (1) The command operations company is responsible for installing, operating, and maintaining wire communication between the signal centers it operates and to the forward area signal centers serving major subordinate headquarters.
- (2) The forward communication company is responsible for installing, operating, and maintaining wire communication facilities at the forward area signal centers and lateral lines between them, as well as lines from these centers to the major subordinate headquarters they serve. The trunks between the signal centers normally are radio relay circuits, supplemented by field cable when practicable. Trunks from the forward area signal centers to the battle groups they serve normally are field wire or cable.
- (3) Lateral wire communication to adjacent divisions is established in accordance with standing operating procedures of higher headquarters. The circuits normally terminate at division main signal center, but may terminate at division advance signal center.
- (4) The eleven 3- to 5-man installation teams install and maintain field wire lines and multipair telephone cable in com-

mand post areas and between signal center components. They also install telephone instruments.

- (5) The three 8-man installation teams install and maintain field carrier cable to supplement the radio relay facilities of the division area communication system. The amount of cable authorized by the TOE does not reflect the total cable that the battalion may be expected to install. Additional cable may be requisitioned from division signal supply and Army supply points or depots. Consequently, the cable and field wire capability may be increased or decreased to some degree as warranted by the situation.

50. Communication Center Service

a. A communication center is operated at each echelon of division headquarters and division trains. Message processing, cryptographic, and teletypewriter service are provided by each communication center. A facsimile facility is provided only at the division main signal center. The communication centers at the division main and advance echelons, division trains headquarters, and the division rear echelon (administration center) serve not only those headquarters, but also the units and installations in the vicinity. The communication centers in forward areas serve the units and installations in their vicinity on an area basis as required to supplement the organic capabilities of those elements. Communication service for battle group headquarters and other major units in the area is provided by organic elements.

b. Teletypewriter terminal stations are operated at each communication center. Teletypewriter switching facilities are operated at each center except at the division rear echelon. The division teletypewriter system is designed to operate on a manual switch basis. Terminal tape relay facilities are provided at division main and advance signal centers.

c. Facsimile equipment at the division main signal center is used for communication with corps and army. It is used primarily for record communication but it may also be used for transmission of photographs as required.

51. Messenger Service

a. Scheduled motor messenger runs are established as normal procedure. Maximum use is made of the scheduled service so that special messenger capability is conserved to expedite high precedence message traffic. The aviation company is responsible for providing aircraft and pilots for air messenger service, both scheduled and special. Messenger service is normally provided from higher headquarters to lower echelons. However, special messengers may be dispatched from lower to higher echelons when the situation warrants.

b. Messengers operating in the division messenger service make deliveries directly to the headquarters message centers of the battle groups and to other major divisional elements, as well as to area signal centers operated by the signal battalion. The forward area signal centers serve only as messenger pickup and delivery points for the miscellaneous divisional unit elements in their respective areas. The division area ground messenger service is normally provided by messengers operating in pairs for optimum security. If additional messenger service is required, messengers may be required to operate separately. In this case, miscellaneous personnel should be assigned to each messenger as a security guard. See also paragraph 36.

52. Visual Communication

Division standing operating procedures, signal operation instructions, and standing signal instructions control the use of visual signals. See paragraph 37 for a detailed discussion of visual communication.

53. Sound Communication

The meanings of sound signals are kept short and simple. They are controlled by division standing operating procedures, signal operation instructions, and standing signal instructions. Warning of air, ground, and CBR attacks is usually given by this means. See also paragraph 38.

Section IV. COMMUNICATION, INFANTRY DIVISION TRAINS

54. Organization and Tactical Control

a. *General.* The trains commander must be provided with a flexible communication system for the tactical control and coordination of units within the trains area. Normally, these units consist of the following:

- (1) Headquarters and headquarters detachment and band.
- (2) Quartermaster company.
- (3) Medical battalion.
- (4) Ordnance battalion.
- (5) Transportation battalion.
- (6) Aviation company (division airfield).
- (7) Elements of the division administration company.
- (8) Trains area operators platoon of the division signal battalion.

b. *Command Post.* Generally, the site of the trains command post is selected by the division trains commander in coordination with the division G3 and G4. A site is selected that facilitates tactical control, rear area security, and area damage control.

55. Communication Support for Division Trains

a. The platoon leader of the trains area operations platoon acts as signal officer for the trains headquarters and for units served by the platoon. Communication personnel in the service units of division trains install, operate, and maintain internal communication systems for their own units.

b. Trains area operations platoon establishes and operates a signal center in the division area communication system for division trains headquarters and the division logistical control center (DLCC). For further details on the DLCC, see FM 7-100. It also provides the following signal services for the division trains area:

- (1) Message center, cryptographic, teletypewriter, and limited local area messenger service on a fulltime basis.
- (2) Additional signal facilities to supplement the communication capabilities of the units in the division trains area.
- (3) A telephone switching central for the trains headquarters and other units in the division trains area.
- (4) Trunk-switching service in the division area communication system.
- (5) Radioteletypewriter (RATT) equipment for the division trains station in the division administrative/logistical net.
- (6) An FM radio station for trains headquarters in the division CG/command net.
- (7) A radio/wire integration station at trains signal center.
- (8) The trains area terminals for both radio relay and carrier cable link in the division area communication system.
- (9) Installation and maintenance of the telephone wire system for the trains headquarters and field wire links from the trains command post to the other units in the trains area.

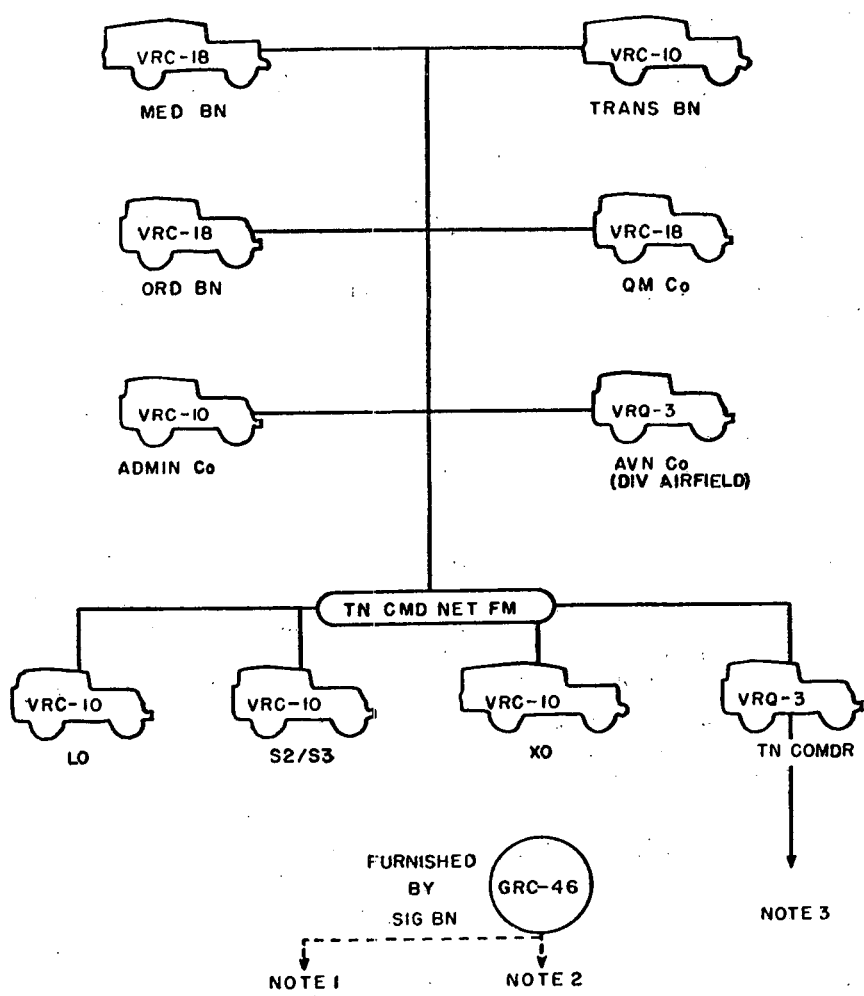
56. Radio Communication

a. The trains area operations platoon operates the following radio stations for trains headquarters:

- (1) *Division administrative/logistical net, AM-RATT.* A truck-mounted radioteletypewriter set is provided for this net. When required, the station also may be switched to operate in the division command/operations net, AM-RATT.
- (2) *Division warning/broadcast net, AM-voice.* The AM receiver for this net is mounted in one of the platoon's $\frac{1}{4}$ -ton trucks. The station is located at the trains area signal center.
- (3) *Division CG/command net, FM-voice.* The FM radio set for this station is mounted in the platoon's $\frac{3}{4}$ -ton truck. This station is located at the trains area signal center. When required, the station may switch to the trains command net.

b. With its own equipment and that of subordinate units, division trains headquarters establishes the following nets:

(1) *Division trains command net, FM-voice* (fig. 8). In this internal command net, the trains commander, the executive officer, the S2/S3, and the liaison officer operate respective vehicular FM radio stations. For tactical control and coordination, elements of the division trains also operate radio stations in this net as required.



- NOTES**
1. SWITCHES TO COMD/OPN NET AM-RTT WHEN REQUIRED
 2. DIV ADMIN/LOG NET AM-RTT
 3. DIV CG/COMD NET FM-VOICE

Figure 8. Infantry division trains command net.

- (2) *Division CG/command net, FM-voice.* Using a second receiver-transmitter component, the vehicular FM radio station of the trains commander (1) above, also operates in this net.

57. Wire Communication

The division trains wire lines are tied into a switchboard at the division trains area signal center. This switchboard is furnished and operated by the trains area operations platoon. It connects units in the trains area into the division area communication system. The platoon provides the telephone service for trains headquarters and installs field wire trunk facilities to switchboards of units in the trains area. When required, wire facilities of the trains units may be supplemented by those of the trains area operations platoon.

58. Communication Center Facilities

The trains area operations platoon provides communication center facilities for division trains headquarters. These facilities include a message center and cryptographic and teletypewriter service operated on a 24-hour basis. All services are available for units in the trains area.

59. Messenger Facilities

The trains area operations platoon provides limited local area messenger service for the division trains headquarters. The service is intended to supplement the organic capabilities of units in the trains area. The extent of message pickup and delivery service at the trains area signal center depends primarily upon the messenger capabilities of the units served.

Section V. COMMUNICATION, DIVISION HEADQUARTERS REAR ECHELON

60. General

a. Division Headquarters Rear Echelon Organization. The division headquarters rear echelon contains the staff and elements needed to provide personnel support and administrative services for the division. Normally, it is composed of the inspector general, staff judge advocate, special services personnel, adjutant general, finance, and replacement sections. For administration, these sections are assigned to the division administration company which also serves as a carrier unit for the division administration center. This center consists of unit personnel sections of organic and attached units, and the division rest camp when established. Other agencies and facilities located at or near the

rear echelon command post are the division army post office, Red Cross, press representatives, and the rear echelon signal center.

b. Control of Division Headquarters Rear Echelon. The trains commander has tactical command of division headquarters rear echelon; but when the tactical situation dictates or the distance of the rear echelon from the trains headquarters requires, the division commander appoints an officer in charge. The few division special staff officers who operate from the rear echelon remain directly responsible to the division commander for their operations. A communication system is required to provide the division headquarters rear echelon necessary communication with both the trains command post and division main.

o. Division Headquarters Rear Echelon Command Post. The rear echelon command post may be located in either of two general areas. Usually, it is placed in the division service area, forward of the division rear boundary. In fast-moving situations, when displacements of the rear echelon are kept to a minimum to avoid disrupting administrative activities, the rear echelon command post may be located behind the division rear boundary and near a forward army area signal center.

61. Communication Support for Division Headquarters Rear Echelon

a. The infantry division signal battalion provides the rear echelon communication system. The division area communication system provides communication means between the trains and other elements of the division.

b. The signal battalion's rear echelon operations platoon establishes and operates a signal center at the division rear echelon. It connects to the nearest division area signal center (or army signal center, when the rear echelon is located outside the division area) with field wire or cable. The platoon leader acts as signal officer for the rear echelon, administration center, and administration company. The platoon—

- (1) Provides communication center facilities, including message center, cryptographic, teletypewriter, and limited motor messenger service on a fulltime basis.
- (2) Operates the division rear echelon radio receiver station in the division, corps, or army warning net.
- (3) Installs the telephone system for the division rear echelon, administration center, and the administration company (fig. 9).
- (4) Installs and operates a single position manual telephone switchboard on a fulltime basis.
- (5) Operates a radioteletypewriter station in the division administrative/logistical net.

Section VI. TACTICAL APPLICATION OF COMMUNICATION

62. Communication in a Concentration Area

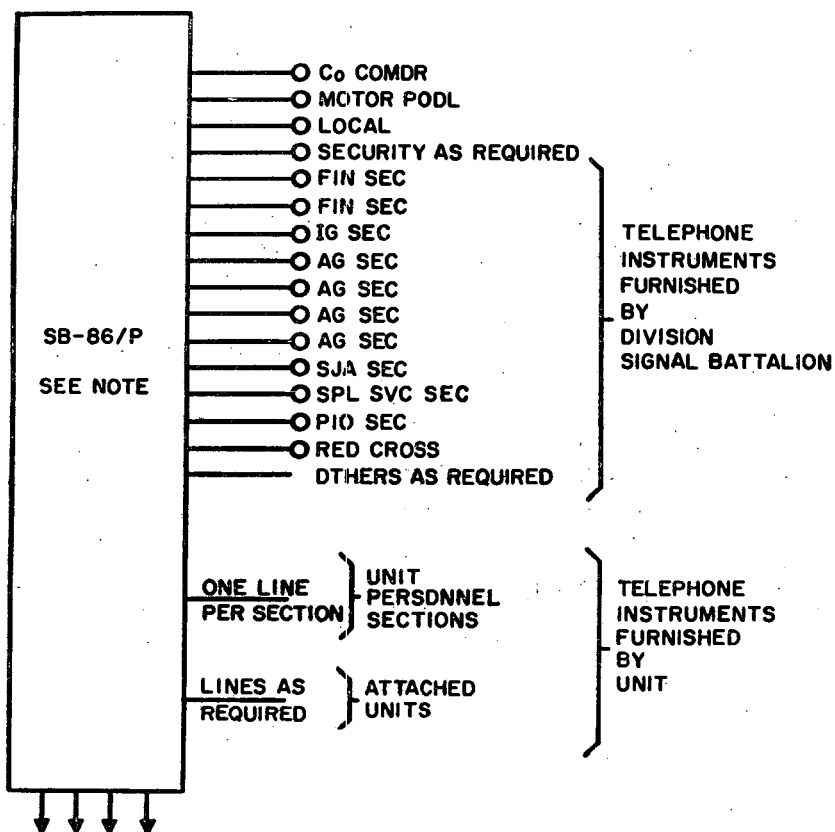
a. General. A tactical concentration is the assembly of forces in a selected area from which an impending operation can be launched. Effective control of the concentration depends on the prompt establishment of the command post and signal communication.

b. Planning Communication for Concentration. During the preparation for the concentration, the division signal officer and his staff—

- (1) Conduct a reconnaissance of the concentration area to obtain detailed information concerning the location of command post sites, messenger routes, and existing signal facilities.
- (2) Prepare a signal plan for communication during the movement of the division into the concentration area.
- (3) Coordinate the installation of all signal systems within the concentration area. This insures an integrated system for the division as a whole.
- (4) Take steps to provide communication security during the movement into and occupation of the concentration area.

c. Communication Activities During a Concentration. During the concentration, the signal officer and all personnel of the division signal battalion are engaged in training and in performing signal supply and other signal activities. The extent to which these activities are carried on depends on the state of training, the adequacy of equipment, the number and capabilities of personnel, and other factors peculiar to the contemplated operation. The more important signal activities include—

- (1) Revising the SOP or preparing a new one to meet the requirements of anticipated operations.
- (2) Training personnel in the installation, operation, and maintenance of new or special equipment provided for the operation. This includes training in modified or new operating techniques.
- (3) Studying enemy characteristics and adopting special precautions required by the planned operation to insure the successful performance of missions.
- (4) Formulating specific communication security measures for the anticipated operation. These are in addition to all normal security measures.
- (5) Insuring technical inspection of all signal equipment in the division to determine its operating condition and adequacy.
- (6) Replenishing shortages and replacing unserviceable items.



TRUNKS INTO AND IN THE DIVISION OR ARMY AREA COMMUNICATION SYSTEM, ON A COMMON USER BASIS, AS REQUIRED.

NOTE:
 PROVIDED AND OPERATED BY REAR ECHELON OPERATIONS PLATOON FROM DIV SIGNAL BATTALION.

Figure 9. Administration company wire diagram.

- (7) Establishing and maintaining a signal supply point for the division.
- (8) Installing, operating, and maintaining the division area communication system.
- (9) Preparing SOI and SSI.
- (10) Making a detailed reconnaissance for the purpose of establishing an area communication system capable of meeting foreseeable future requirements.
- (11) Drafting tentative plans for future operations and making preliminary provisions for their execution.

d. *Application of Communication.* Signal communication normally is required from the command post in the concentration area to landing

zones and debarking, detraining, and detrucking points; division security and reconnaissance forces; division trains and rear echelons; the headquarters of division units; and division supply and evacuation installations within the area.

- (1) *Communication centers.* Communication centers are operated at each echelon of division headquarters, and others may be located at sites such as entraining and detraining points.
- (2) *Messengers.* Messengers are employed at each established communication center. The signal officer determines whether the volume of message traffic and the location of communication centers serving the division and its elements warrant the establishment of scheduled messenger service.
- (3) *Radio communication.* Radios in the concentration area are silenced when secrecy and surprise are essential to the success of the concentration, except as needed to broadcast warnings and as needed by reconnaissance forces in contact with the enemy.
- (4) *Wire communication.* The installation of wire in a concentration area should be limited, but should suffice for concentration operations and provide for future use of the area.

63. Communication During Marches and Halts

a. General. Marches by an infantry division may be made in one or more stages, in one or more columns, and on one or more routes. They may be motor marches or combined foot and motor marches. In either case, minimum essential communication must be provided for control of the moving columns. The signal officer is given information of the march plan in time for the signal battalion to provide the required communication facilities.

b. Communication While Columns Are Forming. While units are moving to their march positions, communication from the division command post to unit command posts may be maintained by radio and special messengers. Radio can be used advantageously for communication between staff officers supervising the organization of march columns, especially when the different units are widely separated. However, the use of radio is subject to security restrictions.

c. Communication During Marches. Communication is provided from division main to reconnaissance and security elements operating under division control, to column commanders, to command posts of the other echelons of division headquarters, and to control points. Communication within the various reconnaissance and security elements of any column is the responsibility of the column commander.

- (1) *Communication centers.* Communication centers are established at division main, trains, and rear echelon command

posts, and at control points and advance locations designated in the march plan. When the division commander accompanies the division on the march, communication center operations are conducted in a vehicle moving with the march command post.

- (2) *Messengers.* The number of messengers and the type of service provided at each communication center varies with the size of the echelon served. Motor messengers are indispensable at the communication center of the march command post. At least one messenger vehicle is detailed to follow the division commander's vehicle. Motor messengers also may be detailed to follow designated staff vehicles, the communication center vehicle, and the operating radio vehicles. When aircraft are available, air messenger service is used to supplement motor messenger service.
- (3) *Radio communication.* The employment of radio communication during the march is determined by such factors as security, the speed of movement, the importance of surprise, and the necessity for rapid communication. Frequently, radio is the only adequate means for communication between rapidly moving or distant units, and between air and ground elements. The division CG/command net includes stations at division main, at the march command post of each column and, on occasion, at control points and advance message centers. The division intelligence net includes stations at division main, with the reconnaissance and security elements under division control, and with elements of the aviation company observing for the division.
- (4) *Visual communication.* Panels, hand signals, and pyrotechnics, including colored smoke, are the principal means of visual communication used during the march. Friendly aircraft may warn marching troops of impending hostile attacks by flying over and alerting the columns with prearranged signals. Panels are used to mark specified vehicles in column and to transmit short prearranged messages. These panels are displayed by either message center or radio teams. A special prearranged pyrotechnic code may be prescribed for use on the march. If higher commanders have designated the code, the division requests authority to assign additional special meanings that are needed.
- (5) *Wire communication.* When control points or advance communication centers are located near existing wire circuits, arrangements are made to use the circuits. When columns march on roads that are paralleled by commercial wire lines, arrangements may be made to establish wire communication

over such lines at specified times such as during periodic halts.

d. Communication During Extended Halts. Plans must be made in advance for the communication system to be used during a halt. Factors that are considered in formulating the plans include the location of communication installations and elements of the division signal battalion in the area, the volume of traffic and types of communication required by the division commander for reconnaissance, security activities, and administration; and the conservation of signal supplies to insure the availability of sufficient quantities for the next operation.

- (1) *Communication centers.* The schedule for reliefs at communication centers is arranged to cover the time the command post is expected to remain in the bivouac area.
- (2) *Messengers.* The signal officer determines whether special or scheduled messenger service, or both, are to be provided. The duties of some messengers on the march are tiring, and their need for rest during the halt must be considered. Normally, special messenger service is adequate during halts. Local messengers are informed of the location of the various offices at the command post and are given the names of the officers on duty at each site. During the halt, messengers must reconnoiter the routes from the communication center to the other installations in the vicinity.
- (3) *Radio communication.* Radio stations are located as near as practicable to the signal message center. The restrictions placed on the use of radio during a march usually are applicable during a halt. When security permits, the division intelligence net continues to operate. Stations in the command nets, although normally prohibited from transmitting, usually remain in a standby status (ready for operation). Radio operation in corps and army nets continues to be as directed by corps and army commanders.
- (4) *Visual communication.* When reconnaissance aviation is working with the division during a daylight halt, a panel station is established. The panel station, combined with a message drop and pickup point, is located so as to preserve maximum security for the command post against observation by hostile aircraft.
- (5) *Wire communication.* The telephone system installed in the bivouac area is held to a minimum. When wire facilities already exist, arrangements may be made for their use to reduce the requirement for new telephone lines. When practicable, telephone communication trunks between signal centers are established by using radio relay in lieu of wire lines.

e. Signal Supply. Signal supplies, including expendable items for the march, are distributed before the march begins. When it is necessary to issue additional supplies during halts, the signal bivouac area usually is designated as the signal supply point.

64. Communication During Development

a. General. During development, columns break up into smaller groups and move on assigned march objectives, or move to assembly positions preliminary to deploying for attack or defense. The signal battalion must be prepared to meet the communication requirements created by the changing tactical situation.

b. Application of Communication. There is no break in the operation of the area communication system during development. A properly planned operation insures a communication system flexible enough to meet the requirements of development and deployment.

- (1) *Communication centers.* The march command post communication center may continue operation during development. If a communication center does not accompany the headquarters on the march, one must be established at the new command post by signal center personnel of the advance party.
- (2) *Messengers.* With units changing locations during development and with several of them possibly using the same routes, close coordination is required to permit the continuation of adequate messenger service. Units should notify the division communications center of the locations of their command posts, and all messengers should be instructed concerning the routes to, and the location of, the units to which they are dispatched. Scheduled messengers make their deliveries to unit rear echelons or old command post locations until new locations are established, at which time the messengers are rerouted to the unit command posts.
- (3) *Radio communication.* The extent to which radio is used depends on the requirements for secrecy and surprise as balanced against the urgency for radio communication. When security permits, the division command net is operated during the development. The operation of secondary stations in this net may be limited to combat units in contact with the enemy. Usually, there is no reason to curtail radio operation in the division intelligence net during the development. The commander needs this channel of communication to receive timely information concerning the enemy.
- (4) *Visual communication.* The use of visual communication during the development is governed by the enemy's ability to observe the visual signals. It may be necessary to curtail

the use of visual communication if enemy air observation is active.

- (5) *Wire communication.* Every effort is made during the development to establish the wire system required for combat. The installation of lines that will not be used during combat is held to a minimum. When an installation section of the signal battalion's battle group support platoons has completed the installation of wire lines to a battle group, the section must maintain the lines, stand prepared to extend them when the battle group command post moves, and be prepared to aid battle group communication personnel on order of the division signal officer.

65. Communication During Attack

a. General. During an attack, combat troops of the division normally are organized into three tactical forces: the main attack force, the secondary attack force, and the division reserve force. Since the main attack force requires the maximum of signal communication support, the division signal officer and division signal battalion personnel are particularly concerned with the location and direction of the main attack.

- (1) *Orders and instructions.* When time permits, the signal officer obtains approval of his plan for signal communication, completes the detailed signal plan, and issues orders to the signal battalion. However, the installation of the area communication system is not delayed to await the detailed signal plan. If any delay is contemplated, the signal officer orders the advance party to proceed to the designated location of the command post; there they install the communication system. Fragmentary orders and SOP's are used in the absence of other orders.
- (2) *Instructions to subordinate units.* The necessary instructions on signal matters are communicated to all units requiring them. These instructions may be issued at a conference of the division signal officer and the unit signal/communication officers, or they may be sent in messages or issued in the signal annex of the division operation order. These instructions may concern messenger service, use of radio, location of signal supply points, use of the wire system, and any other information of a coordinating nature. The division SOP tends to reduce the volume of such instructions.

b. Application of Communication. Time factors govern the extent to which the installation of signal communication facilities may be carried out. In addition, the elaborateness of the signal installation is

limited by the quantities of signal supplies and equipment available to the division.

- (1) *Communication centers.* The operation of a communication center at a division command post may involve displacement from a temporary location (used during the development) to a more advanced location. Displacement is made by leap-frogging the teams of the communication center. The communication center must be prepared to displace on short notice.
- (2) *Messengers.* Normally, after the attack has been launched, special messengers are used forward of the division advance signal center.
- (3) *Radio communication.* When surprise is important, radio operation is limited initially to those units in contact with the enemy. In some instances, to increase deception and surprise, the operation of dummy stations may be directed by higher commanders. When the division is moving into an area just prior to attack, it maintains radio silence until the attack is launched. When the division already is occupying a sector from which it is to launch an attack, and its radio stations are already in operation, normal radio operation is continued without substantial change in traffic load until the attack is launched. If the division is moved to another sector or relieved by another unit, it may be required to provide dummy stations to remain in the area and continue normal operation until the attack is fully under way. Once the attack is launched, the special restrictions on radio operation are, as a rule, removed.
- (4) *Wire communication.* The initial wire system installed for the attack is limited in extent by time and by the amount of wire and wire personnel available. The minimum essential circuits are installed first and the system expanded as required. Telephone trunk circuits between division signal centers are usually established by radio relay in lieu of wire lines.

c. Signal Supply. A division signal supply point must be designated from which signal supplies are issued during the attack. Signal supply and maintenance facilities are provided by the signal supply and maintenance section of the signal battalion's headquarters company. In addition, the forward communication company provides field signal maintenance at each forward area signal center.

66. Communication During Reorganization

a. General. When an attack has attained its objective or has been unsuccessful, the division commander must decide to renew the attack, defend, or withdraw. Regardless of the action taken, the signal

officer must be prepared to provide signal communication support. As soon as he receives the commander's decision, he directs the signal battalion to modify the existing area communication system to support the new action.

b. Tactical Application of Communication.

- (1) During the reorganization, radio communication is altered as little as possible. Any change at this time, especially in the amount and type of message traffic, gives the enemy an opportunity to increase his collection of intelligence.
- (2) Wire systems are installed or changed to meet the new situation.
- (3) The period of reorganization is an excellent time for combat units to replace expendable signal supplies and to repair or exchange signal equipment. For example, wire teams replenish their gasoline and wire supplies. Every effort is made to provide all echelons with the items required for the contemplated operation.

67. Communication During Pursuit

a. General. When an enemy is forced to retreat, an immediate and relentless pursuit may be launched to exploit the advantage. During pursuit, all units are pushed to the extreme limit of physical endurance. Direct pressure against the retreating forces is combined with an encircling force to prevent them from sustaining a successful retrograde action. Maintenance of communication during the pursuit requires maximum effort on the part of all signal troops.

b. Application of Communication. The speed of a vigorous pursuit necessitates rapid and numerous displacements of command posts. Continuous message center operations must be maintained during the pursuit.

- (1) *Messengers.* All available messengers are used at established communication centers. When distances become extended among elements of division headquarters, messenger relay points will have to be established. Aircraft can be used to great advantage to assist the messenger service.
- (2) *Radio communication.* Radio is the most suitable means of communication for pursuing forces. The distance between these forces and the nearest division signal center may become so great that the most powerful radio sets available will be needed to maintain communication.
- (3) *Visual communication.* Direct pressure and encircling forces use panels to identify themselves to friendly aircraft. They may also use panels to communicate with their division air support.

- (4) *Wire communication.* Rapid pursuit does not permit the construction of wire lines. Existing facilities along the routes may be used when practicable.

c. Signal Supply. The signal officer includes in his plans a provision for the supply of any attached forces used in the pursuit. He arranges to distribute signal supplies to all forces before the pursuit is launched. Every signal plan includes provisions for airdrop or air transport of signal supply, if necessary.

68. Communication During Defense

a. General. The time available to organize a defense position determines the elaborateness of signal installations. The organization for defense dictates the type of communication system required. When the mission requires the retention of specific terrain, the commander places primary reliance on the ability of fires and forces deployed on position; with this organization for defense, wire communication is emphasized. A mobile defense is adopted when the commander places primary reliance on maneuver and fire to accomplish the defensive mission. Minimum combat power is committed in the forward defense area with the bulk of the division's combat power retained in reserve. This organization for defense requires greater dependence on radio communication and messenger service. For a hastily adopted defense, the communication system currently in use is continued. It is supplemented with speedily constructed wire circuits as needed. When enough time is available, channels of communication are increased and alternate channels are provided.

b. Application of Communication. The division communication system provides communication to division units, to covering forces, to division outposts, and to other units and activities as required. Other units and activities include the division reserve, division landing strips, attached troops, supply and evacuation activities, and the echelons of division headquarters.

- (1) *Communication centers.* Normally, division signal centers do not move frequently when the division is engaged in defensive operations. Nevertheless, communication center personnel must be prepared to displace at any time. When advance or alternate command posts are established, advance parties are dispatched to start communication installations at the new locations.
- (2) *Messengers.* Special messengers are required during the organization of a defensive position. When the position has become organized, the messenger service normally reverts to scheduled messenger runs.
- (3) *Radio communication.* Radio communication is subordinated to wire communication and messenger service; however,

radio relay is often substituted for wire lines. Radio nets remain operative as a supplement to the wire system.

(4) *Visual communication.* Visual signals may be used in the defense as in other situations. Their use, however, is attended by the disadvantages of security risk and a possibility of misunderstanding. A panel station is established for very brief messages. Usually, air-to-ground radio communication is less time-consuming than panel systems.

(5) *Wire communication.* The wire system is made as elaborate as time and facilities permit. High priority circuits are established as rapidly as possible to meet immediate requirements. Thereafter, additional circuits are installed to increase traffic capacity and flexibility.

c. *Signal Supply.* A stock of signal supplies is maintained during the defense. All shortages and depleted stocks are replenished as promptly as possible.

69. Communication During Retrograde Movement

a. *General.*

(1) Retrograde movements include delaying defense, disengagement, and retirement. This paragraph discusses communication during disengagement. Communication during a delaying defense is similar except that a series of communication systems may be required for a defense on successive positions. Communication during a retirement is similar to that used during marches and halts.

(2) Disengagement may be executed either under pressure or not under pressure. Successful disengagement when not under pressure is normally limited to periods of darkness or poor visibility. Disengagement under pressure depends on maneuver, firepower, and control, with the forward units moving to the rear by employing aggressive small unit delaying tactics.

b. *Application of Communication.* Communication operation in the area communication system continues while preparations are made for rearward displacement of the division command post. New installation at the old location is limited to the absolute minimum, while maximum use is made of existing facilities.

(1) *Radio communication.* Radio operation is regulated during the disengagement. Dummy stations may be used to maintain the normal level of message traffic in the old positions when authorized or required by the corps or army commander. Listening silence may be enforced on the other radio stations, both while withdrawing and on reaching the

new locations. Transmission may be resumed when the operation has been completed.

- (2) *Messengers.* During the disengagement, the need for special messengers is increased. Advance communication centers are established where required and special messengers are assigned to them. Elements of the communication center left at the old command post location may be required to remain after the establishment of the new command post to insure messenger service for the forces remaining in contact with the enemy.
- (3) *Wire communication.* The wire system that is in operation prior to the disengagement is used as required to initiate the retrograde movement. The installation of new wire lines is held to a minimum, both as to number and length. As units disengage, the wire lines not required by them or by the elements left in contact are recovered. Wire lines that cannot be recovered for any reason are made useless by removing random sections.

70. Airlanded Operations

Many of the techniques of the airborne division (ch. 5) are used by the infantry division in the conduct of airlanded operations.

CHAPTER 5

AIRBORNE DIVISION SIGNAL BATTALION

Section I. GENERAL

71. Mission and Organization*a. Signal Battalion.*(1) *Mission.*

(a) To provide signal communication, including communication to subordinate units, for the—

1. Headquarters and headquarters company, command battalion, exclusive of staff vehicle radios.
2. Support group headquarters and headquarters detachment, exclusive of staff vehicle radios.

(b) To establish and operate a division area communication system of signal centers, wire and radio trunk and local lines, and radio/wire integration station to provide general and direct communication support for units in the division area.

(c) To perform third echelon maintenance of cryptographic equipment for the division.

(2) *Capabilities.* The signal battalion—

(a) Provides communication for those headquarters, installations, and units listed in (1) (a) above, on a 24-hour basis, to include message center, cryptographic, teletypewriter, and radio (with exceptions noted).

(b) Establishes and operates a division area communication system consisting of signal centers, four-channel radio relay links, and field wire as required to provide—

1. Trunkline and signal center service for the headquarters and units designated in (1) (a) above.
2. Trunkline service for service and combat support units in the division area.
3. Field wire, FM radio/wire integration, and radio relay links to connect using units into the division area communication system.
4. Signal center service for unit elements and installations in the division area as required to supplement organic communication means.

- (c) Provides a limited ground messenger service within the capabilities of two motor messenger teams.
 - (d) Performs third echelon maintenance of cryptographic equipment for the division.
- (3) *Organization.* The signal battalion is organized as shown in figure 10.
- b. *Headquarters and Headquarters Detachment.*
- (1) *Mission.* Battalion headquarters controls and supervises the employment and operation of the personnel and equipment of the airborne signal battalion. The headquarters detachment provides internal administrative and logistical support for itself and battalion headquarters. In addition, it furnishes staff section personnel to assist the division signal officer and battalion staff members in performance of their duties.
 - (2) *Capabilities.* The detachment—
 - (a) Plans and supervises communication, training, and other signal activities.
 - (b) Provides administrative and limited supply support for the airborne division signal battalion.
 - (c) Performs third echelon maintenance on all cryptographic equipment authorized the division.
 - (3) *Organization.* Headquarters and headquarters detachment is organized as shown in figure 11.
- c. *Command Operations Company.*
- (1) *Mission.* The command operations company installs, operates, and maintains communication facilities for the division command post and support group headquarters. It furnishes area signal communication service for units and installations in the vicinity of the division command post signal center. It provides terminal and switching facilities for trunkline connections with the support group communication center and all area signal centers. It also provides terminal facilities for communication circuits to higher headquarters.
 - (2) *Capabilities.* The company—
 - (a) Installs, operates, and maintains all telephone, teletypewriter, radio (exclusive of staff officer's vehicular radio sets), radio relay terminal, and message center facilities for the airborne division command post and support group headquarters.
 - (b) Provides telephone switching, teletypewriter, and message center service at the division main and support group signal centers, and local telephone and messenger service for units located in the vicinity of these signal centers.

- (c) Installs and maintains field wire trunkline interconnections between communication centers.
- (3) *Organization.* The command operations company is organized as shown in figure 12.
- d. *Forward Communication Company.*
 - (1) *Mission.* The forward communication company operates five area signal centers, each in support of a battle group. It provides signal communication facilities at the signal centers and signal communication service for units and installations in the vicinity of each center. It provides terminal and switching facilities for long-line connections between the area signal centers it operates and from those centers to battle groups and to other signal centers of the division area communication system.
 - (2) *Capabilities.* The company—
 - (a) Installs, operates, and maintains telephone, teletypewriter, and radio relay terminal facilities at the area signal centers.
 - (b) Provides telephone switching and teletypewriter service at the division area signal centers, and local telephone service for units located in the vicinity of these signal centers, when required.
 - (c) Provides wire lines to connect battle group headquarters into the division area communication system.
 - (d) Operates a radio/wire integration station for general service to units in the area.
 - (3) *Organization.* The forward communication company is organized as shown in figure 13.

72. Phase of Airborne Operations

An airborne operation progresses through a series of phases, with supporting signal activities conforming to each phase. It usually is initiated by an assault phase executed by parachute or a combination of parachute and airlanded elements whose mission is the seizure of the initial airhead or airheads. The assault phase is followed by one or more of the following phases:

- a. A defensive phase until linkup is made with friendly surface forces.
- b. A defensive phase until air withdrawal.
- c. An offensive phase and subsequent linkup or withdrawal.
- d. A defensive phase until planned buildup by air lines of communication permits a major exploitation.

73. Communication Planning for Airborne Operations

a. Planning for an airborne operation begins as soon as the mission is established by the division commander. All interested commanders

and their staffs participate in the planning, thus assuring complete cooperation and continuity of effort.

b. The division signal officer is responsible for preparing the signal annex for the division operation plan. Signal planning begins as early as possible and includes the details of communication for all the phases of the operation. The division supply officer and division maintenance officer provide the G4 with appropriate signal information for the division administration plan.

c. Joint signal plans are made so that the communication facilities of each participating component of the force may be integrated into the overall system. Planning for signal communication must be coordinated with—

- (1) Troop carrier units.
- (2) Navy, Air Force, and Army units providing support fires.
- (3) The next higher headquarters.
- (4) Friendly advancing units with whom contact can be expected in the objective area.
- (5) The commander designated to assume command of forces in the objective area following linkup.
- (6) Theater unconventional warfare agency.

d. Planning procedure for signal communication in an airborne operation are generally the same as for other combat operations except that it is usually impossible for the signal officer to reconnoiter the objective area. For this reason, he must take into account every possible contingency he may encounter and provide for or neutralize it.

Section II. COMMUNICATION DURING MARSHALING AND AIR MOVEMENT

74. Communication During Marshaling

a. Marshaling is the process by which units of the airborne forces complete final preparation for combat, move to departure airfields or air-loading facilities, and load for takeoff.

b. The marshaling area commander is responsible for providing signal communication during marshaling. The division may operate a small communication center to expedite the transmission of messages.

c. During marshaling, the signal battalion commander is primarily concerned with the final actions necessary to bring the battalion to a state of combat readiness. He conducts command inspections of personnel and equipment, receives and orients replacements, trains and rehearses personnel in their duties, has equipment packed, and briefs personnel on the tactical and signal plans.

d. For further details on marshaling procedures, see FM 57-100.

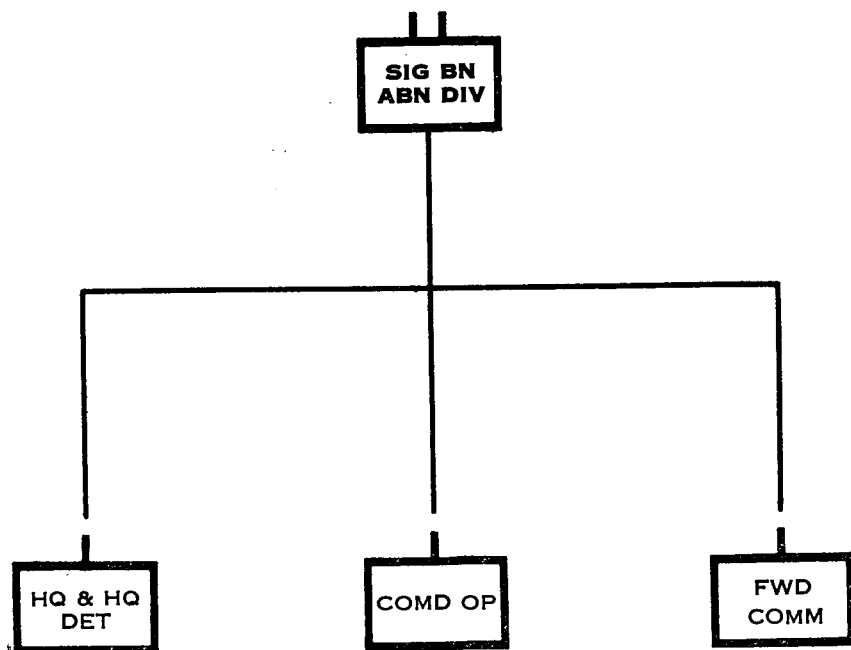


Figure 10. Organization of airborne division signal battalion.

75. Communication During Air Movement

a. During air movement to the airhead, communication is provided by the troop carrier command. Listening silence is usually maintained for security reasons.

b. Messages that must be transmitted between aircraft must be authorized by the senior troop carrier command officer aboard the aircraft where the message originates. Such message traffic is sent through Air Force facilities. See also paragraph 77b.

Section III. COMMUNICATION DURING ASSAULT

76. General

a. During the assault, the division lands, assembles, reorganizes, and accomplishes its assault mission(s). Initially, the assault is characterized by independent action of subordinate units. Centralized control of the division is reestablished as soon as communications and the tactical situation permit. The assault phase presents the greatest difficulty for maintaining communication.

b. The communication objective is to establish a system for the airborne force that is comparable to one for nonairborne forces. The communication missions peculiar to airborne operations require highly trained personnel and special equipment capable of being delivered by

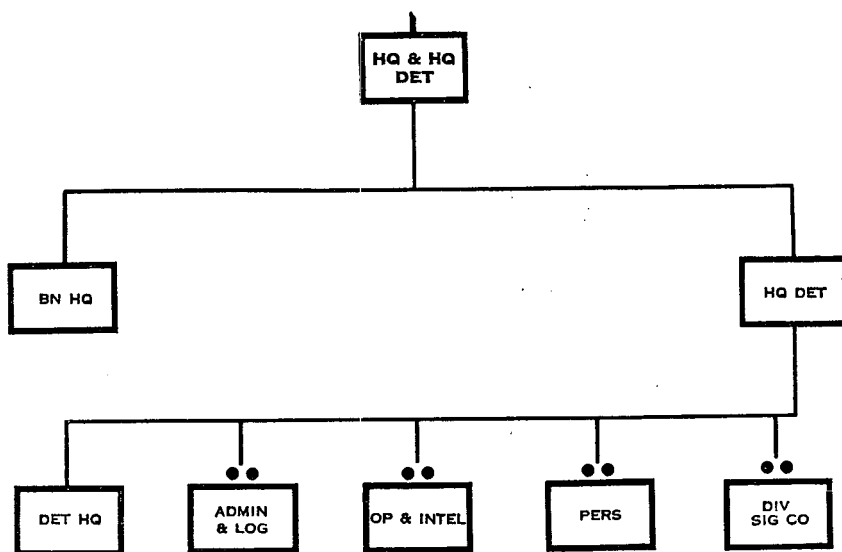


Figure 11. Organization of headquarters and headquarters detachment, airborne division signal battalion.

parachute, Air Force assault aircraft, and Army rotary- and fixed-wing aircraft. These missions may include—

- (1) Combat control operations.
- (2) Individual and small unit communication to assist in the assembly of the units.
- (3) Immediate establishment of command and fire control channels within the airborne force.
- (4) Communication with supporting air and naval forces.
- (5) Communication to bases in friendly territory.
- (6) Communication to other airborne or ground forces with common or coordinated missions.

77. Combat Control Operations

a. Marking drop and landing zones and directing aircraft to them are Air Force responsibilities. Selected Army and Air Force personnel who make up the joint airborne advance party (JAAP) are jointly trained to precede an airborne force to the objective area, when required, to establish navigational aids for the troop carrier formation to insure accurate delivery of airborne forces; to assist with the ground assembly of troops after landing; to land in forward areas, survey landing sites, and report the practicability of landing troops, equipment, and supplies; to assist aircraft in landing at selected sites by pointing out obstacles to landing and acting as flight control personnel; and to remove obstacles from landing sites.

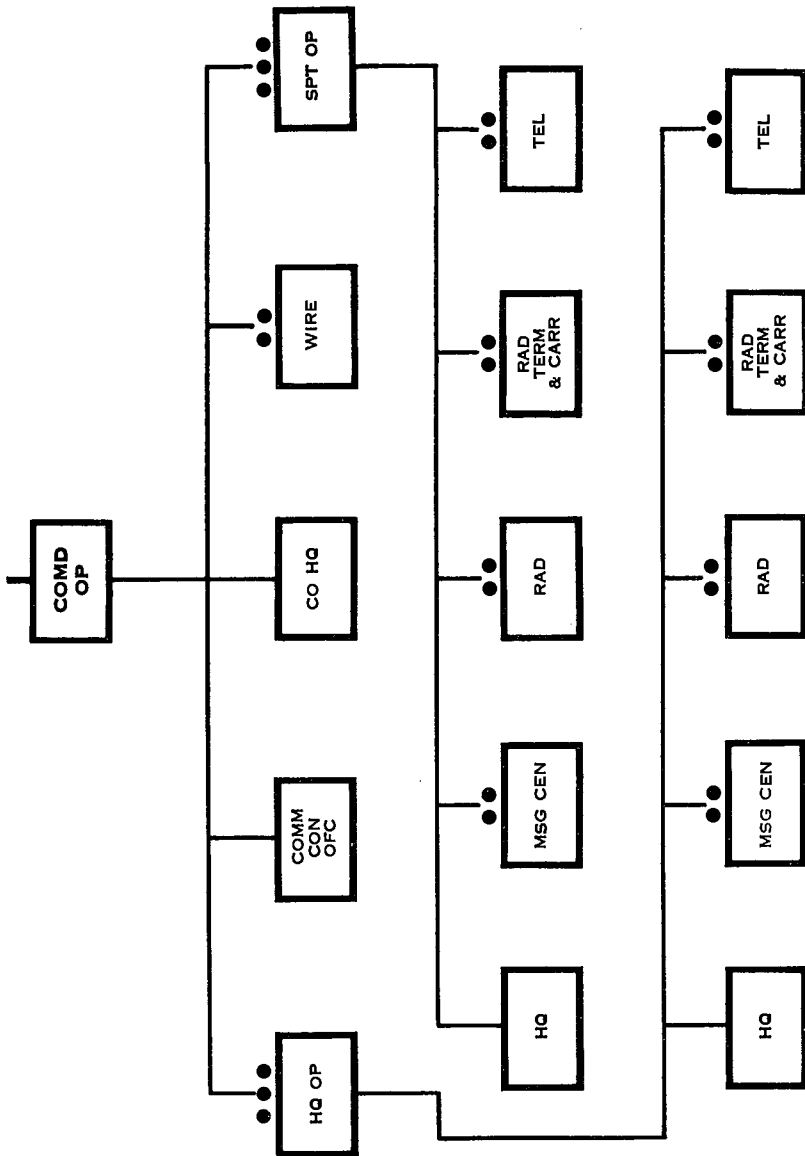


Figure 12. Organization of command operations company, airborne division signal battalion.

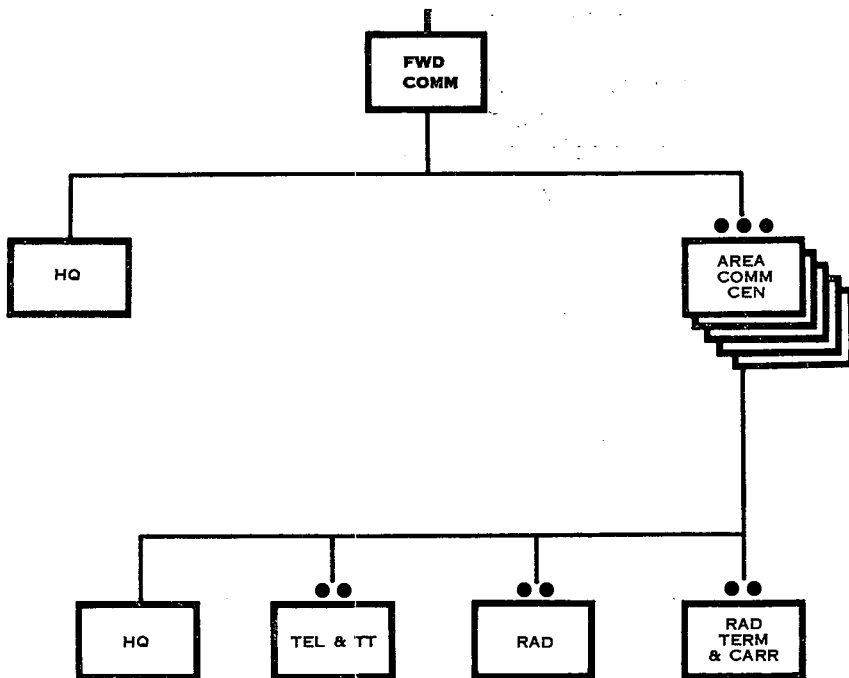


Figure 13. Organization of forward communication company, airborne division signal battalion.

b. The primary mission of the Army element of the JAAP is to provide security to the JAAP during the early stages of the airborne operation. In addition, they may be directed to perform any or all of the following functions:

- (1) Deploy into the objective area by the same means as the JAAP.
- (2) Conduct necessary reconnaissance of drop/landing zones.
- (3) Conduct radiological survey.
- (4) Mark airborne assembly areas and generally assist units in reorganizing after landing; reconnoiter and assist in clearing unprepared landing strips.
- (5) Provide necessary ground-to-ground communication for coordination with other Army assault teams in the area.
- (6) Establish and maintain communication with designated commanders of Army units landing in the drop/landing zone.
- (7) Furnish terminal guidance assistance to Army aircraft when required.

78. Assembly and Reorganization

a. Divisional units assemble and reorganize according to prearranged plans, making full use of assembly aids. The Army element

of the JAAP, when employed, may assist in expediting the accomplishment of assembly plans.

b. Assembly aids used may include assembly areas, personnel and equipment markings, radio communication, direction finding equipment, sound and visual signals, and guides.

79. Establishment of Signal Communication

Enough signal personnel and equipment are moved into the objective area early in the assault to assure the timely installation of vital communications for the command post they are to serve. The signal communication system is developed by successive steps to meet the requirements of the commander.

a. All signal equipment necessary in the initial phases of the operation is delivered with the assault echelon. Personnel of the battle groups are the first to arrive. Accompanying them are signal personnel with wire, radio, and radio relay equipment needed to establish initial communication. Also included in the first serials are representatives from the division signal officer's section, personnel from the telephone and teletypewriter section, and message center teams complete with messengers.

b. The radio team that furnishes the initial communication channels to the individual combat teams lands with the division commander. Immediately on landing, the division assault (command) net is opened. This net is normally operated with manportable radios. When normal radio nets are established, the assault net reverts to standby status. Radio and messenger are the primary means of signal communication until radio relay and wire circuits are established.

c. Wire teams from the division signal battalion may accompany each battle group. They may install wire lines to the division command post simultaneously with the installation of radio relay equipment. As soon as telephone circuits are established through either of these two mediums, wire communication assumes its role as a primary means of signal communication.

80. Extra Equipment

The nature of airborne landings and the initial dispersion of the assault elements create a requirement for spare major items of signal equipment. This requirement must be considered in the planning phase of the operation, and the quantity of the indicated items of equipment to be landed in the assault must be increased accordingly.

81. Area Communication System

a. During the assault, expansion and improvement of the signal communication system is carried on continuously. The ultimate network is an area communication system which, after consolidation of the airhead, is generally similar to that of the infantry division

(pars. 44–46). A type airborne division area communication system is shown in figure 14.

b. The airborne division area communication system is based on the establishment and interconnection of signal centers. In addition to its specific individual mission, each signal center has the general function of providing local area communication support for units and installations in its vicinity as follows:

- (1) The command operations company has the mission of providing a signal center for the division headquarters and the division support group headquarters. When established as a separate agency, the division logistics operations center (DLOC) together with the support group headquarters, is provided a separate communications center in the division area communication system. For further discussion on the DLOC, see FM 57–100 and FM 11–57.
- (2) The forward communication company provides signal centers in support of the battle groups.

c. The area communication system is capable of providing alternate communication facilities between division artillery and its batteries from one of the area signal centers in the event any portion of the division artillery internal communication system fails. Field wire lines connecting artillery units into the area communication centers are an artillery responsibility.

d. Radio relay communication may be provided between the division command post and division artillery, the support group, and the reserve battle group, if the distance involved is sufficient to warrant its use.

82. Radio Communication

a. General. Tactical radio nets are provided in the airborne division to augment the communication facilities of the division area communication system. The nets provide flexible communication for the initial assault phase of an airborne operation, for rapid displacement of major command posts, and for periods during which personal voice communication between commanders is desired. Radio nets within division headquarters and divisional units are primarily for internal organizational communication and for communication between major divisional units. Division standing operating procedures (SOP) will indicate the net(s) used for transmission of air alerts, CBR attack warning, fallout warning, rad-safe data, nuclear strike warnings, and similar information of an urgent operational nature. Other radio equipment is provided for communication with echelons above division.

b. Internal Radio Nets. The division's internal radio nets (fig. 15) are described below. For further discussion, see FM 57–100.

- (1) *Division assault net, FM-voice.* This net is used during the initial phase of an airborne operation to provide communication between the division commander and his subordinate commanders. The division signal battalion furnishes a station for the division commander and the net control station at the division command post. Other stations normally operating in the division assault net are division, fire support coordination center (FSCC), each of the five battle groups, the cavalry troop, and the aviation company. The net remains in operation until normal radio nets are established and then reverts to a standby status.
- (2) *Division command net No. 1, AM-RATT.* This net is used for the operational command and control of the close combat elements of the division. The net control station is located at the division command post and is under the operational control of G3. The medium powered AM-RATT radio equipment and operating personnel are provided by the command operations company. Other units operating in this net are the battle groups, the cavalry troop, and the division FSCC.
- (3) *Division command net No. 2, AM-CW-voice.* This net is used for the operational command and control of the combat support elements of the division. The net control station is located at the division command post and is under operational control of the G3. The medium powered radio equipment and operating personnel are provided by the command operations company. Other stations operating in this net are division support group, aviation company, and the engineer battalion.
- (4) *Division intelligence net, AM-CW-voice.* This net is used for the transmission of enemy information and intelligence. The net control system provided by the command operations company is located at the division command post and serves primarily as a means for G2's message traffic. Other stations normally operating in this net are the five battle groups, aviation company, and the cavalry troop. The division artillery monitors this net.
- (5) *Division CG/command net, FM-voice.* This net provides a direct channel of communication between the division commander and the commanders of all units operating directly under division control. The signal battalion provides the net control station at the division command post. Other headquarters represented by stations in this net are division artillery, each of the five battle groups, support group,

aviation company, signal battalion, engineer battalion, FSCC, cavalry troop, and the military police detachment.

- (6) *Division administrative net, AM-RATT*. This net is used for transmission of administrative and logistical message traffic. An AM-RATT radio set is used in this net to provide communication for the G1 and G4 at the division command post, to the support group, and each of the five battle groups. The division net control station and operating personnel are provided by the command operations company.
- (7) *Division air request net, FM-voice*. This net is used to forward air requests for tactical air support directly to the division FSCC and for disseminating information and instructions on all types of air strikes that may affect the command. The net control station is provided by division artillery and is located with G3 Air at the division FSCC. Other stations operating in his net are the five battle groups.

c. *External Radio Nets*. The external radio nets of the airborne division (fig. 15) are described below. For further discussion, see FM 57-100.

- (1) *Corps command net, AM-RATT*. This net is used by the corps commander for the command and operational control of his major subordinate units. The division station, which is furnished by the signal battalion, operates in conjunction with the signal center at the division command post. The station employs AM-radio teletypewriter equipment that is also capable of operating on voice or CW.
- (2) *Army air request net, AM-RATT*. This net is used to obtain air support for the division. An AM-RATT radio set is used in this net to provide communication between the division G2 Air and G3 Air at the division tactical operation center and the field army tactical operation center. The division station and operating personnel are furnished by the signal battalion.
- (3) *Spot report receiver net, UHF*. This is an Air Force net and is used to receive information on results of tactical air missions flown in support of the division.
- (4) *Base net, AM-RATT*. This net is used for the transmission of messages between the objective area and the departure area (division base). Operating personnel and equipment for stations in the airhead (division command post and support group command post—DLOC complex) and in the departure area (division base), are provided by the command operations company. Normally, the logistics command or other agency designated to provide administrative support

for the operation will also maintain a station in this net. This net may be combined with the division administrative net.

83. Wire Communication

a. General. Wire communication is used extensively by the airborne division. Wire circuits parallel radio and radio relay channels and take over the communication load as they are installed. The initial system depends on the immediate needs of the commander, the time required to make the installation, the availability of equipment, and the expected future requirements.

b. Wire Installation. Wire and cable within the division are installed by the wire and telephone sections of the command operations company and the telephone section of the forward communication company.

- (1) Wire trunk circuits in the area communication system (fig. 14) are installed by the wire section of the command operations company. In addition, this section also installs trunk circuits to division artillery and the support group.
- (2) Wire lines are extended from the area signal centers (fig. 14) to the battle groups by wire personnel of the area signal center platoon, forward communication company.
- (3) For further details on wire communication, see FM 11-57.

84. Internal Signal Battalion Communication

Internal communication for the signal battalion is provided over other wire channels in the division area communication system and by a signal battalion radio net (fig. 16). This net employs FM radio sets and provides a flexible and mobile communication system between elements of the battalion and its installations.

85. Communication at Base Camps During Operations

a. Adequate communication facilities are required at the airborne division's base camps. During the buildup for an airborne operation and the delivery of supplies to the airhead by air, the marshaling area commander continues to furnish communications at the departure area. The division rear echelon has direct radio, telephone, and teletypewriter communication channels to the headquarters directing the airborne operation, the troop carrier headquarters, supply installations, major airborne units awaiting commitment, and to other headquarters and installations in the rear area. These communication means remain in service until the airborne division is completely under the control of the ground commander of the combat zone.

b. The division signal battalion furnishes radioteletypewriter stations in the base net for communication between the airhead and the

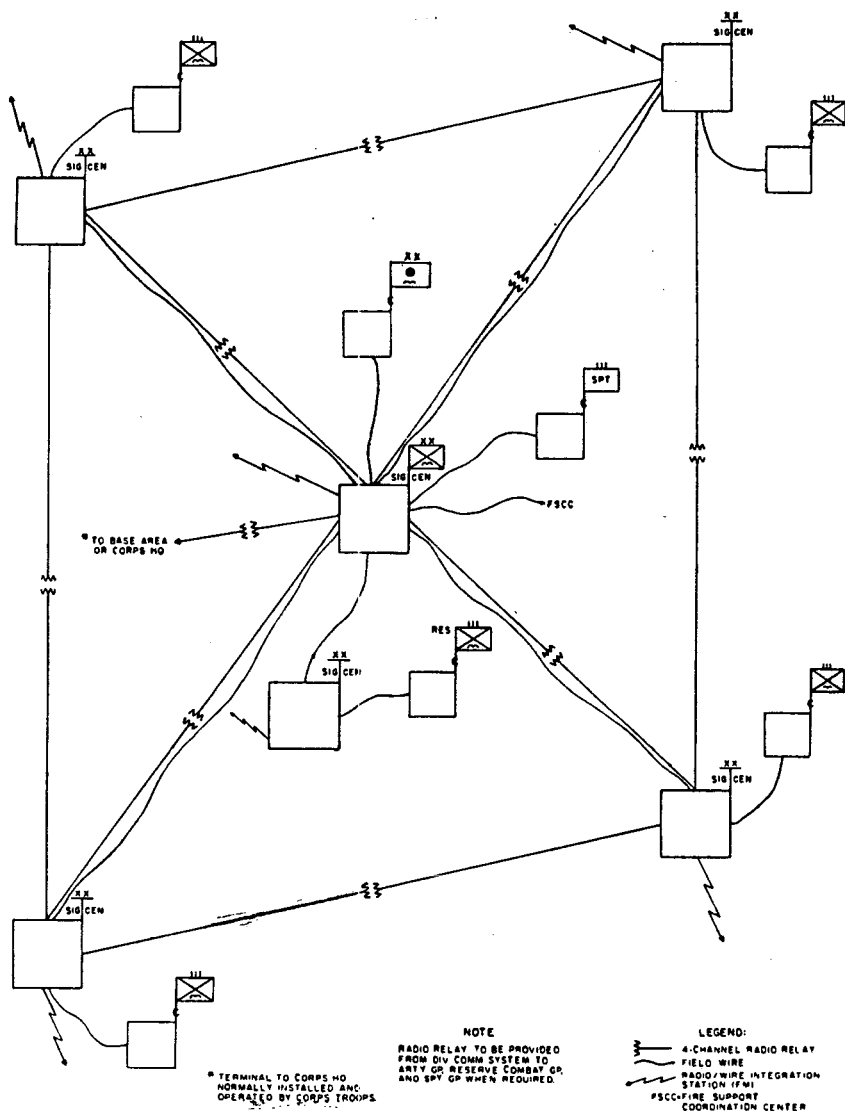


Figure 14. Type airborne division multichannel communication system.

departure area. One station operates at the division command post and one at support group headquarters.

c. Division elements remaining in the base camps until the division returns or the camps close are provided with the communication essential for administration. Existing base area wire systems are used.

d. For communication during linkup, see FM 11-57 and FM 57-100.

e. For communication during withdrawal, see FM 11-57 and FM 57-100.

Section IV. SIGNAL SUPPLY AND MAINTENANCE

86. Signal Supply













a. General. The quantity and types of signal supplies carried by assault airborne forces are dictated by the initial combat requirements. A minimum level of 2 days' supply should be maintained in the objective area at all times, with the exception of raid and relief operations. When feasible, it may be desirable to maintain a 3-day level of supplies.

b. Planning for Signal supply

- (1) *Accompanying supply.* Prior to arrival at the marshaling area, enough signal equipment and supplies are distributed to sustain normal operations and to withstand the abnormal losses usually associated with an airborne assault. These are known as accompanying supply and are landed with the assault elements. Accompanying supplies may be carried on individuals, in aerial delivery containers, in heavy drop loads, or may be bulk-loaded in assault aircraft.
- (2) *Followup supply.* Followup supply consists of prepackaged items of signal equipment and supplies designed to meet anticipated daily requirements. Delivery is made to forces in the objective area by airlanding, parachute, or free-fall. Followup supply is classified as automatic and on-call.
 - (a) *Automatic.* Automatic followup supply consists of those items that are delivered to units in the objective area on a planned basis.
 - (b) *On-Call.* On-call supply consists of prepackaged supplies which are held in readiness and delivered to the objective area on specific request.
- (3) *Routine supply.* Routine supply consists of replacement and consumption signal supplies delivered to the objective area in bulk, based on actual needs for distribution by normal supply procedures. Followup supply is discontinued as soon as routine supply procedure can be instituted.

87. Signal Maintenance

See FM 11-57 and FM 57-100.

	HIGHER HG NET	ASSAULT NET *	INTEL NET CW	COMD NET NO. 1	COMD NET NO. 2	CG/ COMD NET (FM)	ADMIN NET (RATT)**	BASE NET ***	DIV AIR REQ NET	SPOT REPT RCVR NET	ARMY AIR REQ NET
	GRC 26										GRC 26
											
	GRC 46 (S)	PRC 10 (S)	GRC 19 (S)	GRC 46 (S)	GRC 19 (S)	VRQ 3, (S)	GRC 46 (S)	GRC 46 (S)***			
								GRC 46 (S)****			
		PRC 10	GRC 87	GRC 46		VRQ 3	GRC 46		VRC 19		
					GRC 19 (S)	VRQ 3 (S)	GRC 46 (S)	GRC 46 (S)			
			GRR 5			VRC 10					
					GRC 19	VRC 10					
		PRC 10	GRC 19		GRC 19	VRQ 3					
		PRC 10	GRC 19	GRC 46		VRQ 3					
CG DIV STAFF		PRC 10 (S)				VRQ 3					
 FSCC*****		PRC 10		GRC 46		VRQ 3			VRC 19	ARC 27	GRC 46 (S)
 (DSO)						VRQ 3 (S)					
HIGH PERFOR- MANCE ACFT										UHF SET (AF)	

* THIS NET MAY BE DIVIDED SIMILAR TO COMD NET NR 1 AND COMD NET NR 2 TO PREVENT OVERLOAD

** THESE NETS MAY BE COMBINED

*** WHEN NOT IN CORPS COMDNET

**** OR AS REQUIRED

***** FSCC SETS ARE PROVIDED BY DIV ARTY

(S) DENOTES EQUIPMENT ORGANIC TO SIGNAL BATTALION

Figure 15. Type airborne division radio nets.

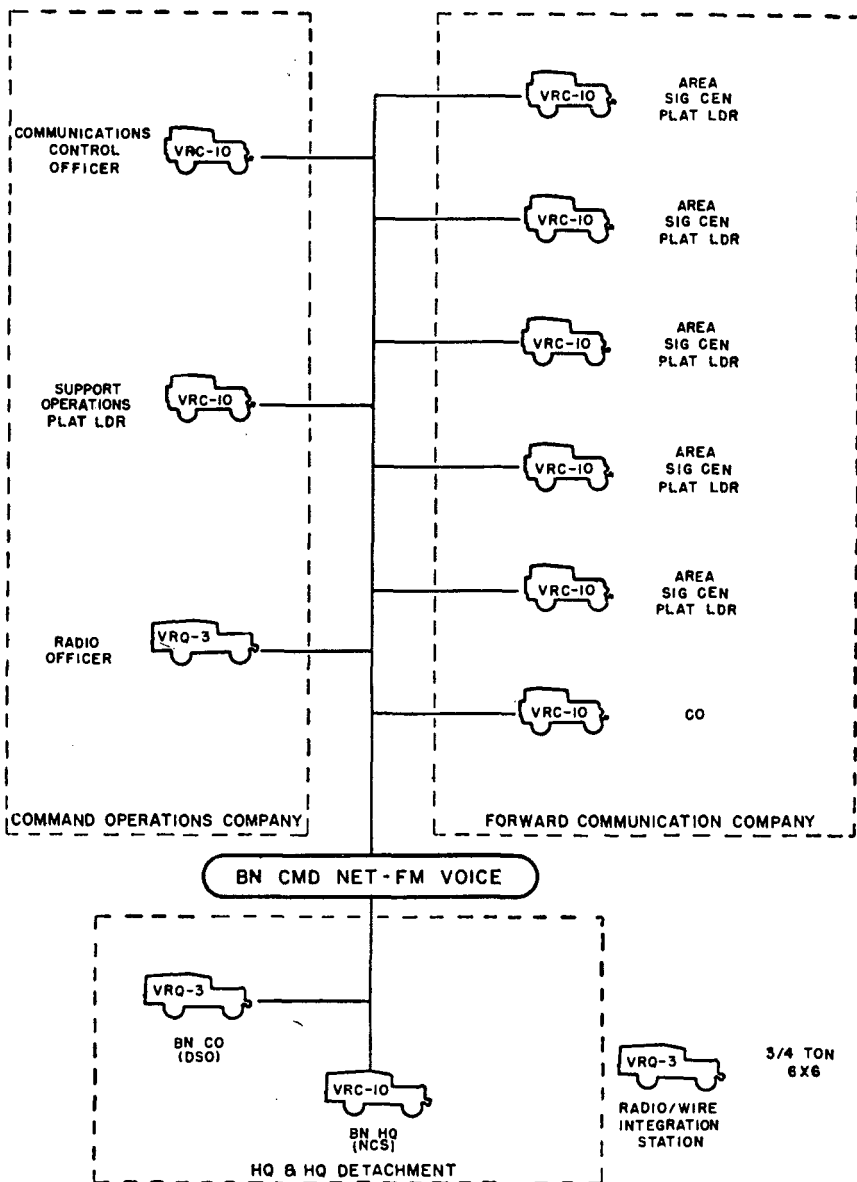


Figure 16. Type internal signal battalion radio net.

CHAPTER 6

COMMAND AND CONTROL BATTALION, AIRBORNE
DIVISION

Section I. HEADQUARTERS AND HEADQUARTERS COMPANY

88. General

The headquarters and headquarters company provides command, control, staff planning, and supervision of administration and operations of the airborne division. It also provides means for command post security and music for military formations and ceremonies.

89. Command Post

Division command post communication requirements, and factors affecting the location and establishment of the division command post are discussed in chapter 1. Provision of command post communications (other than staff vehicular radios) is the responsibility of the command operations company, airborne division signal battalion, and is discussed in chapter 5.

90. Staff Vehicular Radios

Vehicular mounted FM-voice (AN/VRC-10) radios and required driver-radiotelephone operators for division headquarters command and staff personnel are provided by the transportation section of the division headquarters and headquarters company.

91. MP Detachment

(Ch. 19)

a. Detachment Headquarters. One FM-voice (AN/VRC-10) vehicular mounted radio provides the net control station for the MP detachment command net; a second FM-voice (AN/VRC-10) vehicular mounted radio provides the detachment commander with entry into this net.

b. Provost Marshal Section. An FM-voice (AN/VRQ-3) vehicular mounted radio allows the section to maintain stations in the division command net and in the MP detachment command net.

c. MP Platoon Headquarters. Each MP platoon headquarters is provided an FM-voice (AN/VRC-10) vehicular mounted radio; normally, the two preset channels are maintained on the MP detachment command net and the platoon command net. An FM-voice

(AN/PRC-6) portable radio is also provided for netting with the MP squads' AN/PRC-6's when they are employed.

d. MP Squads. Each MP squad is provided two FM-voice (AN/VRC-10) vehicular mounted radios. In addition to providing entry into the platoon command net, they are used for convey control, in mobile checkpoints, on route reconnaissance, and in other situations requiring relatively long range communications. Each squad is also provided with an FM-voice (AN/PRC-6) portable radio for use in traffic emergency situations such as defile control or column control when shorter range portable communications are required.

Section II. ADMINISTRATION COMPANY

92. General

The administration company serves as a carrier unit for elements of the division rear echelon which provides personnel and administrative services to divisional units. It also provides limited service support for the division rear echelon and the division administration center. When augmented, the company provides replacement support for divisional units.

93. Communications

The company has no organic radio sets; intracompany communications and communications with external agencies is entirely dependent on wire. If radio communications are required, they must be provided from outside sources (e.g., supporting log comd).

Section III. AVIATION COMPANY

94. General

The aviation company provides the division and its elements with aerial observation, reconnaissance, resupply, and transportation. It is organized as shown in figure 17.

95. Communications

General procedures and techniques for communications in the airborne division aviation company are the same as set forth in chapter 18 for the infantry division aviation company. Radio nets of the airborne division aviation company are shown in figure 18. Wire nets are shown in figure 19.

96. Flight Operations Center

A major difference, communications-wise, between the airborne and infantry division aviation companies is the inclusion of an organic flight operations center in the airborne division aviation company. This flight operations center is required for Army air traffic regula-

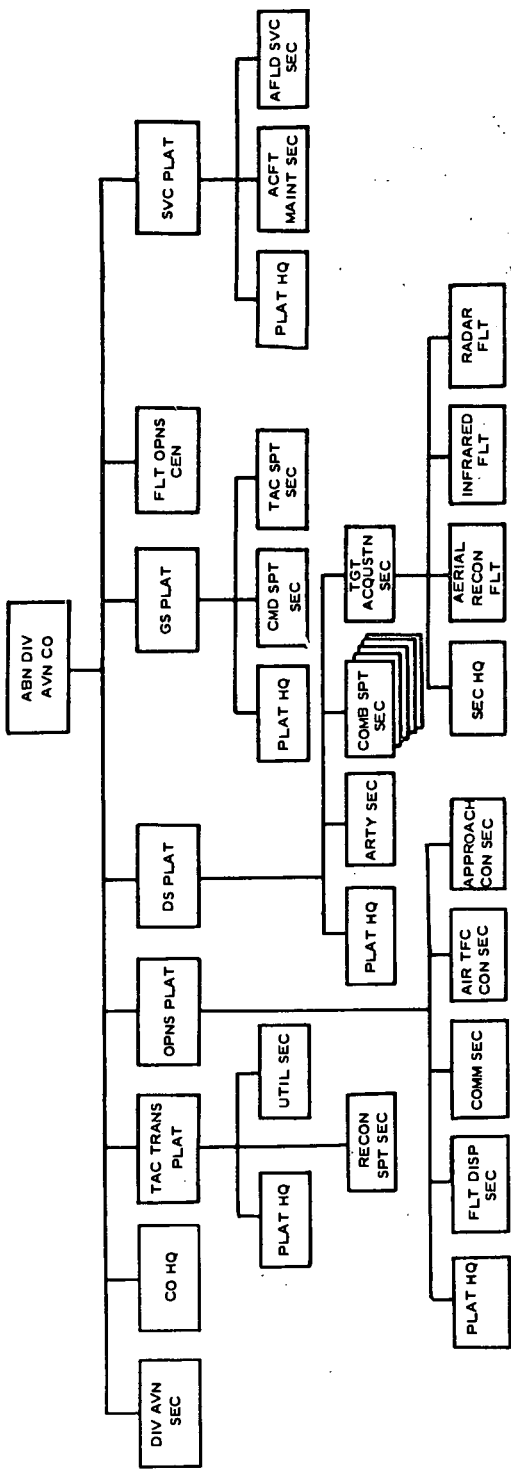


Figure 17. Organization of aviation company.

tions in the airhead, i.e., when the division is not operating in a corps FOC environment.

a. Mission. The mission of the flight operations center is to provide air traffic control in keeping with the air space utilization plan, provide aircraft identification information to AADCP, disseminate nuclear artillery and aircraft warnings (both friendly and enemy), and disseminate weather information for Army aircraft operating in the airhead and/or division area.

b. Organization. Officer and enlisted personnel operate the air-ground communications equipment and maintain a pictorial representation of Army air traffic for control purposes.

c. Duties of Personnel.

- (1) *Flight operations center commander.* The flight operations center commander is responsible for the regulation and control of Army aircraft within the airhead objective area. This is accomplished through coordination with Army and/or Air Force air traffic control agencies at higher and/or lateral echelons of command. He is also responsible for the training and discipline of organic personnel and the maintenance of assigned equipment.
- (2) *Assistant flight operations commander.* The assistant flight operations commander assists the section commander in the discharge of his duties and the section mission.
- (3) *Enlisted personnel.* These personnel operate air-ground radio equipment, teletypewriter equipment and maintenance plotting boards, and air traffic control logs, accept flight plans, issue air traffic clearances, and disseminate warnings, both friendly and enemy. The light truck drivers operate, maintain, and service organic vehicles, and also perform duties of radiotelephone operators.

d. Employment.

- (1) Normally, this section is employed in support of all Army air traffic within the airhead objective area. It may, however, be employed in part to control and regulate Army aircraft supporting the independent action of a battle group. The flight operations center may assume the duties of higher headquarters flight operations center to a limited extent, for a limited period of time.
- (2) To establish early control of air traffic, some portion of the flight operations center should normally be in the parachute or airlanded element of the company making the initial assault. An aerial FOC is operated from an observation aircraft on an austere basis during the initial assault until the airlanded FOC is established in the airhead.

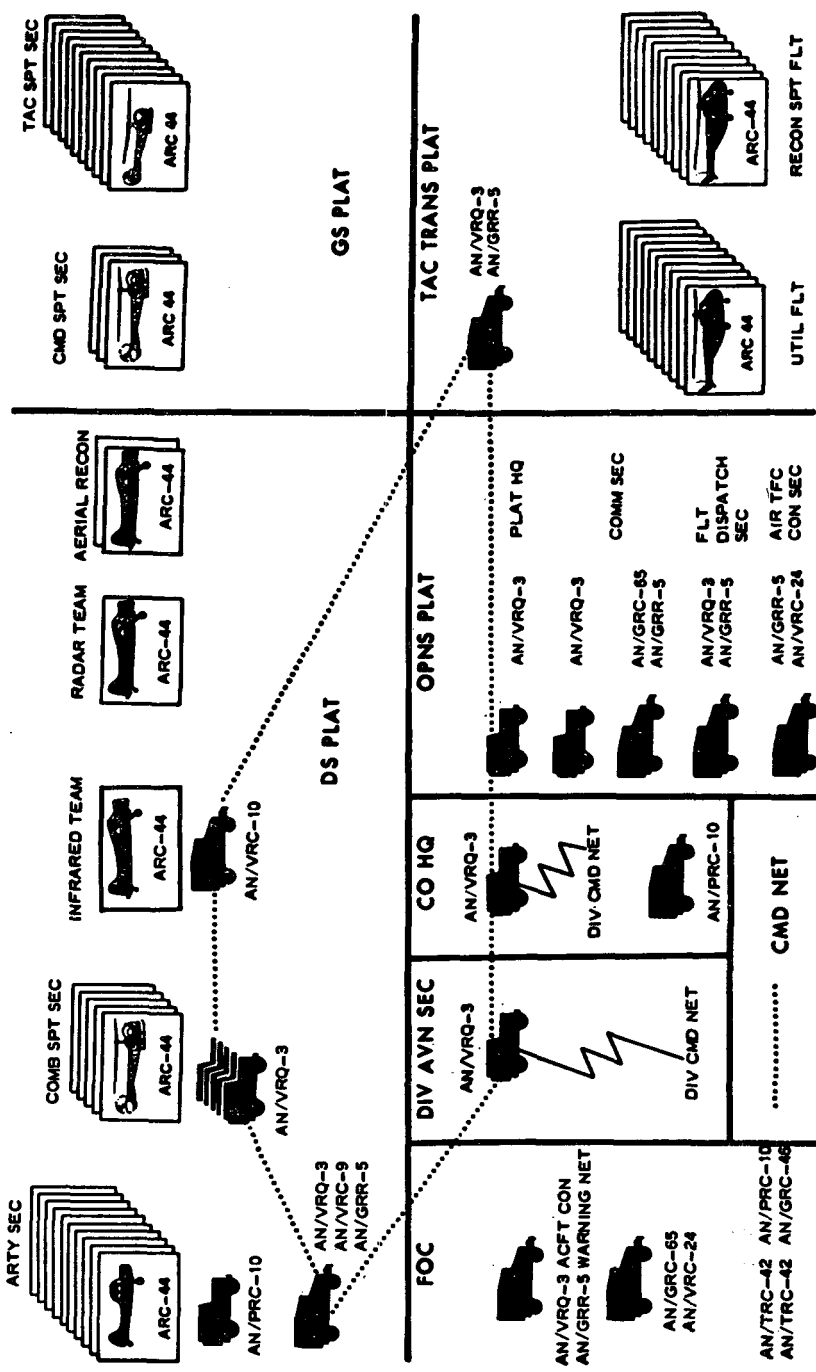


Figure 18. Radio nets of division aviation company.

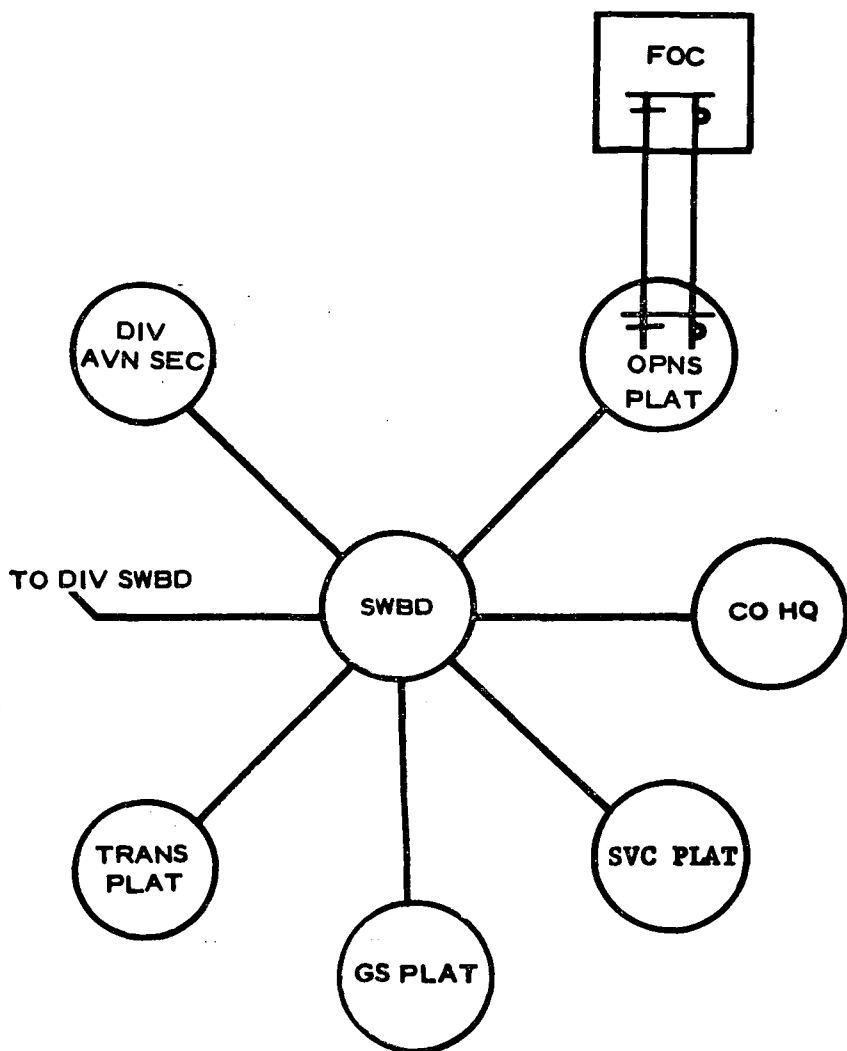


Figure 19. Wire nets of division aviation company.

- (3) The flight operations center should be located immediately adjacent to the airhead sector control center (Air Force).

Section IV. CAVALRY TROOP

97. References

See FM 57-17, "Airborne Division Cavalry Troop" and FM 1-5, "Army Aviation Organizations and Employment."

CHAPTER 7

DIVISION ARTILLERY

Section I. COMMUNICATION REQUIREMENTS AND PRINCIPLES

98. Requirements, Division Artillery Headquarters

The communication requirements for division artillery headquarters include facilities for—

- a.* Tactical control and administrative supervision.
- b.* Fire control.
- c.* Exchange of information and intelligence.
- d.* Dissemination of meteorological data.
- e.* Receipt of warnings and dissemination of air warnings.
- f.* Receipt of tactical and administrative orders from higher headquarters.
- g.* Requesting additional fire support and coordination of fire support with corps artillery.
- h.* Communication with close support aircraft.
- i.* Receipt of accurate time.
- j.* Coordination of survey.

99. Requirements, Field Artillery Battalions

The communication requirements for the battalions include facilities for—

- a.* Tactical and administrative control.
- b.* Fire direction.
- c.* Exchange of information and dissemination of intelligence.
- d.* Receipt of tactical orders and administrative supervision from division artillery.
- e.* Receipt of warnings.
- f.* Communication with supported units.
- g.* Receipt of meteorological data.
- h.* Coordination of survey.
- i.* Communication with close support aircraft (direct support battalions only).
- j.* Requesting additional fire support.

100. Principles

Principles of communication for artillery units are—

a. Superior to subordinate. An attached unit is considered as a subordinate unit.

b. Supporting to supported.

c. Reinforcing to reinforced.

d. Lateral communication from left to right unless otherwise directed.

e. Maintenance of established communication should be joint effort on the part of all units concerned, although the responsibility remains with the unit responsible for establishing communication.

Section II. ORGANIZATION INFANTRY DIVISION ARTILLERY

101. General

The infantry division artillery is organized as a tactical unit as shown in figure 20.

102. Communication Officer

The communication officer of the division artillery headquarters and subordinate battalions is a special staff officer. He exercises immediate supervision over the installation, operation, and maintenance of the communication system within his respective unit. He is also responsible for advising the commander on all communication matters.

103. Communication Platoon

The division artillery headquarters battery and the headquarters battery of each battalion has a communication platoon. This platoon is commanded by the assistant communication officer and contains a platoon headquarters, wire section, and radio section. In addition to the assistant communication officer, the platoon headquarters contains the communication chief and personnel necessary to operate the unit message center. The radio section in division artillery headquarters performs organizational maintenance on organic radio equipment and operates a portion of the organic AM radio sets. The remainder of the AM radio sets is organic to various sections, who also have organic operators. The radio section in battalions operates the radioteletype-writer sets and performs organizational maintenance on all radio equipment in the battalion. The wire section installs and maintains the unit wire system except short local circuits within sections.

104. Communication Sections, Howitzer and Missile Batteries

The battery communication sections consist of a communication chief, switchboard operators, and sufficient wiremen to install the battery wire system and at times to assist in the installation of wire out-

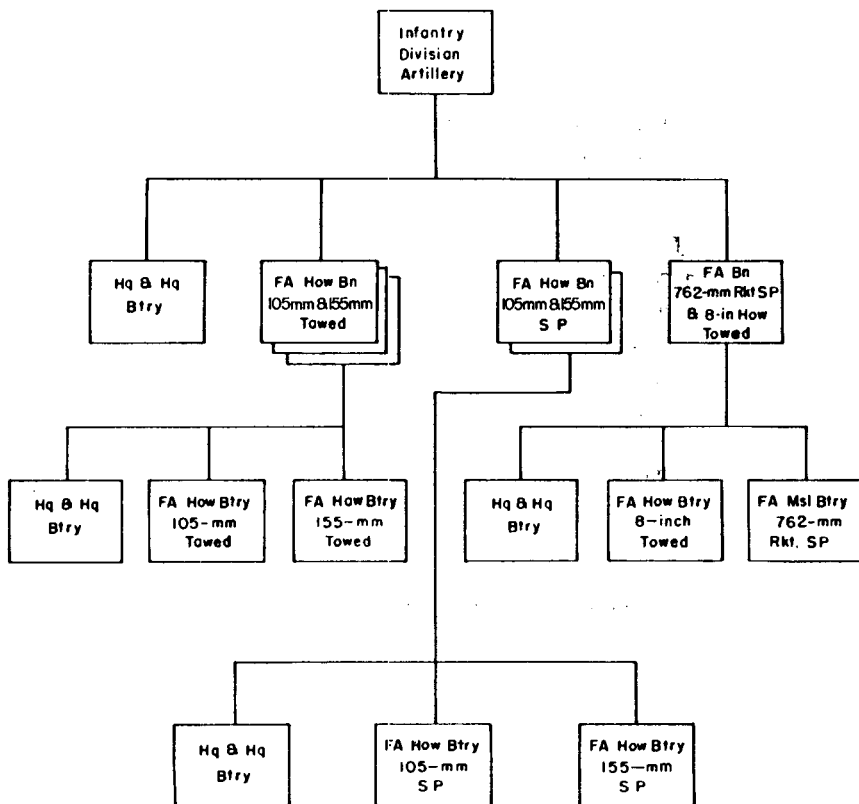


Figure 20. Organization of the infantry division artillery.

side the battery. The battery communication chief is responsible to his commander for the installation, operation, and maintenance of the battery communication system.

Section III. COMMUNICATION SYSTEM, DIVISION ARTILLERY HEADQUARTERS

105. General

The division signal battalion furnishes communications to connect division artillery headquarters into the division area communication system. The area communication system is used by division artillery to supplement its organic communication means. Organic and attached units of the division artillery will connect into the nearest signal center. The division area communication system is comprised mainly of common-user circuits; however, to meet special requirements, a specified number of sole-user circuits will be allocated. Sole-used circuits are those circuits which are allocated to an organization for fulltime use to provide point-to-point communication.

Normally, the division artillery will require one sole-user circuit to the division fire support coordination center (FSCC) and one circuit from the division FSCC to the battle group FSCC. The corps signal battalion provides terminal facilities at division artillery for the corps artillery—division artillery, 12-channel carrier system.

106. Wire System

a. General. The wire system parallels and supplements the radio nets of division artillery. The extent of the division artillery wire system installed will depend on the tactical situation and the length of time the unit remains in position. Priority wire lines are those to be used for conduct of fire. To add flexibility to the wire system, the division artillery headquarters establishes separate command and fire direction center switchboards. A type wire system for an infantry division artillery is shown in figure 21.

b. Installation of Wire Circuits. The division artillery is authorized five wire teams. These teams may be employed as follows:

- (1) Four wire teams may be used to install wire lines to the battalions with a direct support mission.
- (2) The fifth wire team may be employed to install circuits in the command post area. This same wire team may install lines to the field artillery missile battery 7.62-mm rocket, if it is under division artillery control.
- (3) Howitzer battalions with a general support or reinforcing mission may be directed to install circuits between the battalion and division artillery.
- (4) The field artillery battalion, 7.62-mm rocket, 8-inch howitzer will normally install the circuits between the battalion and division artillery.
- (5) Division artillery countermortar radar sections will normally install a wire line to the fire direction center and command switchboards of the nearest field artillery howitzer battalion, 105-mm and 155-mm, to provide a means of contacting division artillery.
- (6) As time permits, a wire team will install a line to the surveillance radar section, either direct or through the area communication system.

107. Internal Radio Nets

a. General. The division artillery internal radio system must provide the commander with facilities for tactical control and administrative supervision and fire control. The division artillery headquarters operates two internal radio nets, one FM and one AM.

b. Division Artillery Command/Fire Direction Net, FM (CF). This net provides communication with elements of the staff, airborne

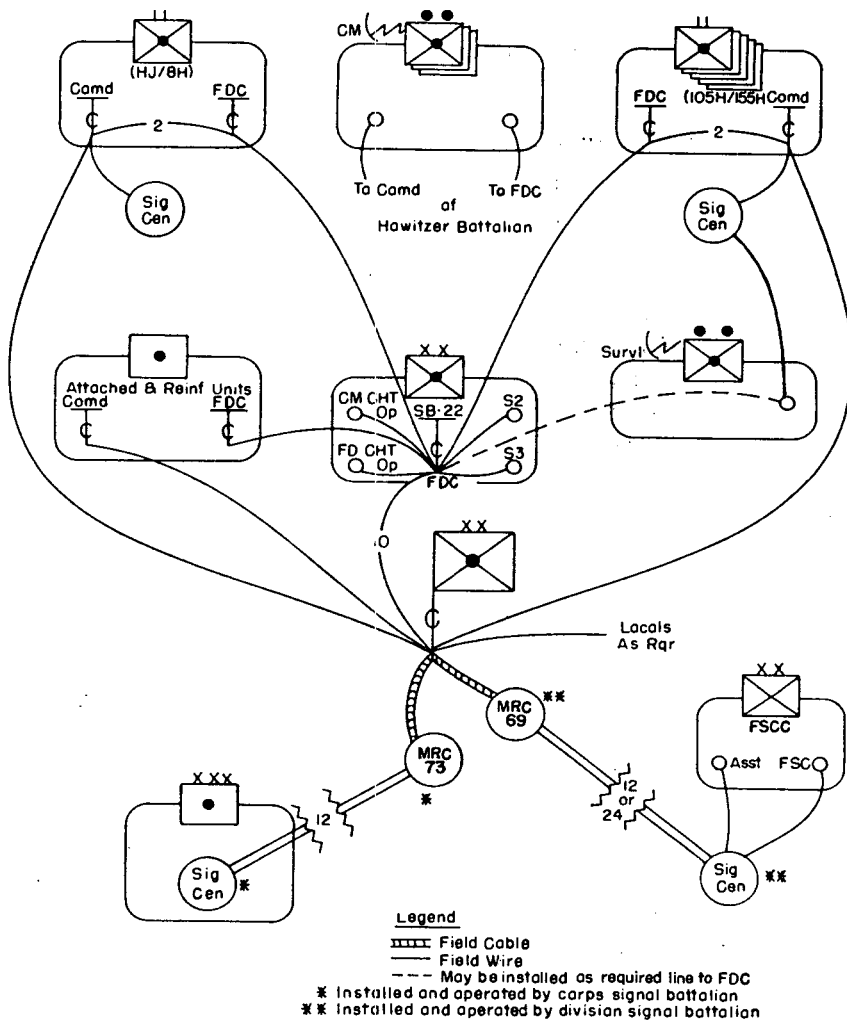


Figure 21. Type wire system, infantry division artillery.

aircraft and subordinate units for tactical control, collection of information, and dissemination of intelligence. It is also used for transmission of firing data. Stations, units, and individuals that may be operating in this net are shown in figure 22.

c. *Division Artillery Command/Fire Direction Net, AM-RATT (CF)*. The division artillery command/fire direction net, AM, is used for transmission of fire requests from battalions to division artillery, and for fire missions from division artillery to battalions, and to batteries that have a nuclear capability, and from the FSCC to nuclear units and division artillery FDC. This net is also used for tactical control and administrative supervision of subordinate units

and for the exchange of information and intelligence. Stations, units, or individuals that may be operating in this net are shown in figure 23.

108. External Radio Nets

To meet its internal requirement of transmitting meteorological data and to meet the external requirements, the division artillery headquarters operates in, or listens to, three FM and ten AM external radio nets. Stations or individuals in the headquarters that may operate in these nets are shown in figure 24.

a. Division CG/Command Net, FM. The division CG/command net provides a direct radio channel between the division artillery commanding general and the commanding general of division. The division artillery operations center operates a fulltime station in this net to handle traffic when the commander and executive officer have their sets off. Other units in this net are shown in figure 7.

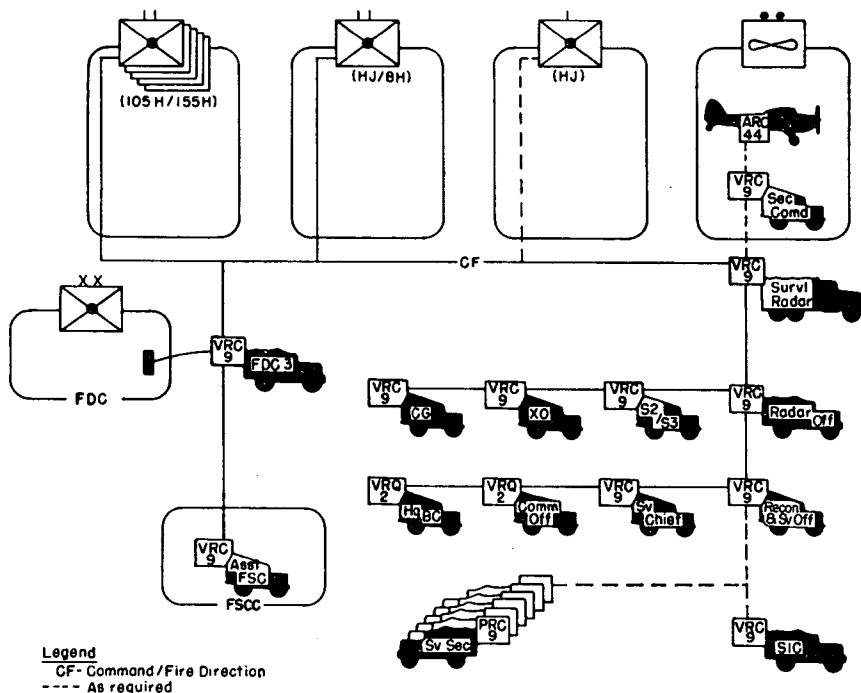


Figure 22. Type command/fire direction net, FM, infantry division artillery.

b. Division Intelligence Net, AM-RATT. The division artillery as an intelligence gaining agency, uses this net to transmit information and intelligence to division. It is also used for the exchange

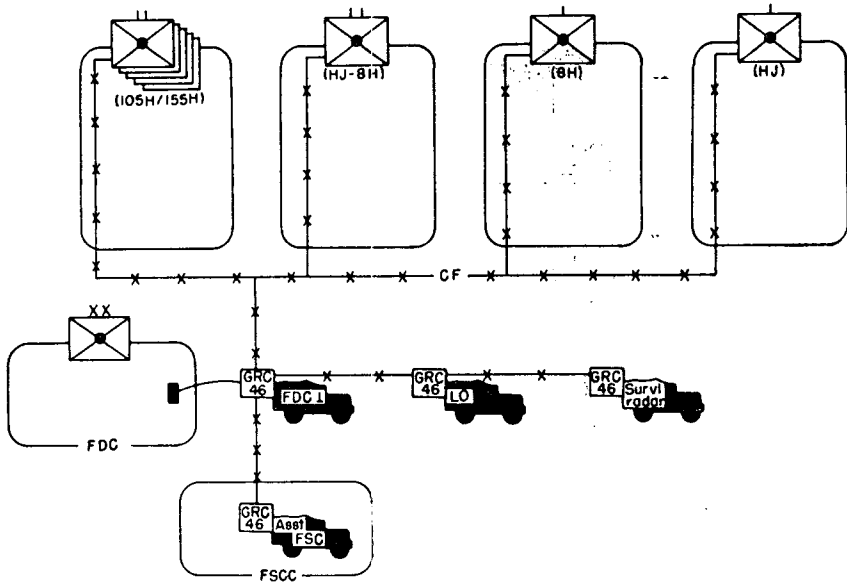


Figure 23. Type command/fire direction net, AM, infantry division artillery.

of information and intelligence with other intelligence gaining agencies in the division.

c. *Division Command/Operations Net, AM-RATT.* Division artillery operates in this net for receipt of operational and control traffic from division.

d. *Division Warning/Broadcast Net, AM.* The division artillery operates a station in this net to receive various types of warnings from elements of the division and for transmission of air defense warnings received over the air defense intelligence net.

e. *Division Administrative/Logistics Net, AM-RATT.* This net is used for administrative and logistical traffic between division headquarters and service support elements. The division artillery enters this net as required by switching a radio set from another divisional net.

f. *Corps Artillery Survey Channel, FM(S).* The corps artillery survey channel FM(S) is used by the division artillery headquarters and artillery battalion survey sections to facilitate survey and to coordinate with other artillery survey elements. Because of the limited range of the radio sets employed on this channel, it is not intended or feasible for this to be a coordinated net; however, it does provide communication within and between all survey sections in the division artillery.

g. *Corps Artillery Fire Direction Net, AM(F).* The Corps artillery fire direction net, AM, is used by division artillery to request

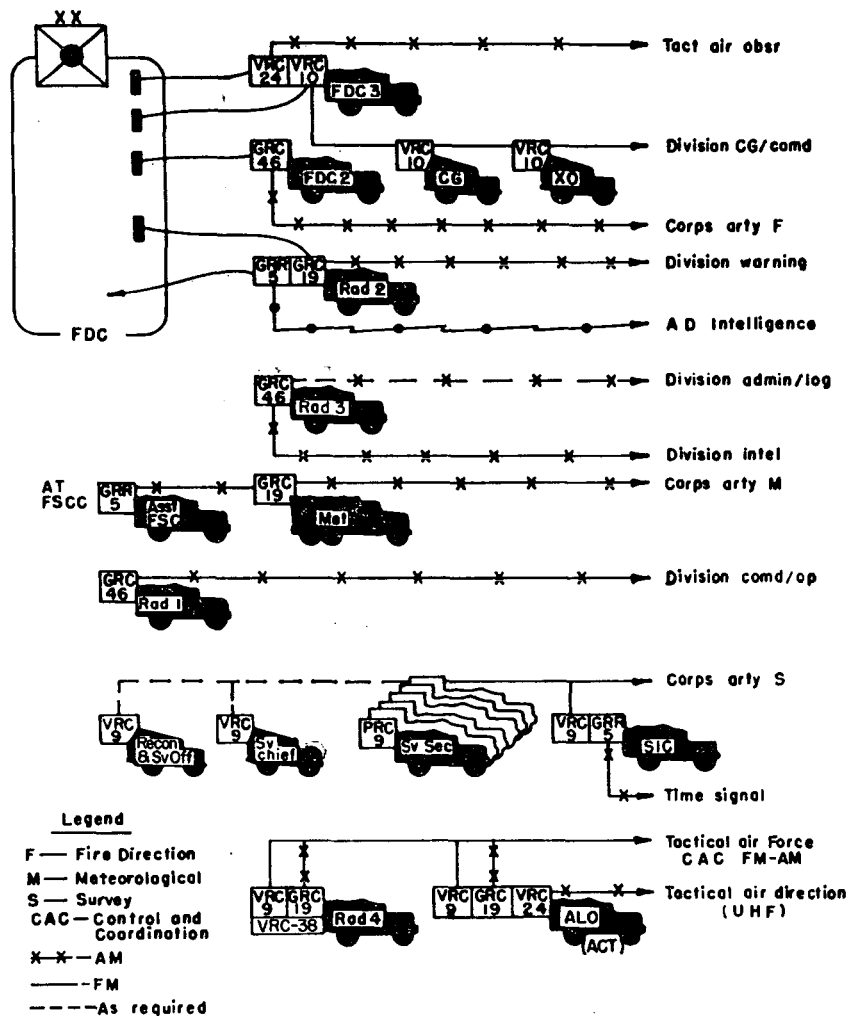


Figure 24. External radio nets FM and AM, infantry division artillery.

additional artillery support from corps artillery and for coordination of artillery fires.

h. Corps Artillery Meteorological Net, AM(M). The corps artillery meteorological net, AM, will be used by the field artillery target acquisition battalion and the division artilleries to transmit meteorological data. Meteorological data will be transmitted on a schedule to be established by the net control station (field artillery target acquisition battalion).

i. Time Signal Net, AM. A radio set in the division artillery survey information center is used to receive time signals. Normally, one station in each area of operations will be designated to broadcast

time signals to the entire area of operations. The survey sections require accurate time for astronomical survey.

j. *Tactical Air Force Control and Coordination Net, AM-FM.* The control and coordination (CAC) net is used by the air liaison officer (ALO) at the division fire support coordination center to control and coordinate the activities of the forward air controllers (FAC) working with subordinate units. This net may also be used to exchange information between the air liaison officer and the forward air controllers. The division artillery air control team (ACT) furnishes

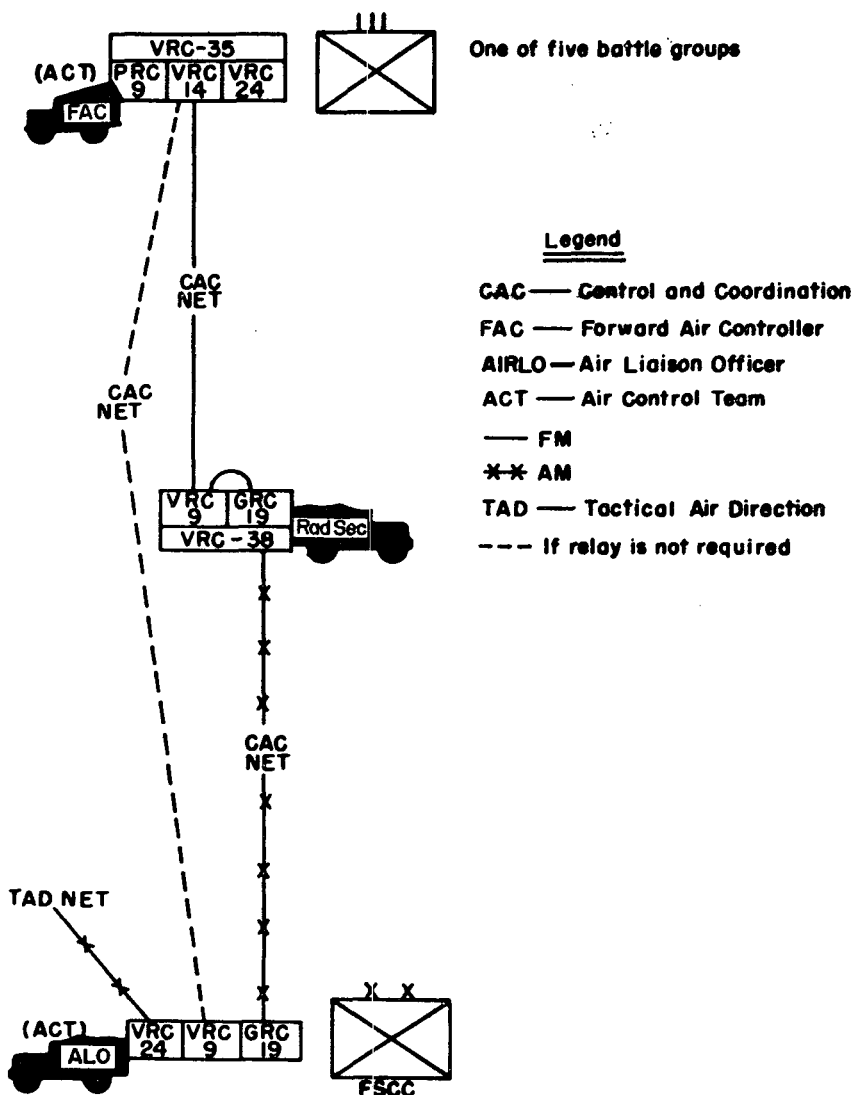


Figure 25. A method of employment of air liaison officer radio equipment.

the ALO with a vehicle, necessary FM and AM equipment, and personnel to operate and maintain this equipment. If the FAC's with the battle groups are within range of FM equipment, the ALO will communicate with them utilizing his FM set. If the FAC's are not within FM range, the ALO will communicate with them using his AM set as shown in figure 25. The radio section provides the FM-AM retransmission station.

k. Tactical Air Force Tactical Air Direction Net, AM-UHF. The air liaison officer at the division fire support coordination center will operate in the tactical air direction net utilizing the AM radio set furnished to him by the air control team of division artillery. This net gives the air liaison officer a radio link with high performance aircraft that may be conducting air strikes in the division area. The air liaison officer may not be directly involved in the conduct of the air strike but will be able to obtain valuable information regarding targets in the division area and will have knowledge of all aircraft that are operating in the division area.

l. Tactical Air Force Tactical Air Observation Net, AM. The tactical air observation (TAO) net is used for communication between tactical air force reconnaissance aircraft and division artillery for artillery adjustments and surveillance of nuclear fires. High performance reconnaissance aircraft may be called on to adjust long-range artillery when it is not feasible for Army aviation to accomplish the mission.

m. Air Defense Intelligence Net, AM. The division artillery headquarters listens to the air defense intelligence net to receive air defense warnings for the division. Information received that is pertinent to the division area will be rebroadcast over the division warning net.

Section IV. COMMUNICATION SYSTEM, FIELD ARTILLERY HOWITZER BATTALION, 105-MM AND 155-MM, TOWED AND SELF-PROPELLED

109. Wire System

a. General. The battalion wire system must provide facilities for fire direction and command control. Priority wire circuits are those necessary for conduct of fire and for communication with the supported unit and will be established first. The battalion wire system is shown in figure 26.

b. Installation of Battalion Wire System. The headquarters battery is authorized two wire teams.

- (1) One wire team will install the priority circuits to the forward observers. The team and a switchboard operator may install a forward switchboard to reduce the number of long circuits to the forward observers.

- (2) The other wire team will install priority circuits to the supported battle group headquarters.
- (3) The switchboard operators, under the supervision of the communication chief, will install and operate a command switchboard.
- (4) Each forward observer will install a circuit to the supported infantry company command switchboard.

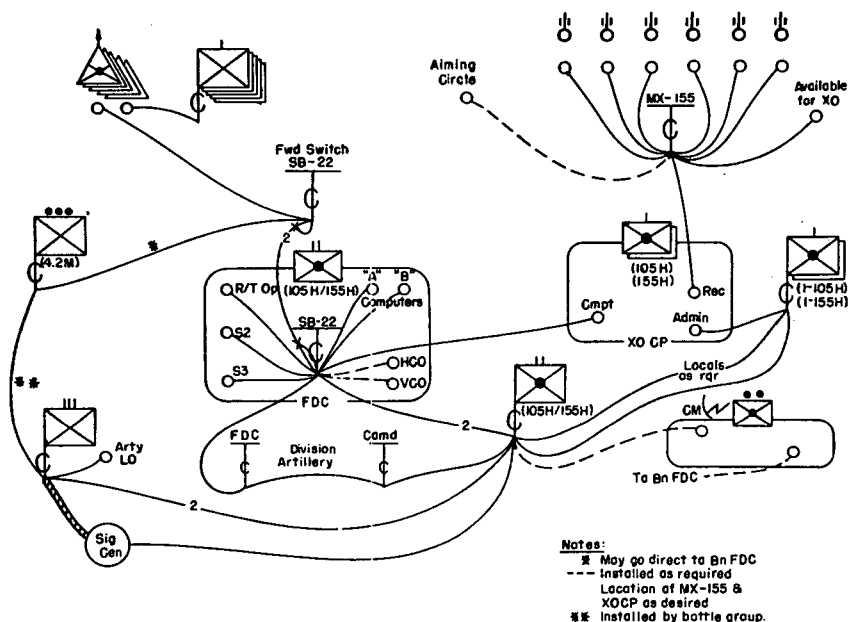


Figure 26. Type wire system infantry division field artillery howitzer battalion, 105-mm and 155-mm, towed and self-propelled.

- (5) A wire circuit from the mortar platoon may be installed according to division standing operating procedure (SOP).
- (6) A wire team will also install a circuit to the nearest signal center.
- (7) Circuits from division artillery will be installed by the division artillery wire team.

c. Installation of Howitzer Battery Wire System. The 105-mm and 155-mm howitzer batteries will install identical wire systems. Each battery is authorized one wire team. The priority wire circuit for the battery wire team is the circuit from the howitzer battery to the battalion fire direction center. The team will also establish a battery command switchboard and install a circuit from this switchboard to the battalion command switchboard. The howitzer sections will install a circuit to the MX-155/GT connecting and switching kit. The recorder installs a circuit from his telephone to the MX-155/GT. A

fixed location for the executive officer has not been specified. He will station himself to facilitate control of the battery. A separate telephone may be established to provide wire communication between the executive officer and the howitzer sections. This should be connected to the MX-155/GT connecting and switching kit.

110. Internal Radio Nets, FA Howitzer Battalion, 105-MM and 155-MM

The field artillery howitzer battalions 105-mm and 155-mm of the infantry division utilize three frequency modulated (FM) radio channels to fulfill their internal communication requirements. One channel is used for a command net and 2 channels are used for fire direction nets.

a. Battalion Command Fire Direction Net, FM(CF). The battalion command fire direction net, FM, is used for the command and administration of the battalion. This net provides a channel of radio communication for the battalion commander, his staff, sections of battalion headquarters, battery commanders, and radios at the howitzer batteries. This net may also be used for fire direction when necessary. Stations or individuals that may be operating in this net are shown in figure 27.

b. Battalion Fire Direction Net 1, FM(F1). The battalion fire direction net 1, FM (fig. 28), is used for transmission of fire requests from the forward observers to the battalion fire direction center. It is also used for sending firing data from the battalion fire direction center to the howitzer batteries and to communicate with army aircraft adjusting artillery fire for the battalion.

c. Battalion Fire Direction Net 2, FM(F2). The battalion fire direction net 2, FM (fig. 28), is used primarily for transmitting firing data to the nonadjusting battery but may also be used by the forward observers when the battalion is firing multiple missions.

111. External Radio Nets

To fulfill external communication requirements the field artillery howitzer battalions 105-mm and 155-mm of the infantry division will operate in, or listen to, radio nets as shown in figure 29.

a. Supported Infantry Company Command Net, FM. The forward observers operate in the command net of the infantry company with which they are working. This provides a link between the forward observer and the company commander for coordination of fire support.

b. Supported Battle Group Command Net, FM. The battalion operates in the supported battle group command net for coordination of fire support and exchange of information and intelligence.

c. Division Warning/Broadcast Net, AM. The battalion monitors this net for receipt of various types of warnings. Information re-

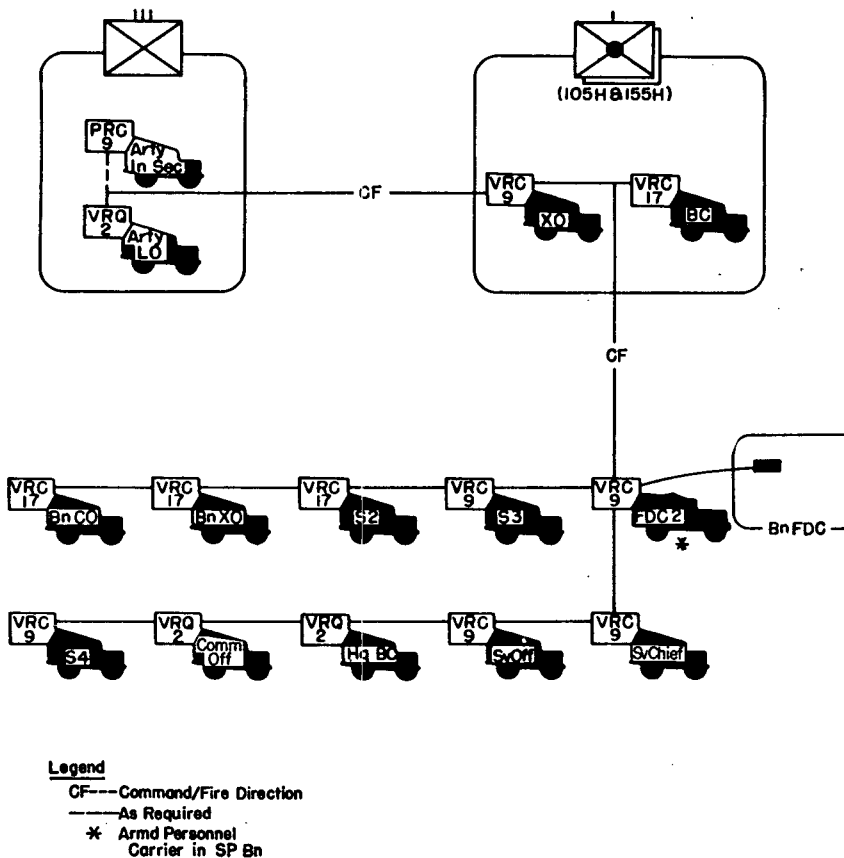


Figure 27. Type command/fire direction net, infantry division artillery howitzer battalion, 105-mm and 155-mm, towed and self-propelled.

ceived over this net should be retransmitted over the battalion internal communication system.

d. *Division Artillery Command/Fire Direction Net, AM(CF).* The battalion operates in the division artillery command/fire direction net to receive command and fire direction control from division artillery headquarters and may request additional fire support from division artillery.

e. *Divisions Artillery Command/Fire Direction Net, FM(CF).* The battalion operates in the division artillery command/fire direction net (FM) to receive command and fire direction control from division artillery headquarters and may request additional fire support from division artillery.

f. *Corps Artillery Meteorological Net, AM(M).* The battalion monitors this net for receipt of meteorological data. Division artill-

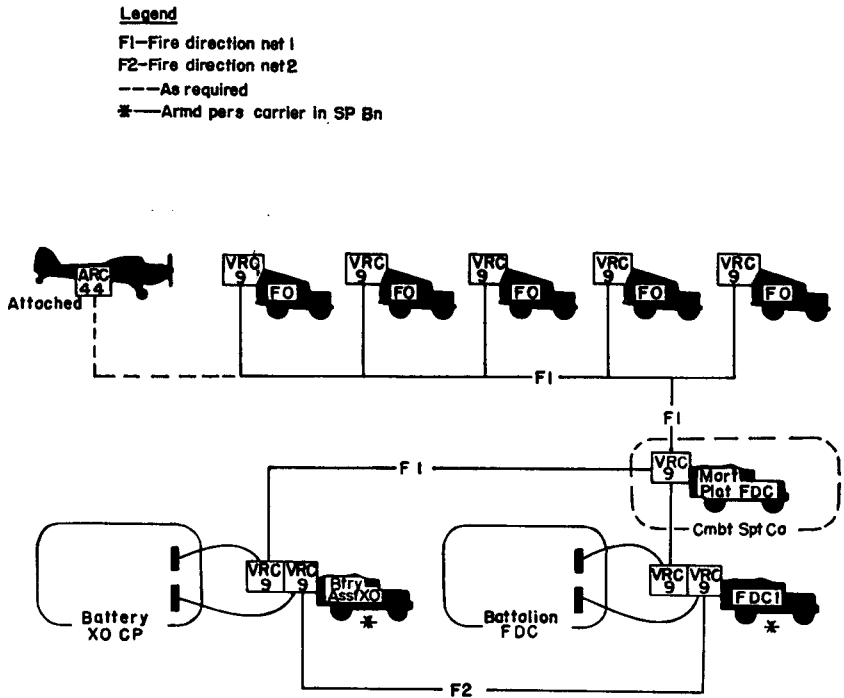


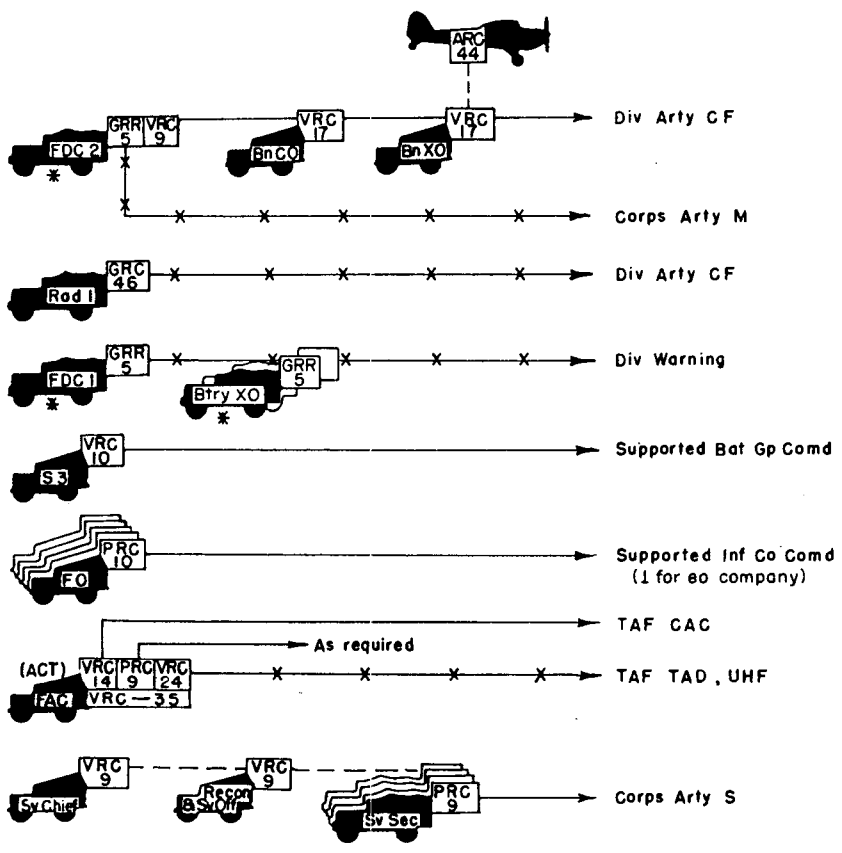
Figure 28. Type fire direction nets, infantry division field artillery howitzer battalion, 105-mm and 155-mm, towed and self-propelled.

lery and the field artillery target acquisition battalion will have transmitting stations in this net.

g. Corps Artillery Survey Channel, FM(S). The battalion survey parties use this net for coordination of survey with other units and for internal communication.

h. Tactical Air Force Control and Coordination Net, FM. The air control team (ACT) in headquarters battery provides a composite radio set for a forward air controller (FAC). The FAC operates one of the FM components of this set in the control and coordination net for communication with the ALO at division FSCC. When the FAC is actually directing aircraft, it will be necessary for him to leave this net and utilize his radio as shown in figure 30.

i. Tactical Air Force Tactical Air Direction Net, AM-UHF. The forward air controller uses the AM portion of his radio in this net for communication from ground-to-air while directing air strikes. If he is unable to observe the target from the vicinity of his vehicle, it will be necessary for him to utilize his portable radio set and through retransmission communicate with the aircraft as shown in figure 30.



Legend

- FM
- - - AM
- - - As required
- S — Survey
- * — Armd Personnel Carrier in SP Bn
- CF — Comd / Fire Direction
- M — Meteorological
- CAC — Control and Coordination
- TAD — Tactical Air Direction

Figure 29. External radio nets FM and AM, infantry division field artillery howitzer battalion, 105-mm and 155-mm, towed and self-propelled.

Section V. COMMUNICATION SYSTEM, FIELD ARTILLERY BATTALION, 7.62-MM ROCKET, SELF-PROPELLED AND 8-INCH HOWITZER TOWED

112. Battalion Wire System

a. General. A complete battalion wire system will be established as time permits. This system must provide facilities to enable the commander to control his organization. Priority of installation is

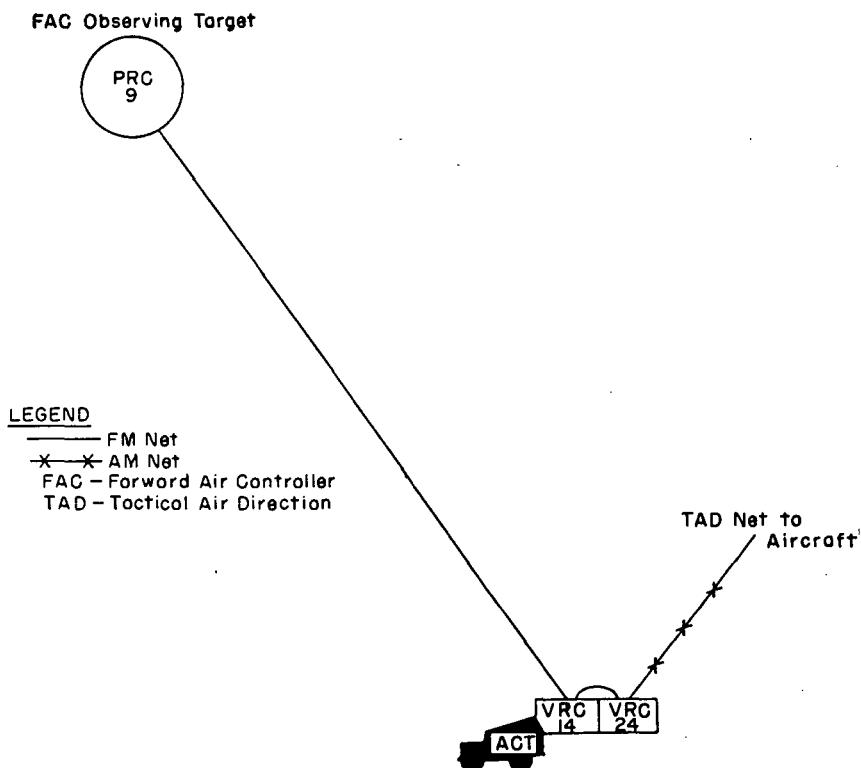


Figure 30. A method of employment of FAC radio equipment when directing aircraft.

given to that portion of the system concerned with fire direction activities. A type wire system is shown in figure 31.

b. Installation of Wire Circuits. The battalion wire section is authorized two wire teams. These teams will establish the battalion switchboard and assist in establishing the following circuits—

- (1) One team will install the circuits from the battalion to the missile battery, 7.62-mm rocket. The circuit to the missile battery fire direction center is the priority circuit for the wire section.
- (2) This same wire team may install a circuit to the nearest signal center as time permits.
- (3) The circuits from the 8-inch howitzer battery are normally installed by the 8-inch howitzer battery wire team.
- (4) This battalion with a normal mission of general support will install circuits from division artillery headquarters to the battalion.

113. Wire System, Field Artillery Howitzer Battery, 8-inch, Towed

a. General. The extent of the battery wire system will depend on the length of time the unit remains in a position. Priority wire circuits are those necessary for conduct of fire. The unit has a nuclear capability and will install a line to the nearest signal center to insure communication with division artillery and the division fire support coordination center. A type battery wire system is shown in figure 32.

b. Installation of Wire Circuits. A wire team, under the supervision of the team chief, will install the priority circuit from the battery executive officer's command post to the battalion operations center. This wire team will also install the command line between the battery and the battalion and a line to the nearest signal center.

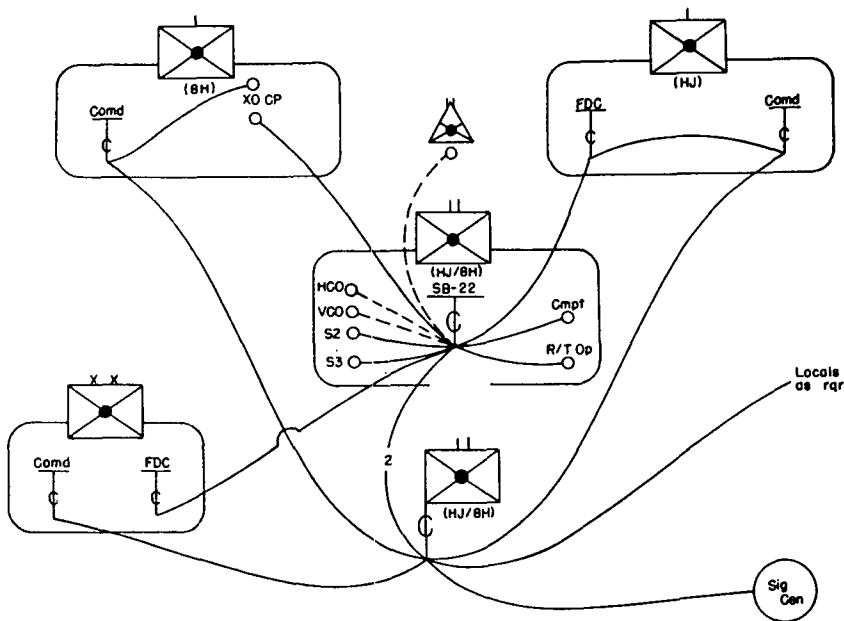
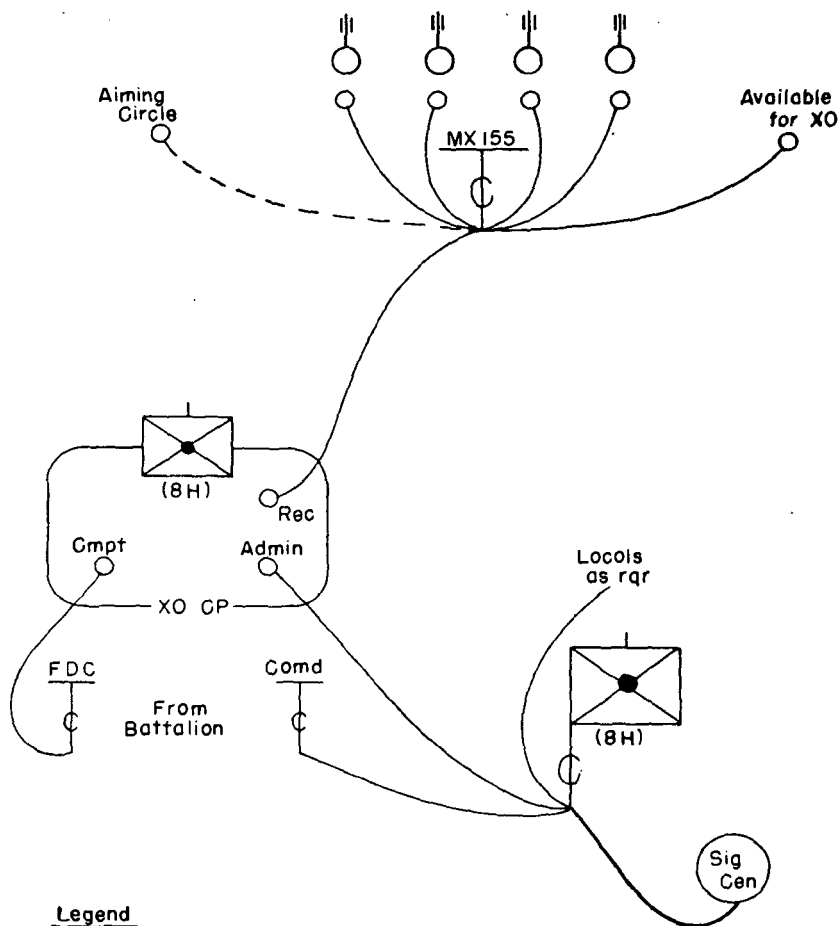


Figure 31. Type wire system, infantry division field artillery battalion, 7.62-mm rocket, self-propelled and 8-inch howitzer towed.

114. Wire System, Field Artillery Missile Battery, 7.62-MM Rocket, Self-Propelled

a. General. The extent of the battery wire system will depend on the tactical situation and the length of time the battery is in position. This type unit will normally occupy a tactical assembly area and prepare several firing positions to include installation of wire. The



Legend
 - - - installed as required
 Rec- Recorder
 Cmpt- Computer
 XOCP- Executive Officers Command Post

Figure 32. Type write system, infantry division field artillery howitzer battery, 8-inch towed.

unit may leave the fire direction center in assembly area and install wire from this area to primary positions and alternate firing positions. Priority wire circuits installed by the battery are those used for conduct of fire. To add flexibility to the system, separate command and fire direction center switchboards are installed. Since the battery has a nuclear capability, it will normally install a line to the nearest signal center to insure communication with division artillery and the division fire support coordination center. A type wire system for the battery is shown in figure 33.

b. Installation of Wire Circuits.

- (1) One wire team will install the priority circuit from the battery fire direction center to one of the designated firing positions.
- (2) A second team will install the priority circuit to a second position.
- (3) Wire will also be installed to other selected firing positions as time permits.
- (4) As soon as a wire team is available, a line will be installed to the nearest signal center.

115. Internal Radio Nets

The battalion uses two frequency modulated (FM) radio nets to fulfill the internal communication requirements. One net is used for a command net and the other for a fire direction net.

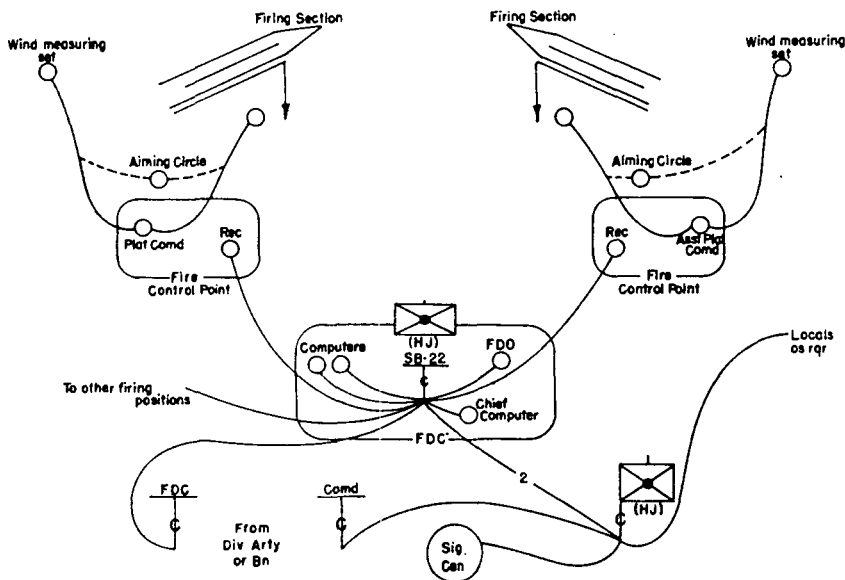


Figure 33. Type wire system, infantry division field artillery missile battery, 7.62-mm rocket, self-propelled.

a. *Battalion Command Fire Direction Net, FM(CF)*. The battalion command net will be used by the battalion commander to exercise tactical and administrative control over subordinate units and for coordination between staff sections. A type battalion command net is shown in figure 34.

b. *Battalion Fire Direction Net, FM(F)*. The battalion fire direction net is used for transmission of fire requests from the forward observer to the battalion fire direction center. It is also used for sending firing data from the battalion fire direction center to the battery

fire direction center (XOCP), and to communicate with army aircraft adjusting artillery fire and collecting information. A type fire direction net is shown in figure 35.

116. External Radio Nets

To fulfill external communication requirements, the field artillery battalion 7.62-mm rocket, self-propelled, 8-inch howitzer, towed, will operate in, or listen to radio nets as shown in figure 36.

a. *Division Artillery Command/Fire Direction Net, AM(CF)*. The battalion operates in this net to receive command and fire direction control from division artillery headquarters. The battalion may also use this net for transmission of fire missions to the batteries.

b. *Division Artillery Command/Fire Direction Net, FM(CF)*. The battalion operates in this net to receive command and fire direction control from division artillery headquarters.

c. *Division Warning/Broadcast Net, AM*. The battalion and batteries monitor this net for receipt of various types of warnings. Information received should be immediately retransmitted over the battalion internal communication system.

d. *Corps Artillery Survey Channel, FM(S)*. The battalion survey parties operate in this net for coordination of survey with other units and for internal communication.

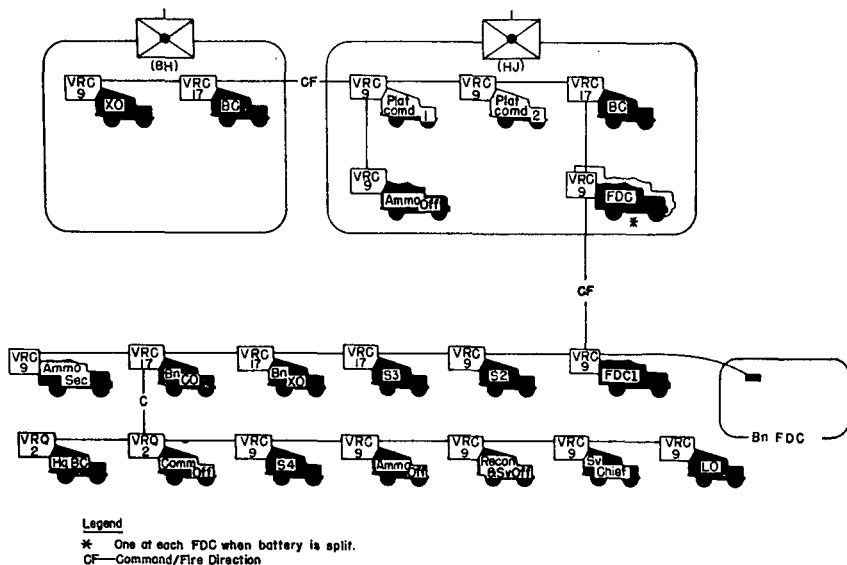


Figure 34. Type command fire direction net, infantry division field artillery battalion, 7.62-mm rocket, self-propelled and 8-inch howitzer towed.

Legend

F— Fire direction

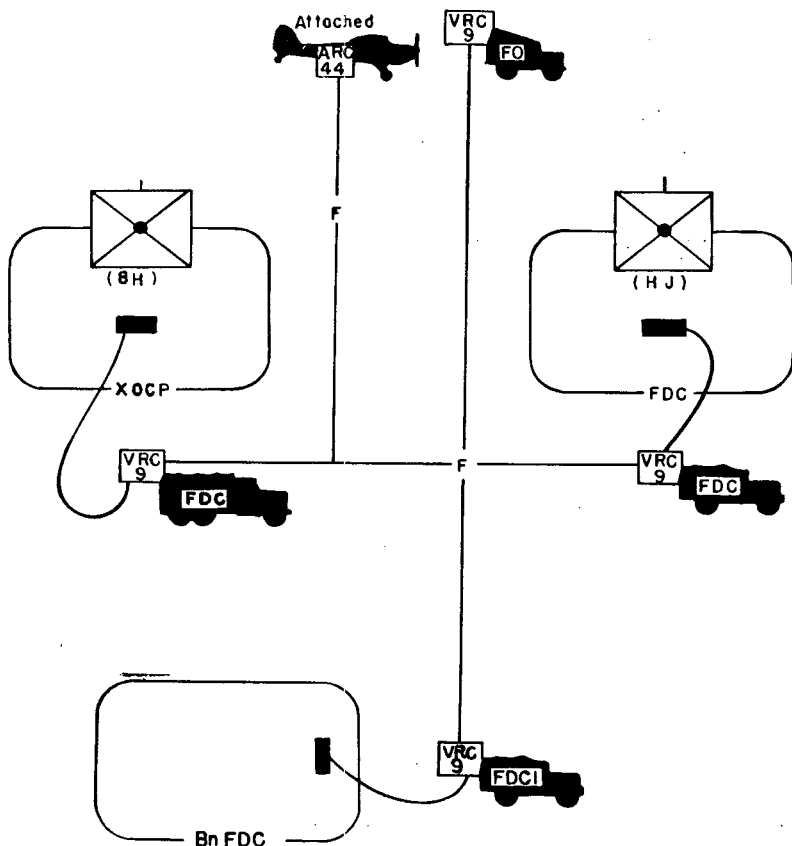


Figure 35. Type fire direction net, infantry division field artillery battalion, 7.62-mm rocket, self-propelled and 8-inch howitzer, towed.

e. *Corps Artillery Meteorological Net, AM(M)*. The battalion monitors this net for receipt of meteorological data. The batteries also monitor this net, as they are both capable of producing firing data. If the missile battery is split it will be necessary for them to transmit meteorological data from one fire direction center to the other, as they are not equipped to monitor this net in two FDC's.

Section VI. COMMUNICATION IN A CONCENTRATED AREA

117. General

During the concentration period, a commander plans and prepares for contemplated or scheduled operations. All echelons receive information concerning contemplated operations and prepare their

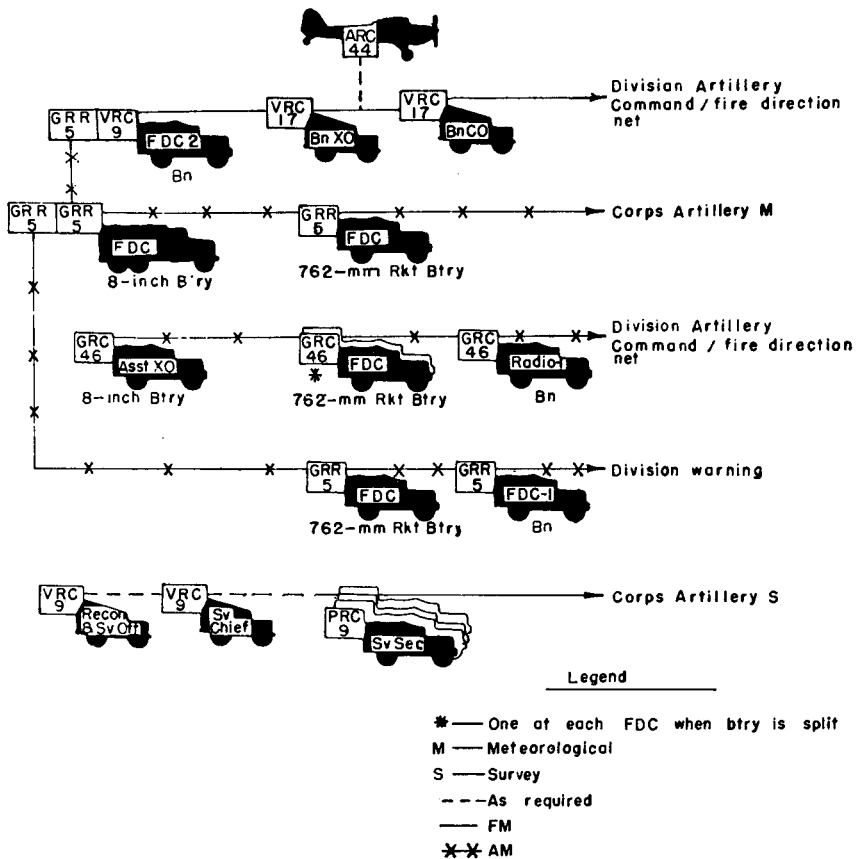


Figure 36. Type external radio nets, infantry division field artillery battalion 7.62-mm rocket, self-propelled and 8-inch howitzer, towed.

plans accordingly. Staff conferences are held for coordination of effort. Command posts are located so that communication and personnel requirements for their operation are kept to a minimum.

118. Tactical Application of Communication

a. Message centers are established and operated by each headquarters. Messengers are stationed at each message center and scheduled messenger service may be provided if the volume of traffic warrants.

b. Wire installations are kept to a minimum within the concentration area.

c. Radio stations generally are silenced or restricted except for warning nets. All radio sets are serviced and tested on channels prescribed by the SOI for the planned operation.

d. All signal equipment is inspected for operating condition and adequacy. Equipment shortages are replenished.

e. Training is continued and intensified. Particular emphasis is placed on requirements for the operation being planned.

f. Prearranged message codes are prepared and distributed.

Section VII. COMMUNICATION DURING MARCHES AND HALTS

119. Communication During Marches

a. During marches, communication facilities are used for column control and for contact with artillery reconnaissance and security parties and with supported and higher units.

b. A march message center is established by each headquarters in one of the leading vehicles of the column. Normally, messengers are used between march units and within groups and serials of individual march units. To provide adequate messenger service, the march is planned so that messengers can be given the exact time and place to meet any headquarters.

c. Wire communication is generally impractical.

d. If radio communication is not prohibited for security reasons, each artillery battalion operates on its command channel. All vehicular radios operate on this channel for rapid dissemination of information and orders. Each battalion commander also operates in the division artillery command/fire direction net, FM. Divisional light aircraft and artillery reconnaissance and security parties maintain radio communication with marching columns.

120. Communication During Halts

During temporary halts, communication is maintained as during the march. The use of messengers and radio (if not restricted) is continued. Wire communications are established if the duration of the halt warrants.

Section VIII. COMMUNICATION DURING THE ATTACK, REORGANIZATION, AND PURSUIT

121. General

When the supported force is developing a situation, the artillery must be ready to provide continuous support. Meteorological messages, warning orders, and other preparatory information are disseminated to the units as rapidly as possible. Registration and fire on targets of opportunity are handled with speed and accuracy. The communication system is developed rapidly to accomplish these missions.

122. Command Posts

Artillery command posts are established for coordination of the entire artillery fire support of the division. Continuous communication is maintained between the command posts of the artillery and supported units. Typical installations may be expanded into more elaborate systems. During preparation for the attack of an organized position, time is usually available to permit a more detailed command post installation.

123. Displacement of Command Posts

a. The method of making a displacement, whether it is in the attack or in a retrograde action in which wire communication is used, follows the general plan indicated in FM 6-20. Regardless of whether displacement is accomplished by echelon, every effort must be made to maintain communication with the command post of the supported unit.

b. Since displacement by echelon presents many difficulties, communication plans made before the attack include the possibility that all means of communication other than radio may be temporarily impractical. Ordinarily, displacing echelons of a field artillery battalion use the battalion command channel. The primary consideration is that communication must be maintained between the forward and rear echelons as well as with the forward observers and liaison officers.

124. Tactical Application of Communication During the Attack

The field artillery commander prescribes to what extent wire and radio systems of the battalions and divisional artillery are to be developed in any tactical situation. Initially, communication is by radio and messenger. Wire communication is provided as rapidly as possible. Although speed is paramount during the development, communication security is vital. Since radio traffic is a source of information to the enemy, it is held to a minimum. Messages sent by radio are kept brief, and the rules of communication security are observed (JANAP and/or ACP 122 series). Maximum use is made of authorized codes. See figures 21 through 36 for typical wire systems and radio nets.

125. Communication During Reorganization

a. After an attack has reached its objective or has been stopped short of the objective, the force commander may decide either to continue the attack, to withdraw, or to defend. In any event, forces are regrouped to fit the new plan of action. Communication systems are reorganized and altered to fit new plans.

b. The reorganization phase is a critical one for artillery communication. Artillery support is continuous to protect the supported units and to assist in stopping counterattacks. Artillery communication officers maintain existing communication systems and are prepared to extend or modify them as soon as a new decision is made. Radio nets continue in operation.

c. In preparation for a displacement, communication officers have signal equipment serviced and repaired and assist in its redistribution within units. Equipment is also salvaged during this phase.

126. Communication During Pursuit

a. The artillery is usually attached to the unit making the pursuit. The communication used by artillery is basically the same regardless of the maneuver used by the pursuing force. However, in any scheme of maneuver during the pursuit, maintenance of communications is more difficult because of the speed of the operation and increased distance between units.

b. Rapid movement requires rapid and frequent displacement. Maintenance of contact between units and between a unit's advance and rear command posts requires message center personnel, messengers, other communication personnel, and appropriate signal equipment at each installation.

c. Messengers with transportation are maintained as needed at message centers. Divisional aircraft may be used for drop and pickup service. Radio is used extensively. Division artillery maintains contact with battalions retained under its control. Within battalions, the most suitable means of communication is radio. Rapid and frequent displacements necessitate continuous radio communication. When a field artillery unit displaces by echelon, the first echelon includes radio sets for communication in command and fire direction radio nets. Panels and pyrotechnics may be used by the artillery to maintain contact with aircraft used in pursuit missions. Every effort is made to maintain wire communication.

Section IX. COMMUNICATION DURING DEFENSE

127. General

a. In a prepared defense, enough time is available for the planning and installation of a complete wire system. Radio may not be utilized initially, but all nets are established and operators maintain listening watch. Wire communication is provided for liaison officers and forward observers. Duplicate circuits should be established, using different wire routes if possible. Wire is installed to alternate positions to facilitate early communication if these positions are occupied.

b. Particular attention is given to the maintenance and improvement of wire circuits in the planning and installation phases (FM 6-140). Wire routes that afford maximum natural cover and concealment are selected at the expense of distance. Wire is installed with great care and improvement of the wire system is continuous.

128. Lateral Communication

Lateral circuits should be established between units to provide lateral coordination and alternate circuits for emergencies. Authority to use commercial or other circuits already in existence is obtained from the division signal officer.

Section X. COMMUNICATION DURING RETROGRADE MOVEMENTS

129. General

Communication procedures during retrograde movements generally are similar to those used in forward displacements. The division artillery communication officer obtains early information regarding routes of withdrawal on which he bases the communication plan.

130. Planning Communication

The communication officer is prepared to recommend the use of existing wire circuits to increase the efficiency of communication during the withdrawal. On receipt of information on the plan of withdrawal, he plans for the communication system to be used by the units of the division artillery. The plans include—

a. Provisions for strict regulation of radio operation which may include silencing certain stations or establishing dummy stations as needed for deception.

b. A plan for the most effective use of existing wire circuits.

131. Communication During Displacements

Before and during a displacement—

a. Communication personnel continue the operation of existing systems while preparing for displacement.

b. Wire not required by units is recovered. When time does not permit complete recovery, the abandoned wire lines should be cut in several places.

c. Radio listening silence is normally maintained during retrograde movements. For the purposes of deception and with approval of higher headquarters, the normal level of radio traffic may be maintained at the old position.

d. All practical means of communication are utilized. Existing wire circuits between the old and new positions are used. Messenger service is available at all times.

Section XI. COMMUNICATION IN SUPPORT OF ARMORED UNITS

132. General

When artillery supports an armored unit, adequate plans are made for effective communication between units. Except when tanks are in a static position, wire communication is not ordinarily feasible. Extensive reliance is placed on radio communication.

133. Radio

Since the organic radio sets of artillery and armored units differ in frequency coverage, radio communication may be established in any of the following ways:

a. An overlap channel common to the radios of both units is provided for the operation.

b. The armored unit furnishes one of its radios to the artillery fire direction center to provide communication between artillery forward observers with the tanks and the fire direction center. Each tank company in the infantry division has a tank available that may be used by an artillery forward observer. Artillery liaison officers and additional forward observers normally operate their organic radios on assigned artillery frequencies.

c. Liaison officers with organic radio equipment and operators are exchanged between units. These radios remain preset to the frequencies of their own units. This exchange provides communication between fire direction centers and provides channels that are used by forward observers to transmit fire missions directly to either or both units.

134. Wire

Wire communication should be established, when possible, between towed and self-propelled artillery units when they are working together in a static situation.

Section XII. ORGANIZATION, AIRBORNE DIVISION ARTILLERY

135. General

a. The division artillery is organized as a tactical and administrative unit and is self-sustaining. The airborne division artillery supports the infantry elements in seizing their assigned objectives and clearing their assigned sectors of enemy opposition. All of the artillery is completely air transportable. Organization of the airborne division artillery is shown in figure 37.

b. Regardless of the method of initial employment of the elements of division artillery, centralized control is regained as soon as pos-

sible to permit maneuvering and massing of fires. The massing of artillery fires is not feasible or possible unless the division artillery has established communication with its subordinate units.

136. Communication Platoon

The communication platoon is organized basically the same as the platoon in the infantry division artillery.

137. Communication Section, Howitzer and Missile Batteries

The battery communication sections include a communication chief, switchboard operators, and two wire teams. This section is under the battery detail and the communication chief is responsible to the reconnaissance and survey officer who is responsible to the battery commander for the installation, operation, and maintenance of the battery communication system.

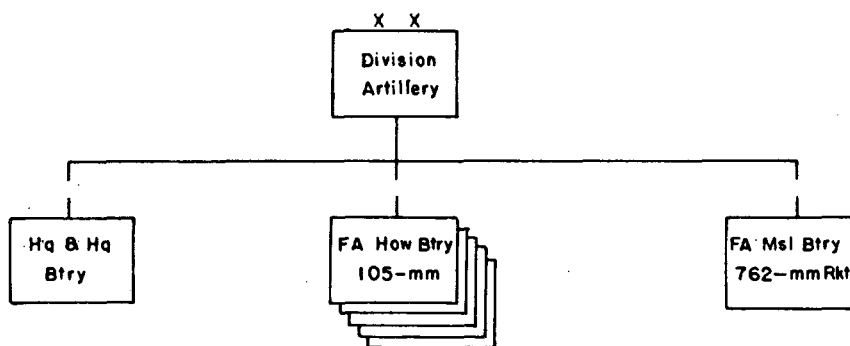


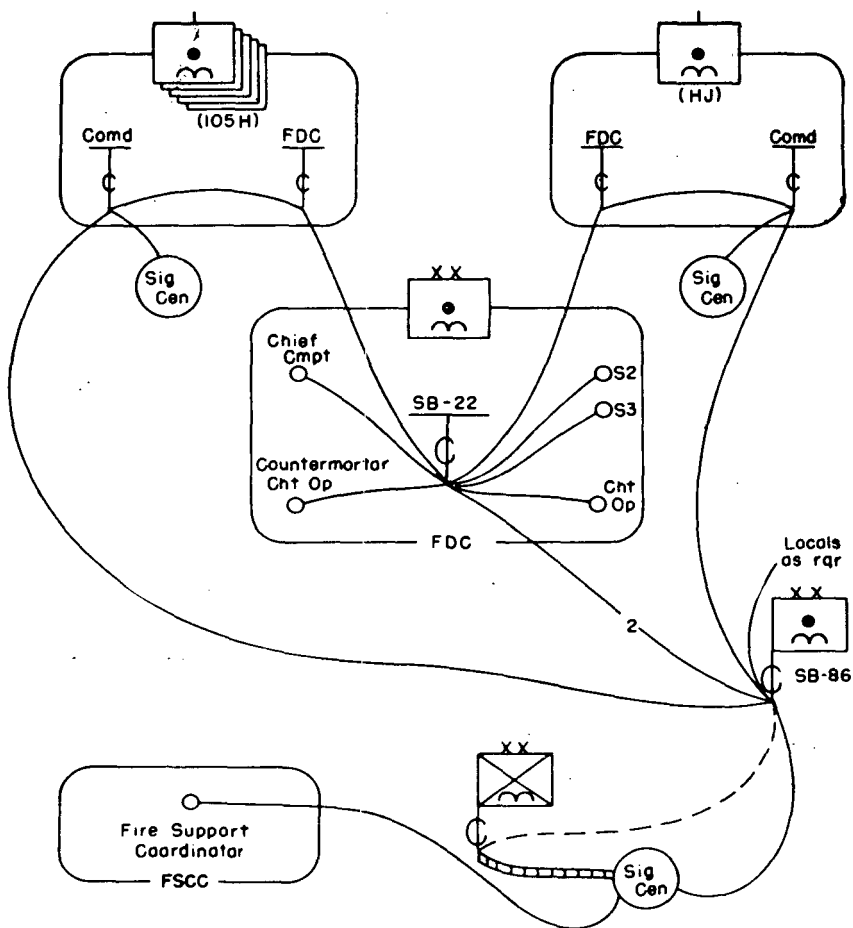
Figure 37. Organization of the airborne division artillery.

Section XIII. COMMUNICATION SYSTEM, AIRBORNE DIVISION ARTILLERY HEADQUARTERS

138. Wire System

a. General. During the assault phase, the howitzer batteries may be attached to the battle groups. Division artillery will install wire to these units and to the missile battery as soon as possible to facilitate centralized control of all artillery support. A type wire system for division artillery is shown in figure 38.

b. Installation of Wire. The wire section in headquarters battery is authorized three wire teams. These are insufficient teams to install lines to all subordinate units simultaneously, so priorities must be established. Priority is given to fire direction circuits to the howitzer batteries with a reinforcing mission and to the missile battery. Howitzer batteries with a general support mission may be directed to install lines to division artillery. The switchboard operators, under the



Legend

- ||||| Field Cable
- Field Wire
- - - As required

Figure 38. Type wire system, airborne division artillery.

supervision of the wire foreman, may install local lines in the command post area. The division signal battalion will normally install circuits necessary to connect division artillery headquarters into the area system and to division headquarters.

139. Internal Radio Nets

When exercising centralized control, the airborne division artillery requires three internal nets. These nets are all FM.

a. *Command Fire Direction Net, FM(CF)*. The command fire direction net, FM, is used for the internal control of division artillery. It can be used to issue tactical and administrative orders to the organic batteries of the division artillery, collect battlefield information from the howitzer batteries, and disseminate intelligence to the batteries. A type command fire direction net is shown in figure 39.

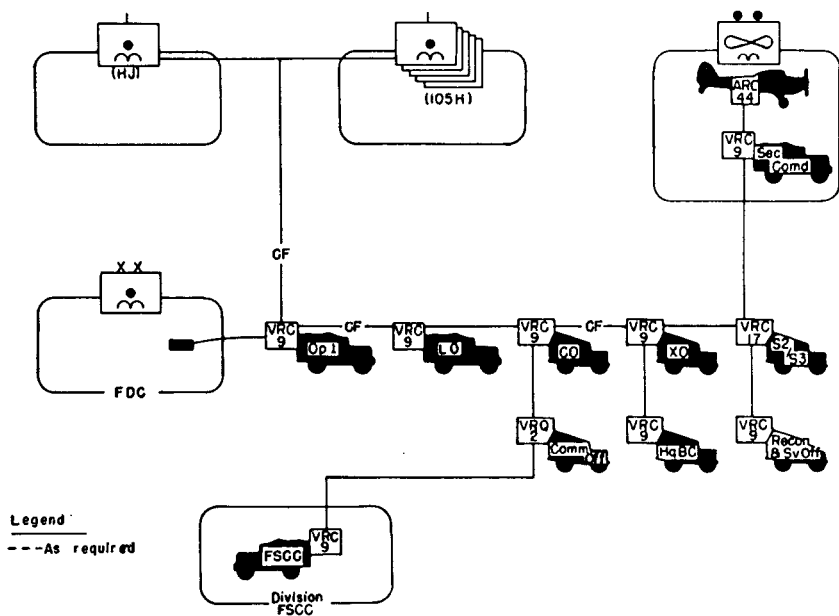


Figure 39. Type command/fire direction net, FM, airborne division artillery.

b. *Fire Direction Net 1, FM(F1)*. The primary fire direction net, FM(F1) is used by division artillery headquarters and the batteries of division artillery for the receipt and adjustment of fire missions. It may be used by division artillery for the dissemination of target data and fire missions. Figure 37 shows the units, stations, and individuals that may be operating in this net.

c. *Fire Direction Net 2, FM(F2)*. The secondary fire direction net, FM(F2), is used for receipt and adjustment of fire missions and the coordination of artillery support. This net is also used for the dissemination of meteorological data. This net is available to the mortar batteries of the battle groups for requesting additional fire support. Figure 40 shows the units and stations that may be operating in this net.

140. External Radio Nets

The division artillery headquarters operates in, or listens to, three FM and eight AM external radio nets to fulfill the external com-

munication requirements. The division artillery provides a considerable number of radios at the division FSCC. Stations or individuals that may operate in these nets are shown in figure 41.

a. *Division CG/Command Net, FM.* The division artillery commander operates in this net for direct communication with the division commander. The division artillery fire direction center operates a fulltime station in this net and the FSCC section provides a full-time station at the division FSCC.

b. *Division Intelligence Net, AM.* The division artillery listens to this net and pertinent information and intelligence received will be retransmitted over the internal communication system of division artillery.

c. *Division Command Net Number 1, AM.* The division artillery headquarters provides a radioteletypewriter set at the division FSCC in this net.

d. *Division Assault Net, FM.* The division artillery headquarters provides a radio at the division FSCC in this net.

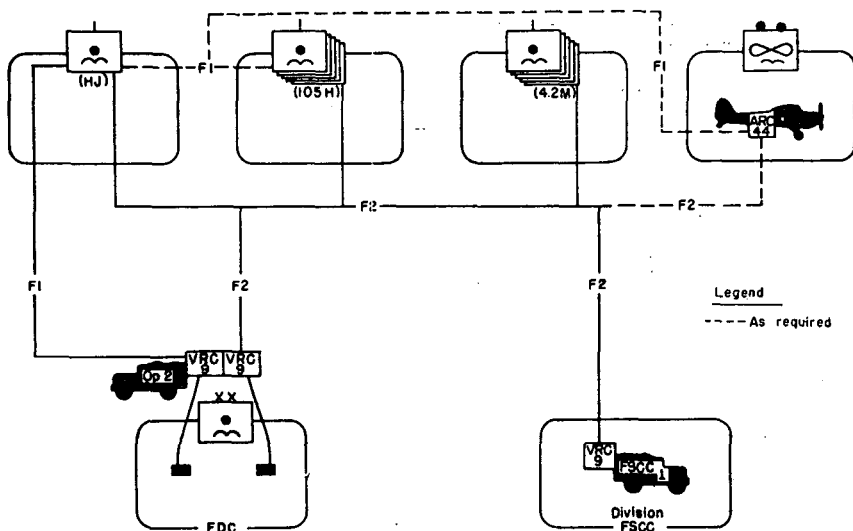


Figure 40. Type fire direction nets, airborne division artillery.

e. *Division Air Request Net, FM.* The division artillery provides a radio at the division FSCC in this net.

f. *Artillery Linkup Net, AM.* The artillery linkup net, AM, provides a radioteletypewriter link with the liaison officer at the artillery headquarters of the linkup force. It is used to coordinate artillery support between the airhead and linkup force artillery. It is used for the adjustment of fire coordination lines between the two closing forces.

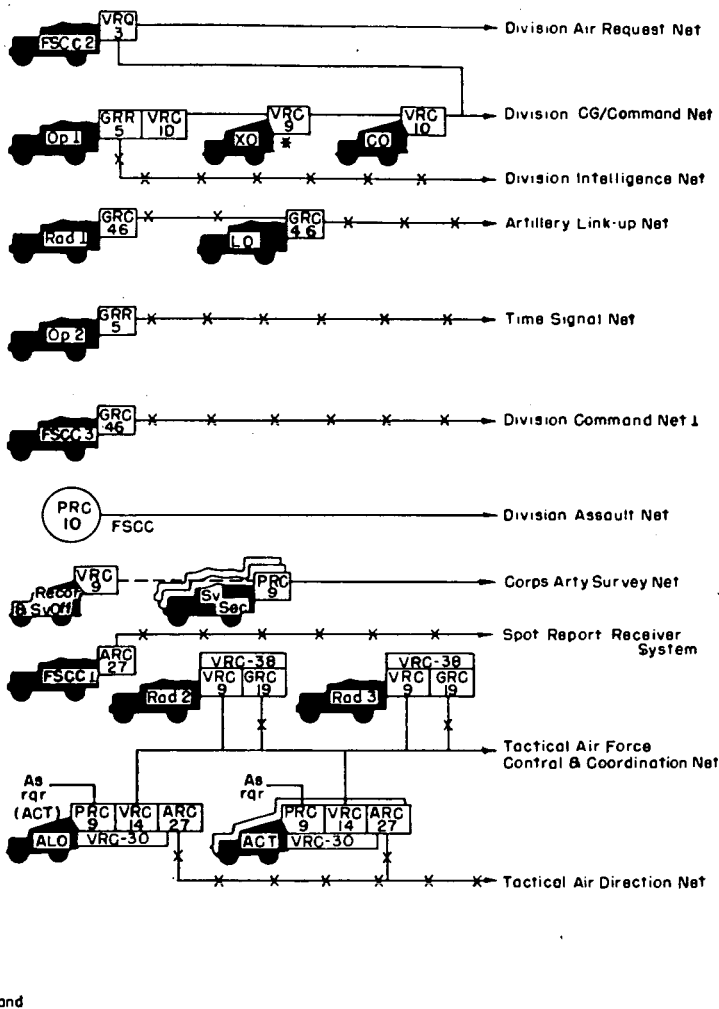


Figure 41. External radio nets, airborne division artillery.

g. Corps Artillery Survey Channel, FM(S). The corps artillery survey channel is used by the division artillery headquarters and artillery battery survey sections to facilitate survey and coordination with other artillery survey elements. Because of the limited range of the radio sets employed on this channel, it is not intended or feasible for this to be a coordinated net; however, it does provide communication within and between all survey sections in the division artillery.

h. Time Signal Net, AM. Normally, one broadcasting station in each theater will be designated to broadcast time signals to the entire theater of operations. The time signal is used in conjunction with astronomic survey.

i. Spot Report Receiver System, AM-UHF. The division artillery provides a radio set at the FSCC in this net.

j. Tactical Air Force Control and Coordination Net, FM. The control and coordination (CAC) net, FM, is used by the air liaison officer at the division fire support coordination center to control and coordinate the activities of the forward air controllers working with subordinate units. This net may also be used to exchange information between the air liaison officer and the forward air controllers. The division artillery headquarters battery has three air control teams. Two of these teams provide personnel and equipment for forward air controllers (FAC) to be used as required. The third ACT provides personnel and equipment for the air liaison officer at division FSCC. Two additional vehicles equipped with FM-AM repeater sets are assigned to the radio section. These two repeater sets are used by the ALO as necessary to extend the range of his equipment. Figure 42 shows a method of employing the ALO radio and the repeater sets.

k. Tactical Air Force Tactical Air Direction Net, AM. The air liaison officer at the division fire support coordination center (FSCC) will operate in the tactical air direction net, AM, utilizing the amplitude-modulated (AM) portion of radio set AN/VRC-30 provided to him by division artillery. This net gives the air liaison officer radio communication with high performance aircraft that may be conducting air strikes in the division area. The air liaison officer may not be directly involved in the conduct of the air strike, but will be able to obtain valuable information regarding targets in the division area.

Section XIV. COMMUNICATION SYSTEM, AIRBORNE DIVISION, FIELD ARTILLERY HOWITZER BATTERY, 105-MM

141. Wire System

a. General. The extent of the battery wire system will depend on the tactical situation and the length of time the unit remains in position. Priority wire circuits are those to be used for fire direction purposes. To add flexibility to the system, the battery will normally install two switchboards, one command, and one fire direction. A type battery wire system is shown in figure 43.

b. Installation of Wire Circuits. The battery is authorized two wire teams. Batteries with a reinforcing mission will establish a fire direction line to the reinforced mortar battery as soon as possible after arriving in the drop zone. As time permits, a command line is installed as a backup for the other line. Units with a general support mission will normally be directed to install wire to division artillery headquarters. This headquarters has insufficient organic wire teams

to accomplish wire to all subordinate units. The battery will also install a circuit to the nearest signal center as time and distance permit.

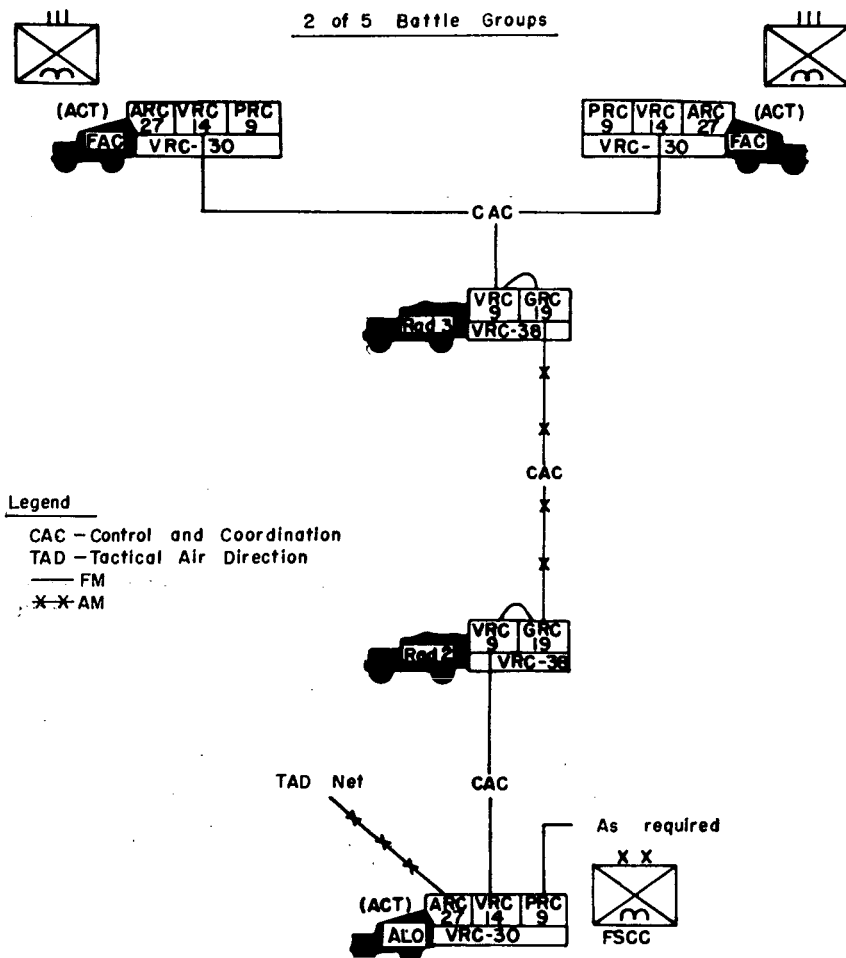


Figure 42. A method of employing radio equipment by ALO, airborne division.

142. Radio Nets

Each howitzer battery operates one internal net and operates in or monitors external nets necessary to accomplish its mission. Type radio nets for the battery are shown in figure 44.

a. *Battery Command/Fire Direction Net, FM (CF)*. This net is used by the battery commander for tactical and administrative control, collection of information and dissemination of intelligence, and for transmission of firing data.

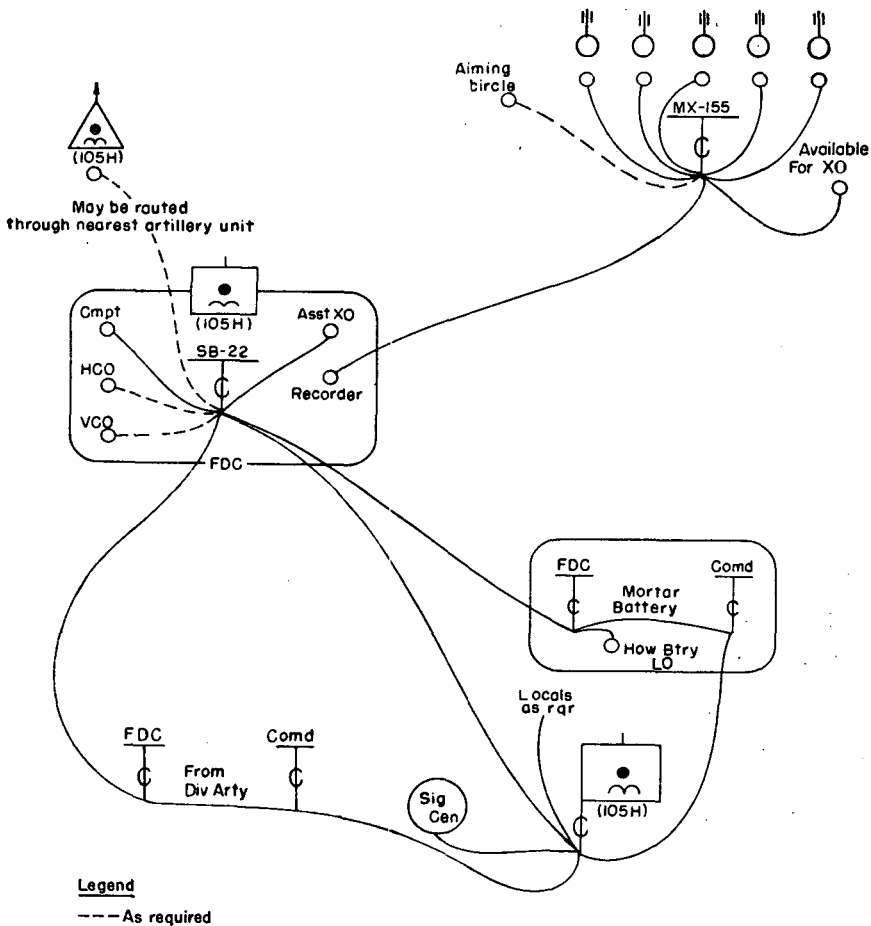


Figure 43. Type wire system, airborne division field artillery howitzer battery, 105-mm.

b. *External Radio Nets.* The battery operates in the following external nets:

- (1) *Division artillery command/fire direction net, FM (CF).* The battery commander operates in this net for direct communication to division artillery commander. The battery FDC operates a fulltime station in this net for exchange of information and intelligence with division artillery and other batteries.
- (2) *Division artillery fire direction net 1, FM (F1).* If the battery has a general support mission, it will operate a radio set in the net for receipt of fire missions from division artillery. When on a reinforcing mission, the battery does not operate in this net.

- (3) *Division artillery fire direction net 2, FM (F2)*. The battery operates in this net for receipt of fire missions, transmission of fire requests to division artillery, and for the receipt of meteorological data.
- (4) *Mortar battery fire direction net, FM (F)*. When a howitzer battery is reinforcing a mortar battery, the battery will operate a radio set in this net for coordination of fire support. It will also provide the mortar forward observers with a direct channel to the howitzer battery. The FO's will normally send their initial fire request to the mortar battery FDC. If the howitzer battery is to fire the mission, the FO will be directed to send his mission directly to the howitzer battery FDC.
- (5) *Corps artillery survey channel, FM (S)*. The battery survey section will operate in this net for coordination of survey with other units and for internal communication.

Section XV. COMMUNICATION SYSTEM AIRBORNE DIVISION, FIELD ARTILLERY MISSILE BATTERY, 7.62-MM ROCKET, SELF-PROPELLED

143. Wire System

a. General. The extent of the battery wire system will depend on the deployment of the battery and the situation. Priority wire circuits for the battery are the fire direction lines to the firing positions. If the battery is required to install wire to several firing positions, it should not be directed to install lines to division artillery. To add flexibility to the system, the battery installs two switchboards, one command and one fire direction. A type battery wire system is shown in figure 45.

b. Installation of Wire Circuits. The battery has two wire teams. Since the battery may establish several firing positions, the tactical situation will dictate the employment of these teams. In addition to circuits to firing positions, the battery will install a circuit to the nearest signal center as time and distance permit.

144. Radio Nets

The battery operates one internal net and operates in or monitors external nets necessary to accomplish its mission. Type radio nets for the battery are shown in figure 46.

a. Battery Command/Fire Direction Net, FM (CF). This net is used by the battery commander for tactical and administrative control, dissemination of intelligence, and transmission of firing data. The firing platoons have sufficient radio sets to establish one at each firing position as a backdrop for the wire system.

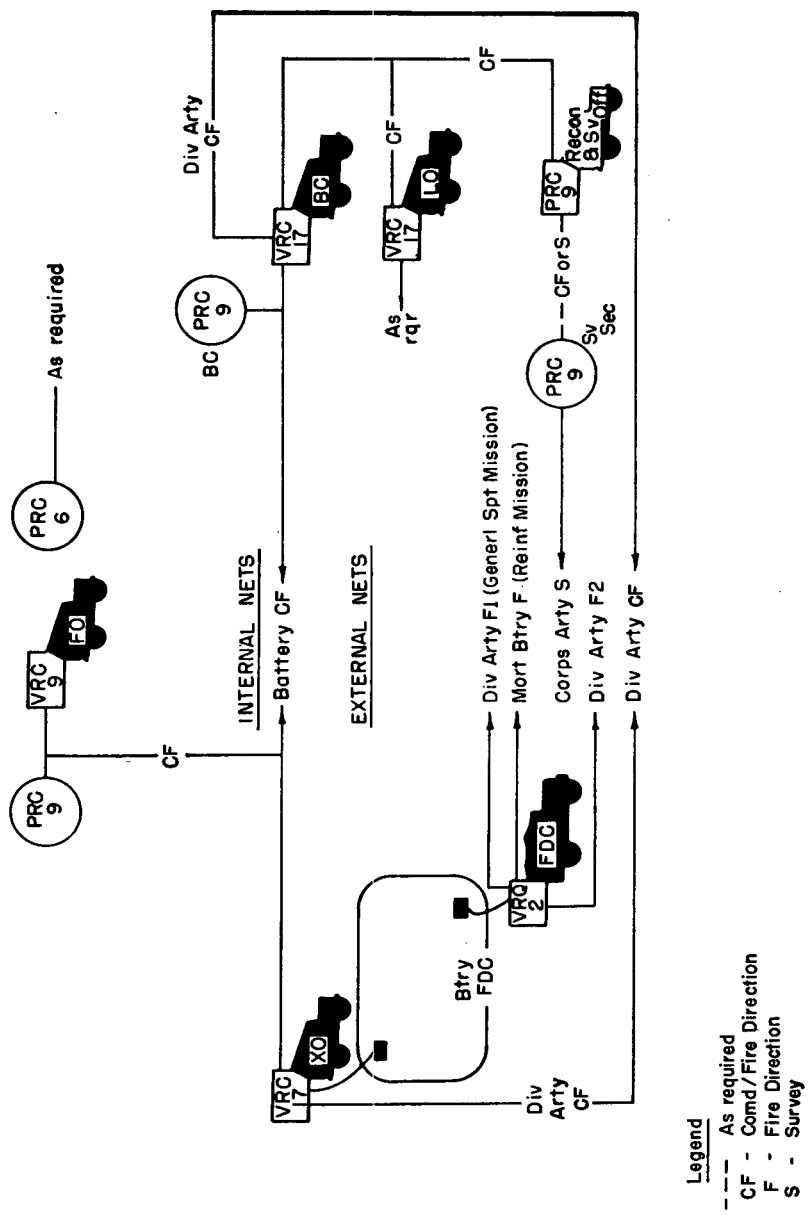


Figure 44. Type radio nets, airborne division field artillery howitzer battery, 105-mm.

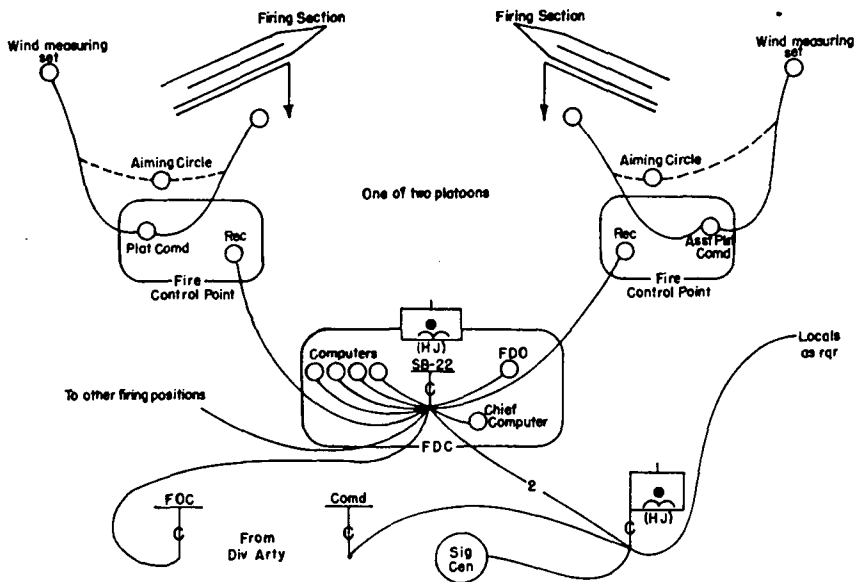


Figure 45. Type wire system, airborne division field artillery missile battery, 7.62-mm rocket, self-propelled.

b. *External Radio Nets.* The battery operates in the following external nets:

- (1) *Division artillery command/fire direction net, FM (CF).* The battery commander and executive officer operate in this net for direct communication to the division artillery commander. The battery FDC operates a fulltime station in this net.
- (2) *Division artillery fire detection net 1, FM (F1).* The battery operates in this net for receipt of fire missions from division artillery.
- (3) *Division artillery fire direction net 2, FM (F2).* The battery operates in this net for receipt of fire missions and meteorological data from division artillery.
- (4) *Corps artillery survey channel, FM (S).* The battery survey section operates in this net for coordination of survey with other units and for internal communication.

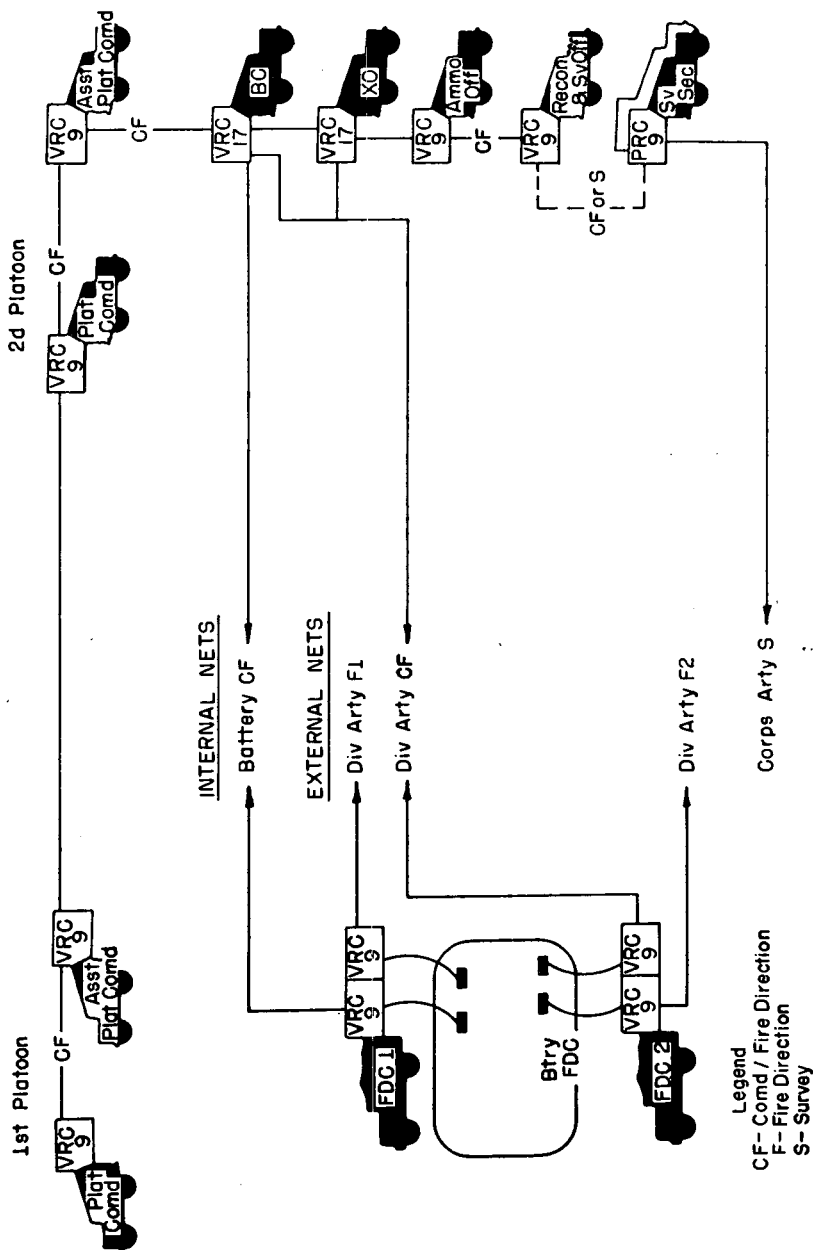


Figure 46. Type radio nets, airborne division field artillery missile battery, 7.62 mm rocket, self-propelled.

CHAPTER 8

INFANTRY DIVISION BATTLE GROUP

Section I. GENERAL

145. Organization

The infantry division battle group is organized as shown in figure 47. The battle group headquarters company includes a communication platoon, which is organized into a platoon headquarters, a message center section, a wire section, and a radio and visual section. For details on the operation of the communication platoon, see FM 7-21. The heavy mortar platoon has a wire section. Communication personnel in other units are assigned to the various headquarters, platoons, and sections. Communication personnel total about nine percent of the battle group's strength.

146. Signal Operation Instructions

The battle group receives copies of the division SOI from which extracts are made for distribution to interested agencies. A complete SOI item is sent no lower than battle group headquarters. For further details, FM 11-16.

147. Responsibility for Training

The communication officer acts as a special staff officer for the battle group commander in communication responsibilities. He assists the S3 in the preparation of training directives regarding communications. The rifle company and combat support company commanders are responsible for the organization and conduct of communication training in their units.

148. Command Post Message Procedures

a. Incoming Messages. Incoming messengers report to the message center where their messages are receipted, made a matter of record, and delivered to the sergeant major. The sergeant major supervises the circulation of the message within the command post. Incoming messengers are used to deliver any messages awaiting dispatch to their unit or activity.

b. Outgoing Messages. Outgoing written messages are delivered to the message center for transmission. Records kept by a message center include a live file (duplicate or skeleton copies of outgoing messages which have not been receipted), a dead file (duplicates of

skeleton copies of receipted outgoing messages), a message center log (record of messages processed through message center), and a means chart (a record of the means of communication available). The dead file is delivered daily to the adjutant for disposition. The battle group message center also maintains a crypto file (clear text copies of outgoing messages encoded or enciphered, and encrypted message center copies of incoming encoded or enciphered messages). This file is destroyed in accordance with unit SOP.

Section II. COMMUNICATION IN AN ASSEMBLY AREA

149. General

Before moving his unit to the division assembly area, the battle group commander makes a reconnaissance of the battle group's prospective location. His communication officer and selected communication personnel are included in the reconnaissance party to insure the early establishment of adequate communication. During the course of the concentration, communication personnel operate the communication system, continue training, prepare plans, and maintain equipment.

150. Tactical Application of Communication

Commercial wire installations are used whenever practicable; additional construction is held to the minimum necessary for adequate control. Instructions concerning restrictions on the use of commercial equipment are furnished by the division signal officer. The use of radios may be restricted to preserve secrecy and to conserve batteries, but intelligence and warning nets may be operated. Transmissions in these nets may be limited. All types of messengers are used extensively in assembly areas. Elaborate command post installations are avoided. Each headquarters is established in its assigned area and is located to facilitate communication.

Section III. COMMUNICATION DURING MARCHES AND HALTS

151. Marches

a. General. Communication during marches is maintained between the battle group march command post and the next higher unit, adjacent columns, security and reconnaissance elements, command posts of major units with the columns and trains. Units within columns also maintain communication. The most emphasized means are radio and messenger (motor, foot, and light aircraft). These means are supplemented by visual and sound. Radio is restricted or silenced if secrecy is imperative. March orders include communication instructions and the location of command posts. Commu-

nication information covered in SOP's may be omitted in march orders.

b. Radio. Radio is an effective means for controlling units during a march. Some secrecy of movement is achieved through the use of cryptosystems and by reporting positions in reference to phase lines and march objectives. Ranges are reduced during movement and when line-of-sight locations cannot be selected. All commanders and operators familiarize themselves with the details of net organization, security codes, and the authentication system to be used. Radios in light aircraft and those with liaison officers are useful in establishing communication with adjacent columns and units, and within extended columns. If march control points are used, they should be equipped with radio sets for added control by serving as relay stations for message traffic.

c. Messengers. Messengers are used by all units during a march. Foot and motor messengers are used from front to rear. Motor messengers are used between adjacent columns. Messages may be exchanged between moving vehicles. Light aircraft messengers facilitate communication between adjacent columns, to distant higher headquarters, and within extended columns. Messengers are informed before the march of the route, formation, location of command posts, and special vehicle markings.

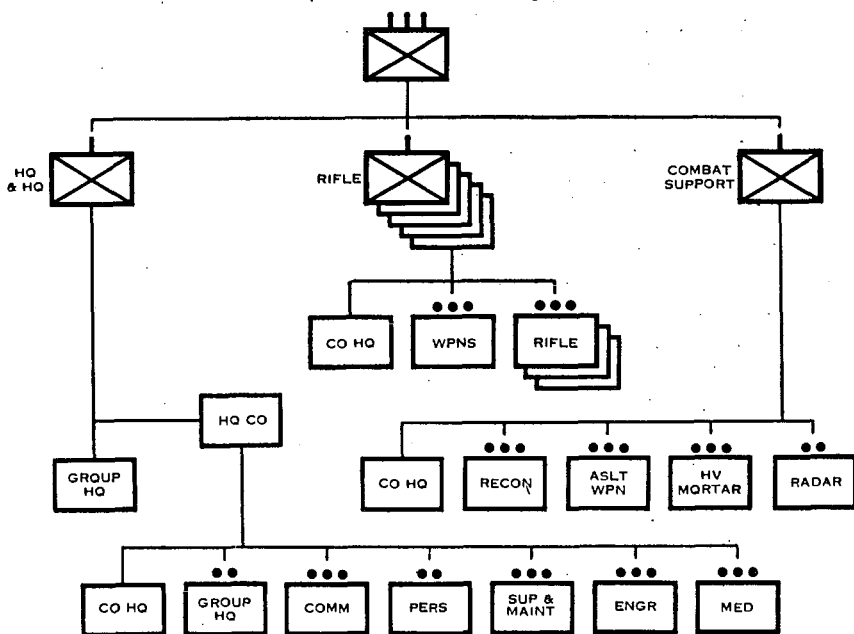


Figure 47. Organization of the infantry division battle group.

d. Visual. If visual signals are prescribed, lookouts are assigned areas of responsibility in which to observe for them. Pyrotechnics may be employed to report arrival at a phase line or march objective, for ground-air communication, to warn of air, CBR, and mechanized attacks, and to transmit other prearranged messages. Panels are used to identify friendly columns, specific vehicles in a column, command posts, and message drop and pickup areas. Panels are kept ready for use, and panel teams may leave the column temporarily to communicate with aircraft.

e. Wire. Wire normally is not installed during a march, but commercial wire systems and existing field wire circuits may be used.

f. Command Posts. Command posts are located to facilitate control of the column. During motor movements, they move at definite places in the column. The battle group command post travels at the head of the main body. Command posts of units in the main body are at the heads of their respective units. A motorized command post consists only of essential command and communication vehicles. Communication vehicles include those for messengers, panel teams, and radios used during the march. Wire vehicles required during or immediately after the march are also included. Communication personnel not needed to maintain communication during the march, travel with the headquarters company. During foot marches, command posts may be motorized. They move by bounds between units. Their composition and relative location within the column are the same as for a motor march. Vehicles and designated personnel not required to maintain communication during a foot march move near the head of the vehicles that follow the foot elements. Communication personnel who cannot be transported, march with their units.

152. Halts

During temporary halts, communication is maintained as during the march. During prolonged halts, messengers are used extensively. Radios are used except when restricted for security reasons. If a quartering party precedes the march, it should include communication personnel to facilitate the establishment of communication in the bivouac or assembly area. Wire is installed, the amount depending on the need for wire communication, the supply of wire available, and the duration of the halt. It is particularly desirable for the battle group to have wire communication to lower units and communication with higher headquarters through the area communication system during overnight halts.

Section IV. COMMUNICATION DURING THE APPROACH MARCH AND IN ASSEMBLY AREAS

153. Approach March

a. The means of communication used on marches in tactical columns are continued in use in the approach march. Radio and messenger are the most used means, supplemented by visual and sound. Communication security measures continue to be enforced as in marches in tactical column. Cryptography is used except when clear text messages may be transmitted without violating security restrictions.

b. Messenger communication becomes difficult when units assume extended formations or move cross-country. March command posts are more difficult for messengers to locate, which delays them in delivering messages. Instructions to messengers must be explicit.

c. It is not practical to use wire in the approach march. The premature establishment of a wire system results in loss of wire, over-extension of circuits, and delay in installing communication for the next operation.

d. March command posts are located to facilitate control. In deployed units, they are well forward and near the center of formation. They follow natural routes of communication.

e. Communication officers and their assistants keep abreast of the situation, supervise the operation of communication system, and plan continuously for future operations.

154. Assembly Areas

On arrival in an assembly area, temporary command posts and a limited communication system are established. The means of communication most emphasized are messenger and wire. Communication personnel install, operate, and maintain the communication system and prepare for the next operation. The commander informs the communication officer of his plan for the next operation at the earliest practicable time.

Section V. COMMUNICATION DURING THE ATTACK REORGANIZATION, AND PURSUIT

155. Planning and Orders for the Attack

a. To facilitate coordination of communication matters, the battle group commander may take his communication officer to hear the order of the next higher commander. The communication officer normally is present also when his commander announces his plans and issues his attack order. If he cannot be present on either occasion, the commander or S3 informs him of the latest developments in the situation and the tactical plan at the earliest practicable time.

b. As soon as the communication officer learns the details of the battle group plan of attack, he completes his own plans for the operation. He discusses his tentative plans with the S3, then completes his map and ground reconnaissance. He takes wire personnel and other selected members of the communication platoon with him on the ground reconnaissance. He submits recommendations to be included in paragraph 5 of the operation order.

c. When the battle group commander issues his attack order, the communication officer completes the coordination of his plans with others concerned, including the staff, lower unit commanders or communication personnel, and supporting units. He then goes to the designated general location of the command post with the S1 to determine the exact location and interior arrangement. He takes the personnel of the communication platoon, leaving only enough men in the assembly area to provide communication until the command post is established and occupied. Finally, he issues oral instructions for the establishment of the communication system.

d. The duties and actions of the communication chief in a company are similar to those of the group communication platoon leader.

156. Wire Communication During the Attack

a. *Battle Group Area Support Platoon.* The battle group area support platoon is responsible for providing a link for the battle group into the area communication system.

b. *Functions of the Battle Group Communication Platoon.* The wire section extends the battle group observation post line, and the lines to attacking company command posts whenever possible. Their installation and maintenance have primary importance. Lateral communication is available through facilities of the area support platoon.

c. *Telephone Facilities at Battle Group Command Post.* Telephones in the command post are installed according to priority established in the battle group SOP. A telephone for the message center is given a high priority. Initially, telephones are shared by two or more officers; for example, the commander and executive officer, the S2 and S3, the S1 and S4. Additional telephones are installed as rapidly as possible.

d. *Rifle Company.* The two company wiremen install and maintain the company OP line whenever conditions permit. One man using a wire dispenser and telephone can lay a wire line and, while moving, have continuous communication.

e. *Combat Support Company.* The mortar platoon wire section installs wire for fire control communication whenever possible. This may be the extent to which wire communication is used by the platoon

in the attack. The assault weapon platoon and the reconnaissance platoon will not normally use wire communication during the attack.

157. Radio Communication During the Attack

a. General. Radio communication is available within all units down to and including squads. To attain secrecy and surprise, the use of radio may be restricted until a prescribed time. A further restriction may be directed for maneuvering and reserve units before they are committed. Listening silence is not carried to the point of hampering the attacking echelons. When it is probable that the enemy knows the location or anticipates the movements of friendly units, and after contact is made, there is little to gain by imposing radio listening silence. Radio nets operated within the battle group are flexible and may be altered as required by the situation.

b. Battle Group. The battle group can communicate with division in six different radio nets, using AM and FM radios. A command net and an administrative net are established within the battle group with FM radio sets (figs. 48 and 49). Each liaison officer is provided with an FM voice radio for communication with the S3 in a liaison net (fig. 50). The radio set (AN/VRC-24) is issued to the S3 Air to monitor the spot report receiver system (UHF), employed by tactical aircraft.

c. Rifle Company. The rifle company operates in two battle group radio nets and has a command net including the company command post, rifle platoons, weapons platoon headquarters, two antitank squads, observation post, the company executive officer, and the company commander. It also operates a fire direction net which includes the three forward observers and the FDC of the 81-mm mortar section headquarters. In addition, each rifle platoon has a command net (fig. 51).

d. Combat Support Company. The combat support company commander has the capability of operating in two radio nets. He operates in those nets required by his mission. The executive officer is in the battle group administrative net (fig. 49), and has the capability of operating in one other radio net as required.

- (1) *Heavy mortar platoon.* The heavy mortar platoon operates in the battle group command and administrative nets. It also has a platoon command net and a fire direction net. The unit has the capability of communicating while operating as a platoon (fig. 52), or as separate sections (fig. 53). The forward observers operate in the rifle company command net with a radio set organic to the heavy mortar platoon. The counterfire squad uses portable FM radios for communication (FM 7-19). For further details on fire request channels, see chapter 6.

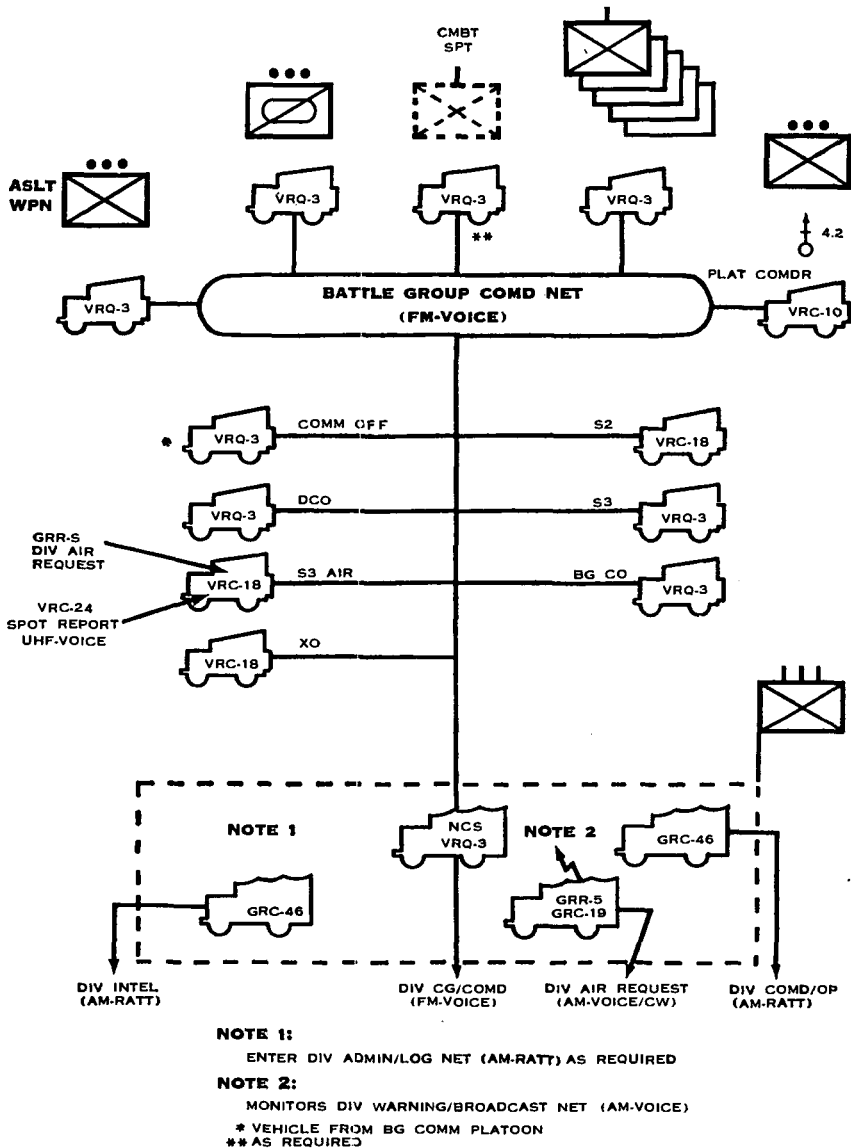
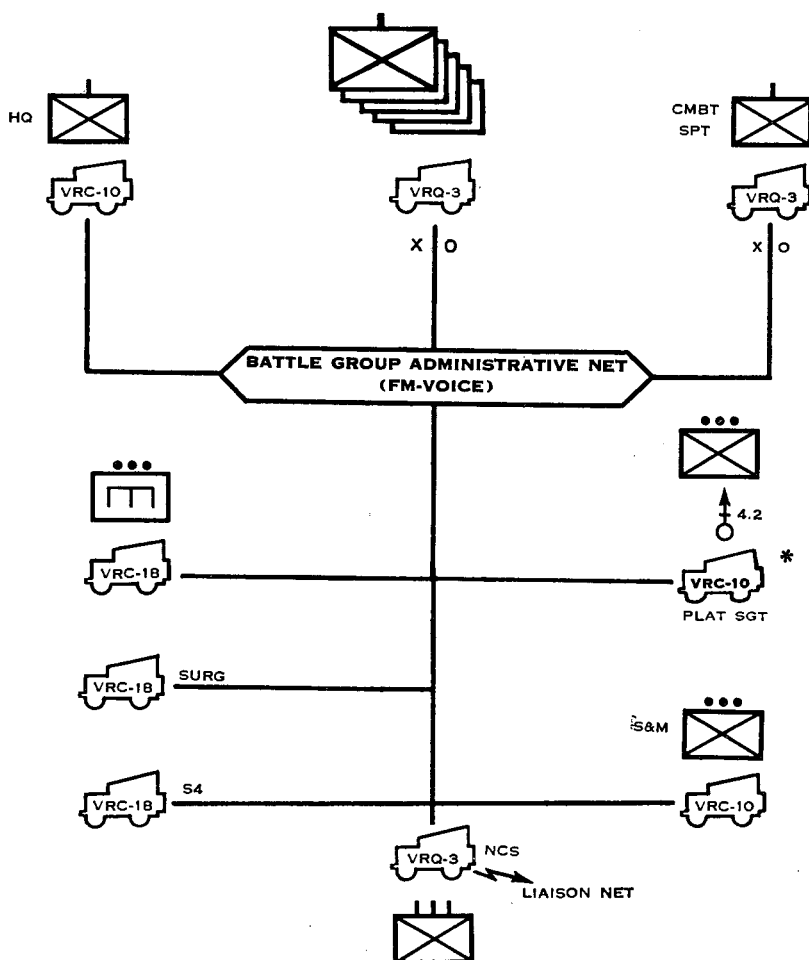


Figure 48. Type battle group command net (FM-voice).

- (2) *Reconnaissance platoon.* The reconnaissance platoon is provided with radio sets for communication within the platoon and with the battle group headquarters (fig. 54).
- (3) *Assault weapon platoon.* The assault weapon platoon has the capability of communicating in the platoon command net and in the net of any supported unit. The platoon leader operates in the battle group command net.



* ADDITIONAL AN/VRC-10 OPERATES IN PLAT COMMAND NET

- NOTE:** 1. THE ASLT WPN PLATOON MAY ENTER THE BG ADMIN NET AS REQUIRED.
 2. BG XO MONITORS THIS NET WITH HIS AUXILIARY RECEIVER.

Figure 49. Type battle group administrative net (FM-voice).

(4) *Radar section.* The radar section operates a surveillance net which incorporates the two medium radar teams and the section headquarters. The five light radar teams may enter this net or the net of the supported rifle company as required. The S2 will normally monitor this net for intelligence purposes.

e. Headquarters and Headquarters Company. The headquarters company operates a radio in the battle group administrative net (fig. 49).

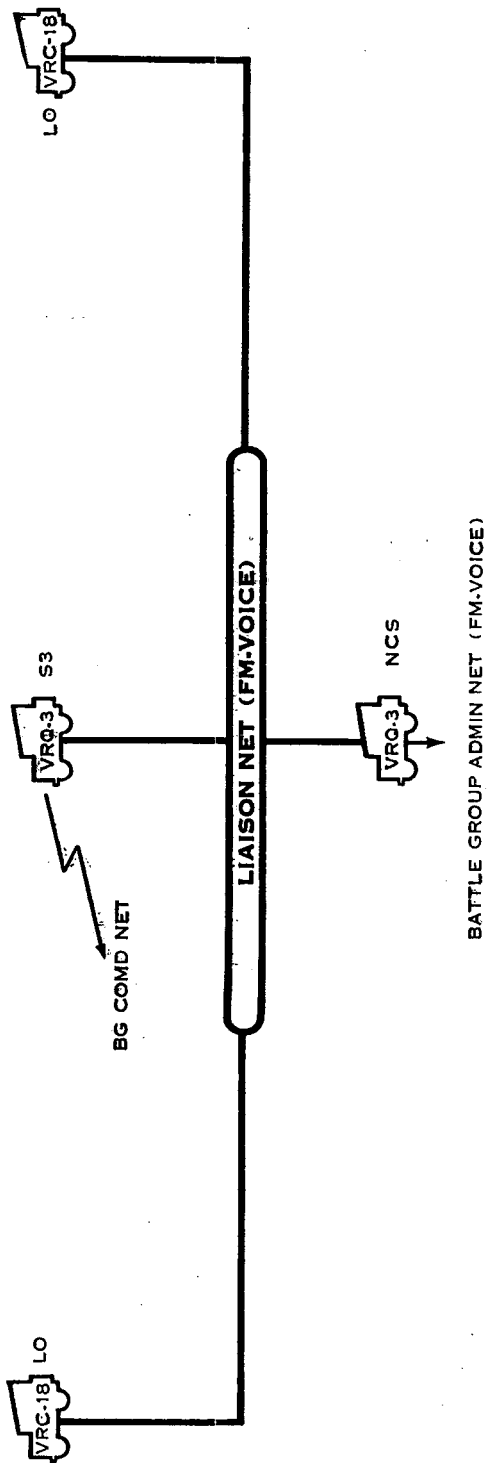


Figure 50. Type battle group liaison net (FM-voice).

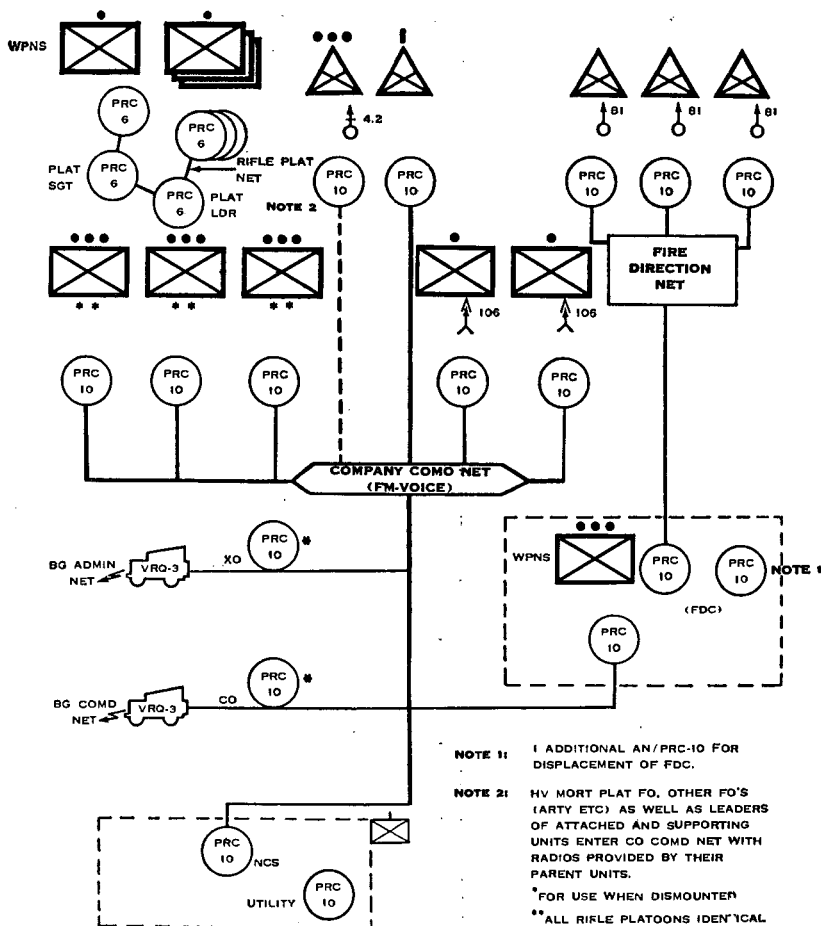


Figure 51. Type radio nets for the rifle company.

- (1) *Engineer platoon.* The engineer platoon operates a radio in the battle group administrative net (fig. 49). Each squad also has a portable FM radio set for use in platoon net or net of supported infantry unit.
- (2) *Medical platoon.* The medical platoon operates a radio in the battle group administrative net (fig. 49). This set is used primarily by the battle group surgeon. Additional portable FM radio sets are issued for use as required.
- (3) *Supply and maintenance platoon.* The supply and maintenance platoon operates a radio in the battle group administrative net (fig. 49).

158. Messenger Communication During the Attack

Messengers are used extensively as a means of communication during the attack. Because of the fluid nature of most attack situations,

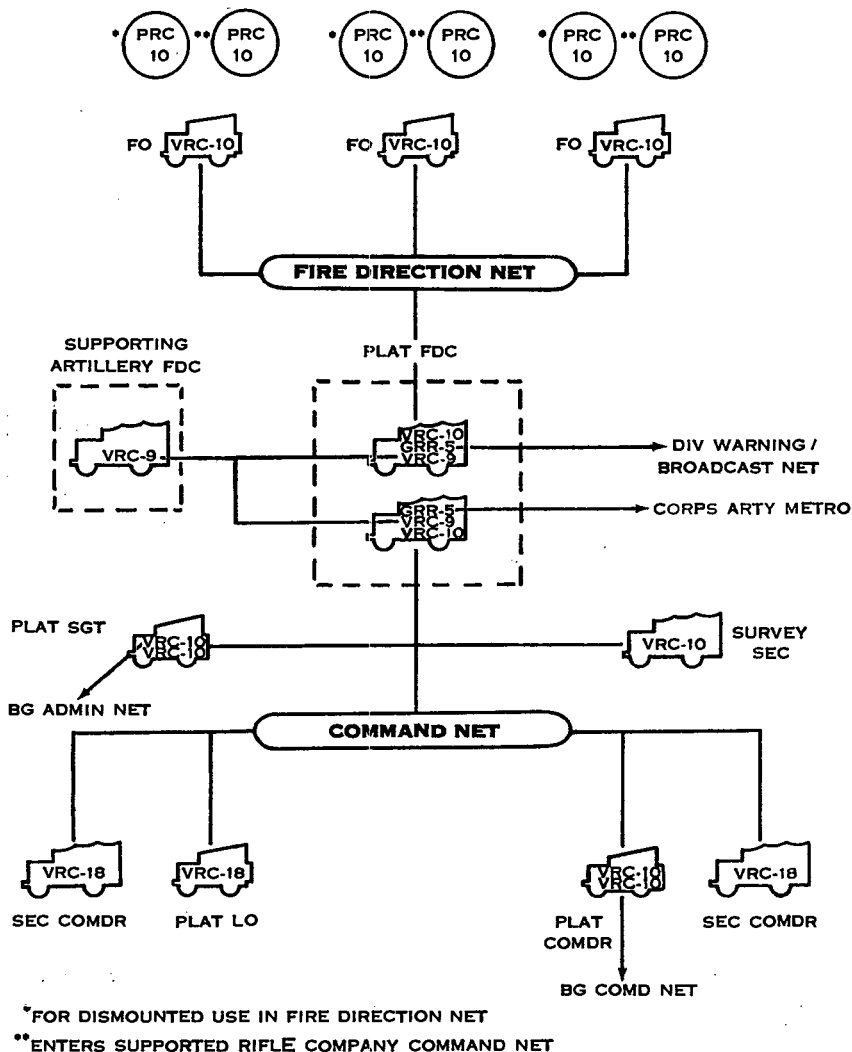


Figure 52. Type radio nets, heavy mortar platoon (platoon position).

only special messengers are used. For further information on messenger communication, see FM 21-75.

159. Visual and Sound Communication During the Attack

Visual and sound signals are used to transmit prearranged messages prescribed in the SOI or by the commander. Each commander insures orders and proper equipment is issued to units to implement the visual and/or sound communication plan, particularly for ground-to-air visual communication. For further information on visual and sound communication, see paragraphs 37 and 38.

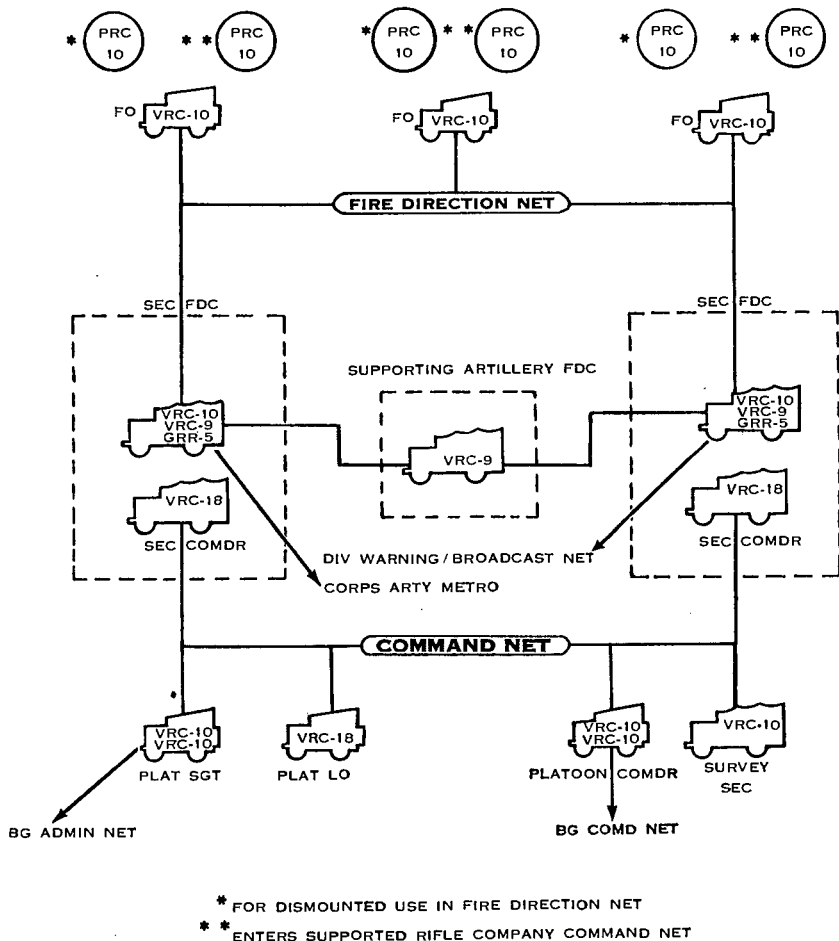


Figure 53. Type radio nets, heavy mortar platoon (two-section positions).

160. Command Posts During the Attack

a. To avoid displacement during the early stages of the attack, the battle group command post is initially established as near the line of departure as practicable. Throughout the attack, the communication officer plans for prompt displacement of the command post and for efficient and continuous communication during displacement.

b. The initial command post of a rifle company is located close to the line of departure. It is moved forward as the company advances. New locations are reported to battle group promptly.

c. The mortar platoon command post is located near the platoon FDC. Both of these installations are established where they can offer effective control of mortar fires. To facilitate communication, a location near the battle group command post is desirable. The wire section

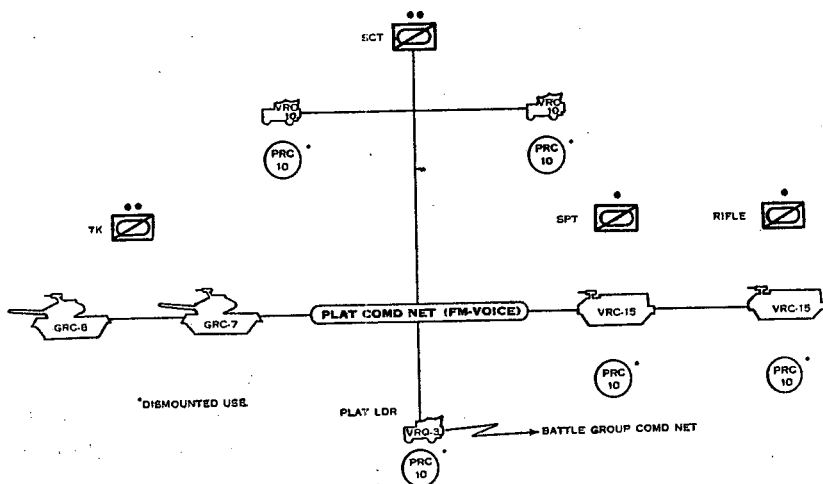


Figure 54. Type radio net, infantry battle group reconnaissance platoon.

chief plans throughout the attack for the prompt displacement of the CP and FDC.

161. Displacement of Command Posts

a. Wire. The communication officer keeps abreast of the tactical situation at all times. He obtains timely information of contemplated displacements of the command post from the S3 or the commander. The battle group command post normally moves along the best available route of communication through the battle group's area. This is normally the axis of command post displacement. To expedite the establishment of communication at the new location and minimize the number of new lines to be laid, the existing wire circuits may be used during displacements. (A technique to assist commanders in maintaining wire communication is to provide them with a short piece of wire with alligator clips attached and a telephone, TA-312, to enter existing wire systems.) The communication officer constantly reconnoiters and plans for the extension of the wire system. If the battle group command post follows the axis of one of the companies, the existing wire line may be used for communication from the new location to the rear. The command post may displace along the battle group observation post wire line. The communication officer insures this line is extended as the attack progresses. He anticipates displacements by installing as many wire lines in subsequent locations as the tactical situation permits. The battle group communication officer must coordinate with the platoon leader of the battle group area support platoon as soon as the displacement of the command post is anticipated to insure that facilities to provide entries into the divi-

sion area communication system will be available to the battle group at the new location.

b. Opening the New Command Net. If the general location of the new command post has been prescribed, a quartering party, including the S1, communication officer, guides, and security and communication personnel goes to the new location. The exact site is selected and locations for the various installations are designated. Communication is established and guides are posted. If the new general location has not been prescribed, the S3 and the communication officer recommend a location for the commander's approval. When he approves a general location, the quartering party and the advance echelon of the communication platoon go to it and establish essential communication facilities before the move. Displacement is carefully coordinated to avoid disrupting communication and losing control. All units concerned are notified of the contemplated change.

c. Closing the Old Command Post. When the new command post is ready for operation, the commander is notified. The command group moves to the new location according to his instructions. Sufficient personnel, including communication personnel, remain at the old command post to operate it until the commander orders it closed. The old command post is closed and the new one opened at the same time. All personnel go to the new command post except a guide who remains temporarily at the old site to direct messengers to the new location. All units concerned are notified when the new command post is opened.

d. Company and Platoon. CP displacement is simpler for smaller units. When the commander is forward and accompanied by enough men, the new command post location may be selected and displacement completed rapidly because radio and messenger are the most used means to communicate with lower units. The rifle company uses this method frequently because it enables the command post to follow the rifle platoons closely without losing communication with lower and higher units. The mortar platoon has an additional requirement of establishing communications in the new area for control of the mortars. This can be done by the platoon wire section. When time does not permit the installation of wire, the platoon can still displace using radio communication.

162. Communication During Reorganization

The means of communication used during the attack are continued during reorganization. After units disperse and start reorganizing, the communication officer and noncommissioned officers prepare for the next operation and take action to obtain replacements for losses of personnel and equipment within their units. They reassign duties and reallocate equipment and supplies pending the arrival of replace-

ments. They supervise the repair or replacement of faulty signal equipment and resupply of units with wire and batteries.

163. Communication During Pursuit

Units in pursuit, to maintain direct pressure against or encircle the enemy, use their means of communication as in the tactical column and approach march phases of a movement to contact. Units in contact with and maintaining direct pressure against a fleeing enemy use their communication means as during the attack. Pursuit requires extensive reliance on radio; enemy interception of radio traffic has little significance. Existing wire lines along routes of pursuit are used if they are serviceable.

Section VI. COMMUNICATION DURING DEFENSE AND RELIEFS

164. General

a. Advance planning and reconnaissance by communication personnel are essential in the defense. Actions and duties are like those for the attack, but the communication system is more elaborate and inclusive. All possible steps are taken to insure uninterrupted operation. Time usually is available to improve the system, including the selection and preparation of alternate command posts which are farther to the rear than in the attack.

b. Higher headquarters establish communication to the advanced covering force and the general outpost. The communication officer recommends the method of establishing and maintaining communication with the combat outpost. Control of the combat outpost of a frontline battle group normally remains with the forward companies. In this case, each company provides communication to its part of the outpost. The communication system within the outpost is similar to that established by units on the forward edge of the battle area.

165. Wire Communication During Defense

a. General. Wire is used extensively as a means of communication during defense. It is installed as rapidly as time, personnel, and equipment permit, and it is continuously improved during the conduct of the defense.

b. Battle Group System. An area support platoon installation section lays and maintains wire lines or cables from its switchboard to the battle group switchboard. The communication platoon lays two or more lines over different routes between the command posts of the battle group and frontline companies (fig. 55), and two or more lines to the elements of the combat support company as required. This platoon also lays wire to the reserve companies and the battle group

observation post. Attached and supporting units are included in the wire system. Local telephones are installed as prescribed in the battle group SOP.

c. Rifle Company System. The rifle company establishes wire communication to all its platoons and to its observation post (fig. 56). Wire communication is established with the 81-mm mortar section and the antitank squads.

d. Combat Support Company. The combat support company command post is integrated into the battle group wire system (fig. 55). No internal wire system is installed between the combat support company headquarters and its subordinate units.

- (1) *Heavy mortar platoon.* The heavy mortar platoon is tied into the battle group switchboard and lays an extensive wire system for both fire direction and fire control. The system ties in all elements of the unit and the forward observers when practical. It is flexible enough to support the platoon when operating as a unit or divided (figs. 57 and 58).
- (2) *Reconnaissance platoon.* The reconnaissance platoon command post is tied into the battle group switchboard when possible. No internal platoon wire system is normally used.
- (3) *Assault weapon platoon.* The assault weapon platoon is tied into the battle group switchboard. The platoon operates an internal wire system when required. It also has the facilities for being integrated into the wire system of the supported rifle company.
- (4) *Radar section.* The radar section will normally tie in its telephone facilities to the present switchboard. The section does not normally operate an internal wire system.

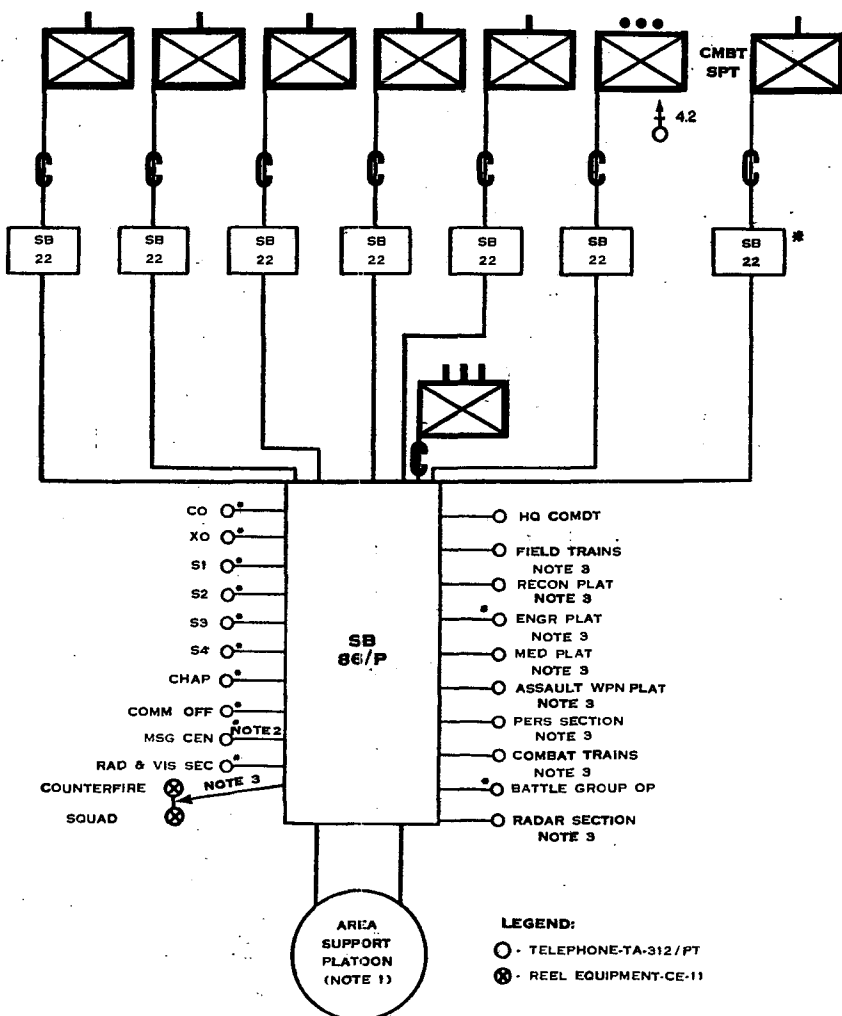
e. Headquarters and Headquarters Company. All elements of headquarters and headquarters company are tied into the battle group switchboard. No wire system normally exists within the subordinate units of the company.

166. Radio Communication During Defense

Radio communication normally is restricted for security reasons until contact has been made with the enemy. When adequate wire communication is available, radio is not used, but radio nets remain open in case wire communication is interrupted or becomes inadequate.

167. Messenger Communication During Defense

Special messengers are used extensively during the defense and scheduled messenger service may be established as required. For further information on messenger communication, see paragraph 36.



- NOTES:**
1. ESTABLISHED BY THE DIVISION SIGNAL BATTALION, PROVIDES CRYPTOGRAPHIC SERVICE, RADIO RELAY, TELETYPE, TELEPHONE AND RADIO WIRE INTEGRATION SERVICE. THE NUMBER OF CIRCUITS INSTALLED IS BASED ON AVAILABILITY AND REQUIREMENTS.
 2. ADDITIONAL LINE FOR PAGE PRINTING TELETYPEWRITER IN BATTLE GROUP MESSAGE CENTER WILL BE LAID TO SWITCHBOARD.
 3. TIES INTO BATTLE GROUP WIRE SYSTEM AT NEAREST SWITCHBOARD
- * PROVIDED BY THE BATTLE GROUP COMMUNICATION PLATOON WHEN THE COMBAT SUPPORT COMPANY IS DESIGNATED AS THE BATTLE GROUP ALTERNATE COMMAND POST.

Figure 55. Type wire system, infantry battle group.

168. Visual and Sound Communication During Defense

Visual signals requiring line-of-sight between observation posts and rear installations can be used to advantage in defensive actions. They are used in accordance with the SOI and SSI.

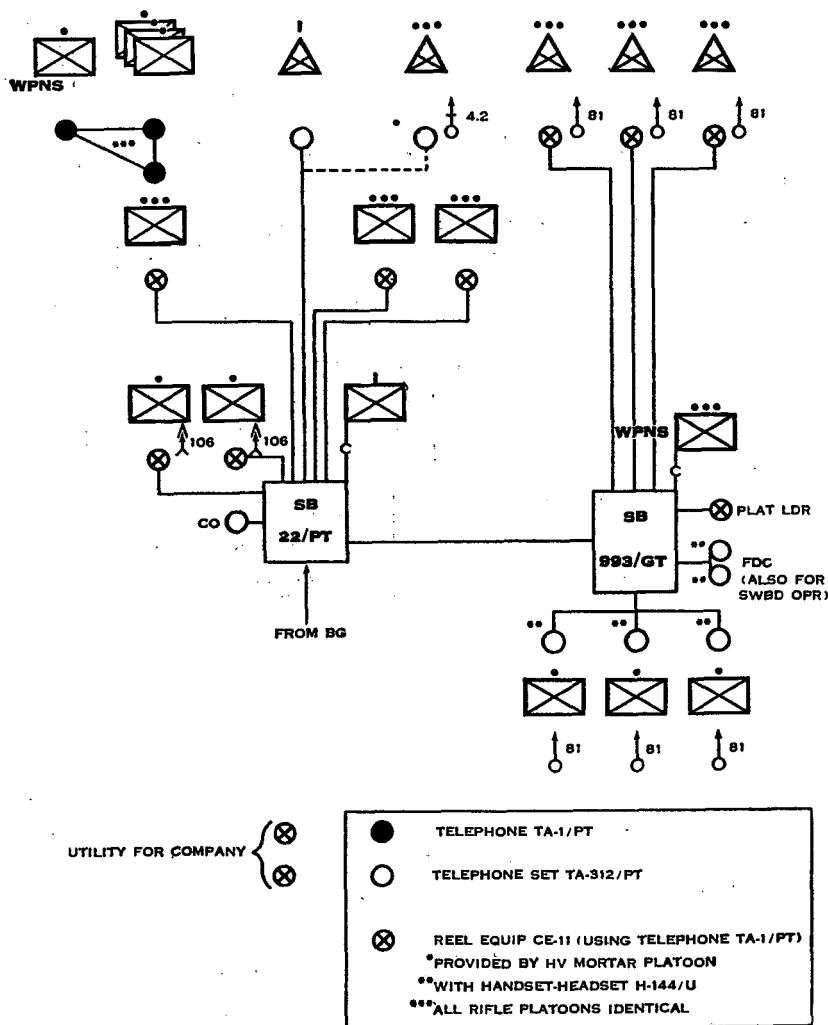


Figure 56. Type wire system, rifle company.

169. Communication During Defense Against Airborne Operations

All units must be prepared for defense against small airborne attacks, to include helicopterborne attacks. The battle group establishes warning stations at the more likely landing areas within its area of responsibility to provide information on which the battle group commander can base his decisions for the conduct of the defense. The warning stations are connected with the battle group command post by every practical means of communication. Wire may be buried a few inches underground to conceal it from enemy airborne troops.

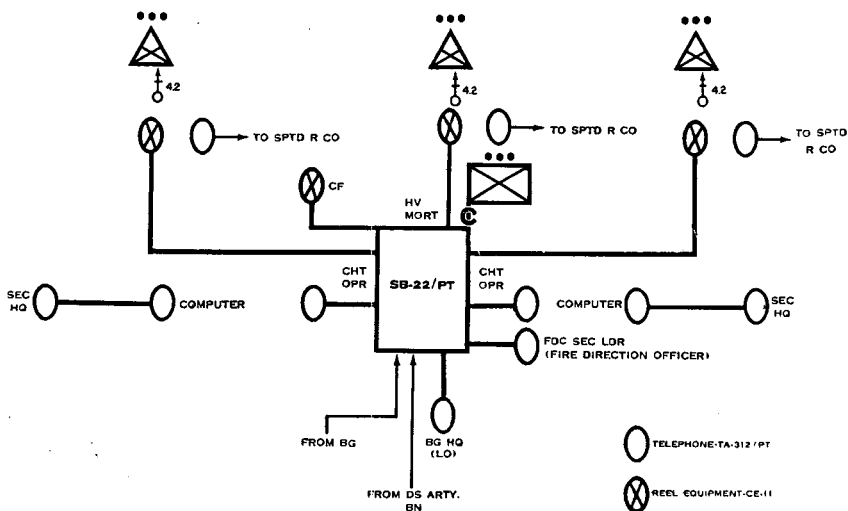


Figure 57. Type wire system, heavy mortar platoon (platoon position).

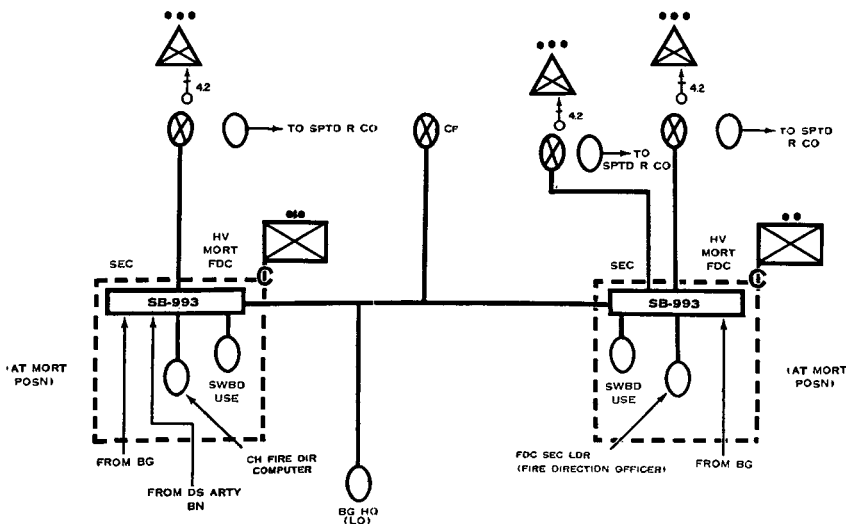


Figure 58. Type wire system, heavy mortar platoon (two-section positions).

Commercial wire lines may be used to supplement the military wire system. Bombing before the airborne attack may interrupt communication, so all communication personnel are continuously prepared to restore damaged circuits. Communication personnel not engaged in operating communication facilities provide a mobile pool for maintenance.

170. Communication During Antiguerilla Operations

The large area assigned to a division and the requirements for static and mobile security elements will usually require augmentation of organic communication means. Troop dispositions provide for an extensive system for area control to include local defense, roadblocks, and checkpoints. Radio is the least vulnerable to guerrilla disruption and is the most flexible. Communication personnel not engaged in operating communication facilities provide local defense of communication installations and provide a mobile pool for maintenance.

171. Communication During Reliefs

When a battle group relieves another unit, the communication officer, accompanied by key communication personnel, precedes the battle group to become familiar with the communication system in operation. The communication officer makes arrangements with the unit being relieved concerning equipment and wire to be left on the position. During reconnaissance, wire personnel familiarize themselves with all wire routes. The communication officer of the unit being relieved furnishes the incoming communication officer with a line-route map and circuit, traffic, and radio net diagrams. The incoming communication officer obtains as much information as possible about road conditions and routes for messengers. He evaluates conditions that may affect uninterrupted radio and wire communication. The relieving unit takes over the communication system when its commander assumes responsibility for the area. When secrecy is imperative, the relieving unit adopts all measures necessary to prevent the enemy from discovering any change in the tactical situation. These measures include continuing the use of the call signs, frequencies, codes, and ciphers of the unit being relieved.

Section VII. COMMUNICATION DURING RETROGRADE MOVEMENTS

172. Communication in Withdrawal From Action

a. General. Communication during withdrawal from action is characterized by detailed planning and close coordination. As many communication channels are maintained as the situation, available equipment, and restrictions imposed by higher headquarters permit. For general information on withdrawals from action, see FM 7-40.

b. During Daylight. If the battle group is forced to make a daylight withdrawal, communication personnel establish, operate, and maintain all available communication facilities. The circumstances which force a daylight withdrawal seldom permit detailed planning and preparation.

c. During Darkness. A night withdrawal is characterized by deliberate planning, reconnaissance, and execution. The tactical and communication plans are carefully coordinated. Plans are made to maintain communication in the old position as long as necessary and to provide communication during the movement to the rear and within the new battle position or battle group assembly area.

- (1) The communication officer reconnoiters the routes of withdrawal to determine what existing wire circuits can be used to provide communication to various assembly areas and march control points, and between the forward and rear positions. He also investigates the rear position for installing a communication system there as soon as practicable. The reconnaissance is conducted by day, and critical points are marked (or guides are posted) for easy identification at night.
- (2) Existing communication facilities and a minimum of communication personnel are left in the old position for the detachments left in contact. The battle group communication platoon leader remains to supervise communication. Unused wire lines are recovered or destroyed. Deceptive measures include the use of dummy radio stations to maintain normal radio activity in the old position.
- (3) Special messengers and existing wire are used extensively during the movement to the rear. Staff and liaison officers provide maximum control. Whenever possible, march control points are provided with communication by tapping telephones on wire circuits already established to the rear. Radio listening silence is maintained within units. If secrecy becomes unimportant, the higher commander directs the lifting of radio listening silence.
- (4) The majority of the communication platoon precedes the main body to the rear position to establish communication facilities. If the tactical plan is to renew the defense at the rear position, a complete defensive wire system is established there. The area support platoon leader has the new area surveyed for installing his facilities when the main body moves in. Radios in the rear position listen on assigned frequencies but remain silent until the battle group commander orders them into operation. If the withdrawal is to be followed by some other type of operation, only essential communication facilities are established within the battle group assembly area. Reconnaissance and plans for communication in the next operation are begun immediately.

173. Communication in a Delaying Action

The communication system for a delaying action is similar to that for an attack. Emphasis is on mobility. Maximum use is made of previously installed wire lines for the control of units during movement to the rear. As time permits, a wire system is installed at each successive position to include the companies and the heavy mortar platoon. Full use is made of visual means and messengers. Timely measures are taken to reconnoiter for and establish communication on successive delaying positions. New wire lines ordinarily are not laid between successive positions.

Section VIII. COMMUNICATION WITH ATTACHED AND SUPPORTING UNITS

174. Infantry-Tank Communication

a. Radio communication is provided between the infantry and tank elements of an infantry-tank team. This direct communication between all rifle units and individual tanks and tank units is desirable. The battle group can establish direct communication with the division tank battalion when required.

b. Tank crews and personnel outside the tanks have a wire communication through the external telephone on the rear of each tank. The handset is connected to the tank interphone system. Expedients may be used if additional wire communication with individual tanks is required.

c. The command posts of the tank units are included in the battle group wire system in defensive and static situations. The battle group uses the division area communication system for communication with the tank battalion when necessary.

175. Infantry-Artillery Communication

A direct support artillery battalion normally supports each battle group. It ties into the battle group command net. The artillery forward observers operate in the command net of the infantry company with which they are working and this provides a link between the forward observer and the company commander for coordination of fire support. The mortar platoon FDC operates in the artillery fire direction net to provide an additional link. This is supplemented by a wire system. In addition, direct communication with other division artillery units is provided through the division radio nets and the area communication system.

176. Infantry-Engineer Communication

All practical means are used to establish communication between the infantry battle group and supporting engineers.

a. When an engineer company from the division engineer battalion is attached to an infantry battle group, it monitors the battle group command net.

b. Wire communication is established between the engineer company and the supported infantry battle group. Other wire lines may be laid between elements of the engineer company and infantry units.

c. Liaison personnel designated by the engineer company commander operate between infantry and engineer units, as do messengers. For further details, see chapter 10.

177. Infantry-Transportation Communication

Units of the transportation battalion support the battle group on a mission basis as required. To give the battle group commander adequate communication for command and control, the attached transportation carrier companies are readily integrated into the battle group command net through organic vehicular radios. For further details, see chapter 16 .

CHAPTER 9

AIRBORNE DIVISION BATTLE GROUP

178. Organization

The airborne division battle group is composed of five airborne rifle companies, a mortar battery, and a headquarters and headquarters company (fig. 59). It is organized generally in the same manner as the infantry division battle group, the basic difference being that all elements are capable of delivery into combat by parachute. Communication personnel are basically the same in the two units.

179. General

Most of the communication difficulties for the airborne battle group occur during marshaling and immediately after the assault landings of the parachute and airlanded elements. Communication difficulties in the marshaling area stem from the integration of Air Force and ground force communication systems and the detailed control required in loading and dispatching units in the air movement. The difficulties in the initial assault phase stem from the problem of regaining command and control once the battle group has landed in the objective area.

180. Planning Communications for an Airborne Operation

As soon as the battle group is alerted for an airborne operation, it begins detailed planning. Its plans are based on and conform to the plans and/or directives of the next higher command. Information concerning the communication plan for the signal battalion (ch. 5) is generally applicable to the battle group.

a. Marshaling Phase. Communication plans for the marshaling phase include provision for communication support within the marshaling area from units other than those participating in the airborne operation, plans for the packaging and loading of the organic signal equipment for the assault, and plans for technical assistance by communication personnel to subordinate units.

b. Assault Phase. Communication plans for the assault phase include consideration of the communication equipment to be carried on individuals and the equipment to be dropped separately. Equipment which can be carried by the individual includes portable voice radios and batteries, field telephones, wire panels, and light-weight switchboards. Heavier general purpose equipment may be

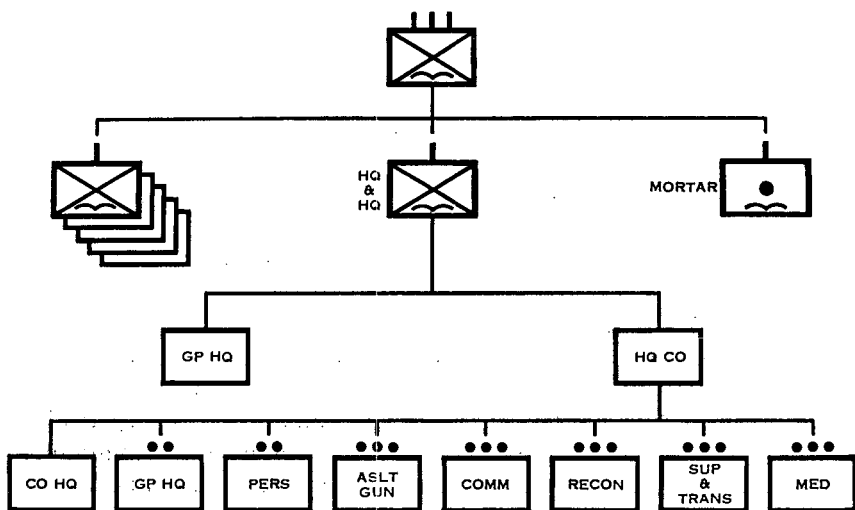


Figure 59. Organization of the airborne division battle group.

broken into component parts and carried by two or more men, or may be kept intact and parachuted into the assault area by heavy drop techniques. Communication personnel are assigned throughout the air serials. A radio operator assigned to a unit commander or to a staff officer should be in the same aircraft and near the officer. Communication vehicles to be airlanded are accompanied by the driver-operator of each vehicle. Communication vehicles to be included in a heavy drop are scheduled so they are in the same or later serial as the driver-operators. Communications plans should be flexible enough to assure continuous communications regardless of changes in tactical situation. The battle group signal officer works out details of resupply procedures for communication equipment with both the S4 and the support group. In airmobile operations he considers the probability that he will have to integrate widely separated units into a common communication system.

181. Marshaling Phase

The battle group maintains close liaison with the units providing communication during the marshaling phase. Communication personnel closely supervise the packaging and loading of the organic communication equipment of the entire battle group. Communication procedures in the marshaling area follow those outlined in chapter 5 for the airborne division signal battalion.

182. Air Movement Phase

See paragraph 75.

183. Assault Phase

a. Assembly. It is imperative that each element of the battle group quickly establish its communication facilities on landing to insure a rapid buildup of control. After landing, the signal officer joins the battle group commander and staff to acquaint himself with the tactical situation and to receive additional information and orders. This permits him to vary the use of the communication facilities at his disposal to meet the requirements of the situation. The communication chief is charged with reorganizing his platoon. The platoon, less radio operators, wire teams, messengers, and electronic devices personnel having special assignments, normally assembles with the battle group command post. The communication chief reports the status of his personnel and equipment to the signal officer as soon as possible. He directs the establishment of communications in accordance with the original communication plan until such time as the signal officer gives him additional information and orders. Other communication personnel assemble with their units and proceed to carry out their missions. Command posts are established immediately in their predetermined locations. If a preselected location cannot be used, a guide is sent there to direct personnel to the new location.

b. Initial Tactical Operation. During the initial tactical operation, radio is the principal means of communication. Radio nets are opened immediately after landing to facilitate control. Portable radios are habitually jumped on individual operators or commanders to expedite the opening of radio nets. Radio communication to the next higher headquarters is established as soon as practicable after that echelon arrives in the objective area. Communication with cooperating air and naval forces is initially provided by air control teams and naval gunfire spotting teams. Radio is supplemented by wire, messenger, and other means to a lesser degree. To facilitate the establishment of wire systems, consideration should be given to dropping wire teams and equipment with the rifle companies. The installation of the wire system is started as soon as the tactical situation indicates that this will be profitable.

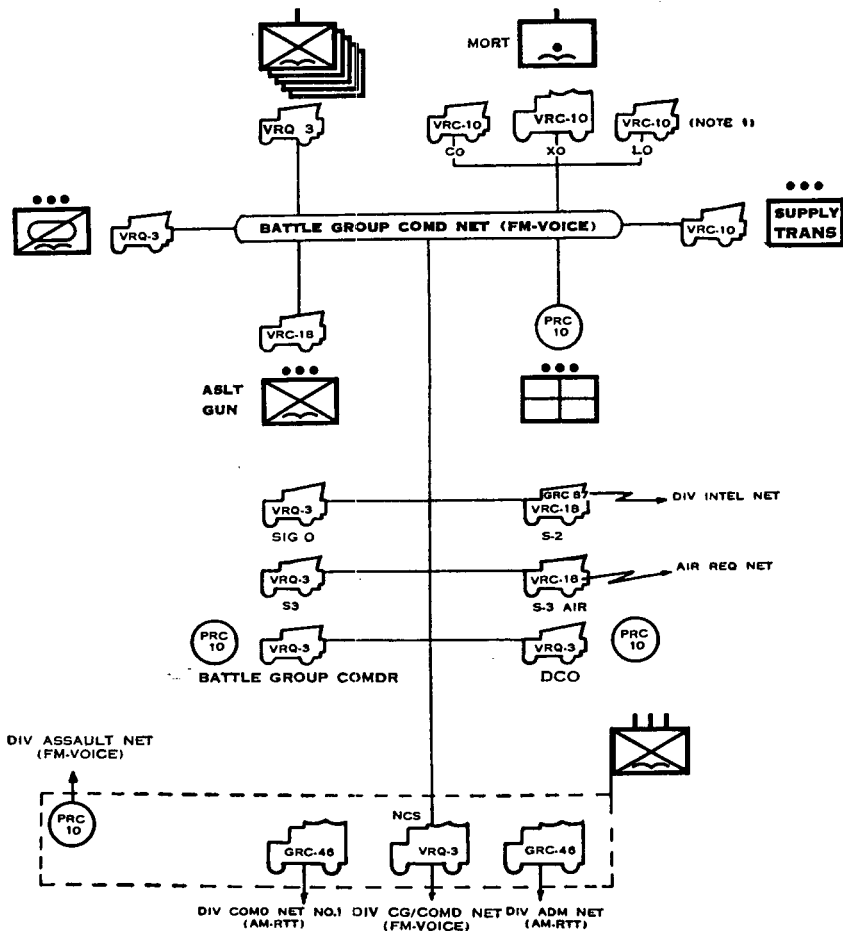
c. Radio Nets and Wire Systems. Figures 60 through 62 illustrate type radio nets, and figures 63 through 65 illustrate type wire systems for an airborne operation.

184. Subsequent Operations

Following the assault phase of an airborne operation, the airborne division battle group engages in further offensive or defensive action (par. 72). In any event, the communication plan must provide for continuous communication in support of the operation.

185. Linkup Operations

When a linkup operation is contemplated, communication plans for the linkup of airborne forces with advancing friendly ground forces are coordinated during the marshaling phase or as much in advance as possible. The plans must be detailed and effectively coordinated if the tactical plans are to succeed. A system of mutual recognition is established. Panel sets and pyrotechnics may be used for this purpose. Frequencies and call signs are exchanged to enable all elements to communicate directly with each other. The battle group and linkup force may exchange radios if organic equipment cannot be netted. The overall communication planning must be flexible enough to allow for drastic changes in the tactical plan without a break in communication. All communication personnel must be thoroughly



NOTE 1: THESE VEHICLES ALSO MOUNT THE RADIO SET AN/VRC-9

Figure 60. Type airborne battle group command net.

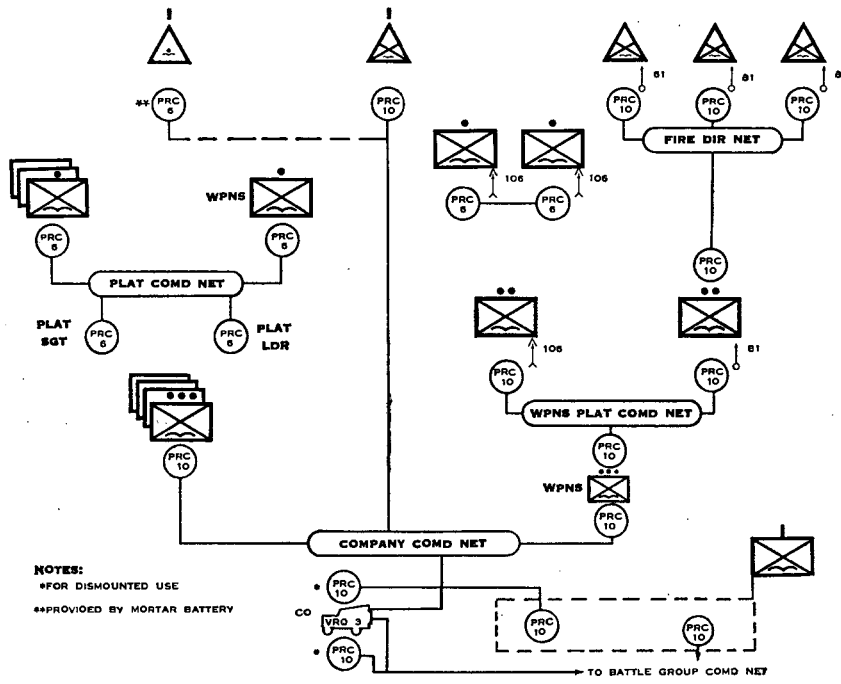


Figure 61. Type airborne rifle company radio nets.

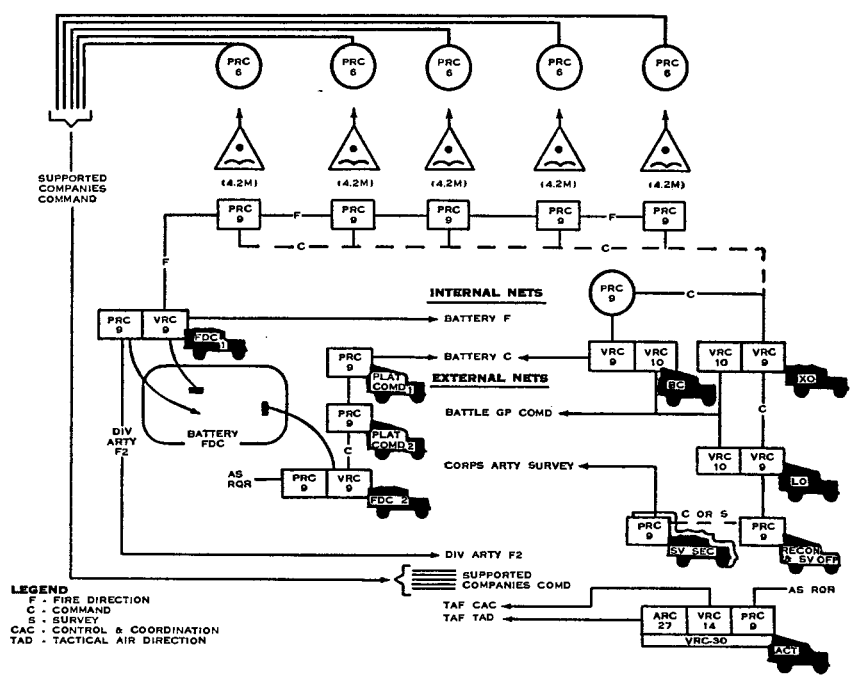


Figure 62. Type radio nets, mortar battery, airborne division battle group.

familiar with emergency procedures for reestablishing disrupted communication.

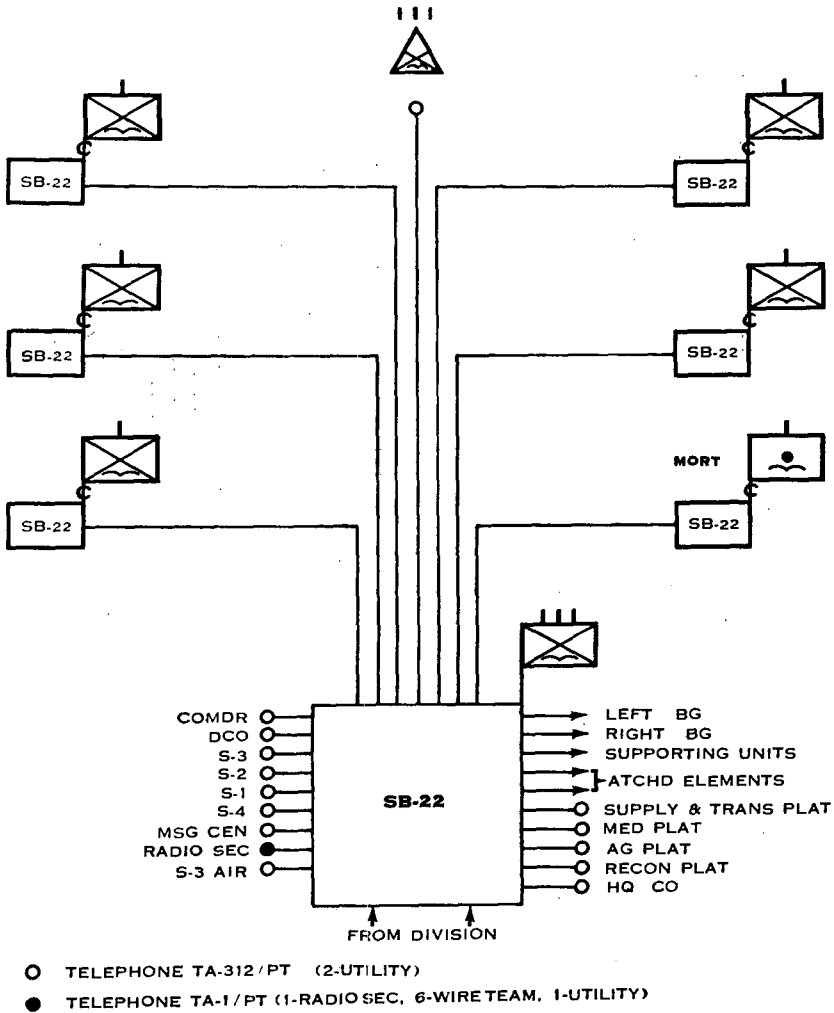


Figure 63. Type airborne battle group wire systems.

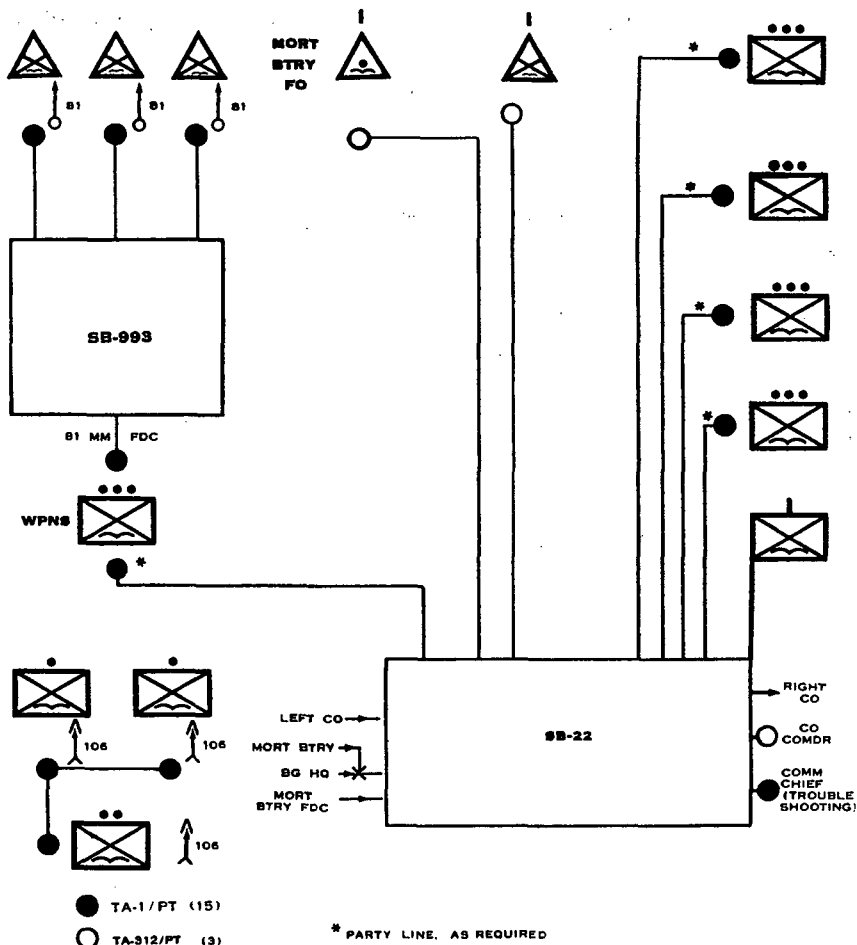


Figure 64. Type airborne rifle company wire system.

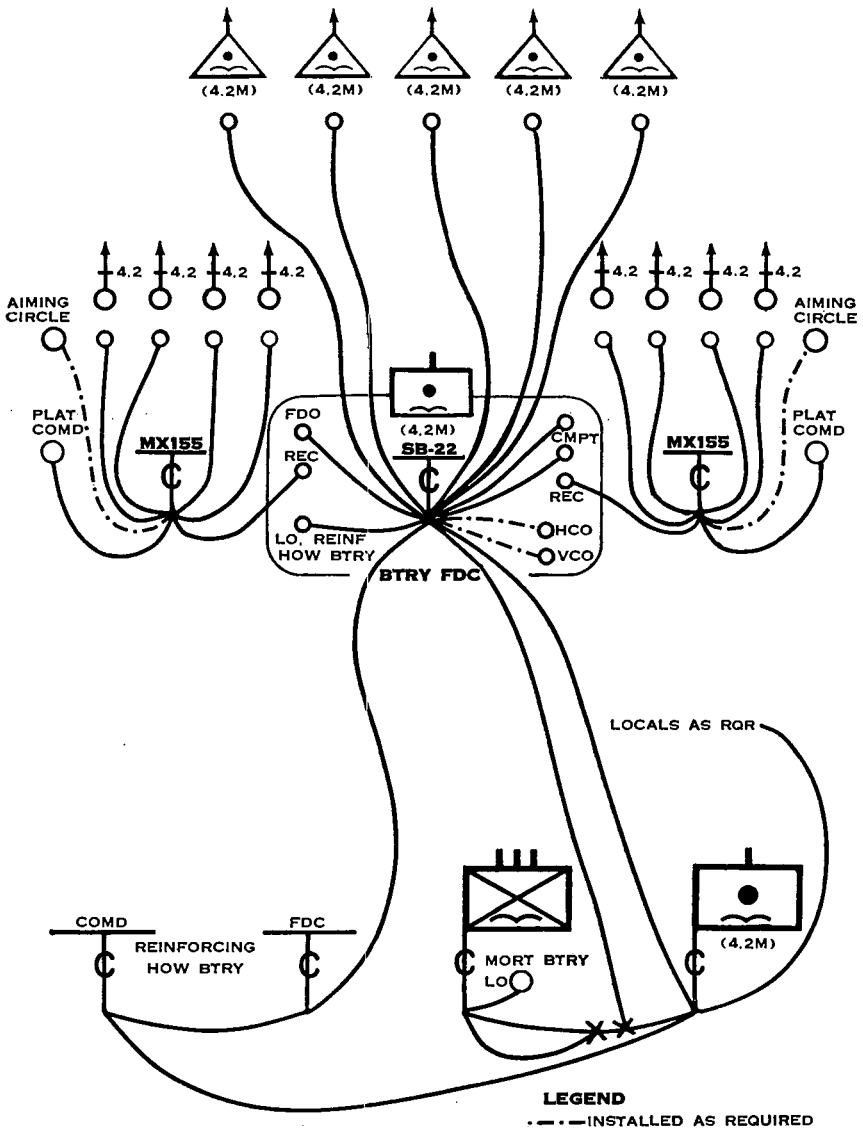


Figure 65. Type wire system, mortar battery, airborne division battle group.

CHAPTER 10

INFANTRY DIVISION ENGINEER BATTALION

Section I. GENERAL

186. Organization

a. The infantry division engineer battalion consists of a battalion headquarters, a headquarters company, and five identical engineer companies.

b. Headquarters and headquarters company includes a communication section directed by a communication chief. The section operates under the immediate supervision of the communication officer who is a member of the battalion special staff.

c. The communication section installs, operates, and maintains communication as required by battalion headquarters. This includes establishing and maintaining communication with subordinate units.

d. The engineer company headquarters TOE authorizes enough men to operate and maintain the company's equipment. In addition, it assigns a radio operator to each engineer platoon.

e. The radios assigned to the engineer squads, the sections of headquarters and headquarters company, and the combat engineer vehicles of the equipment platoon are operated by members of these units as additional duty.

187. Need for Communications

a. The command post of the infantry division engineer battalion usually is located in the vicinity of division headquarters. The various elements of the battalion are frequently separated from their parent unit by considerable distances, as when—

- (1) An engineer element is in support of a battle group.
- (2) An engineer platoon is in support of a task force or on a special mission at a considerable distance from company headquarters.
- (3) An engineer squad builds a bridge approach on the far shore of a river at some distance from the platoon.

b. The separation and tactical concept of dispersion present problems in establishing and maintaining communication between battalion elements. Good communication is essential for the prompt transmission of reconnaissance information, work progress reports, and data pertaining to personnel, supplies, and equipment.

188. Wire Communication

a. Wire communication is used whenever practical (fig. 66).

b. The establishment and maintenance of lines between senior and subordinate units normally are responsibilities of the senior unit. Nevertheless, to insure reliable communications, maintenance must be a joint effort, coordinated by the senior unit.

c. When distance or other factors prohibit direct wire linkage between the engineer battalion headquarters and subordinate elements, communication is established through the division area communication system. The battalion headquarters switchboard has a direct tieline from its switchboard to the division forward switchboard that services the battle group.

d. Units may use wire communication to control traffic through minefields, defiles, and construction projects, and to coordinate the operations of work parties.

189. Radio Communication

a. Wire communication is frequently difficult or impractical to establish in very fluid or dispersed combat situations. At such times and during periods of wire outage, radio and messenger are used. Radio is used to parallel and to supplement wire circuits. When conditions favor the use of wire, radio reverts to a backup role.

b. Type radio nets within the engineer battalion are shown in figures 67 and 68.

190. Messenger, Visual, and Sound Communication

Messenger, visual, and sound are used whenever the situation warrants. They may be especially valuable when radio listening silence is imperative before wire communication is established, and when temporarily disrupted.

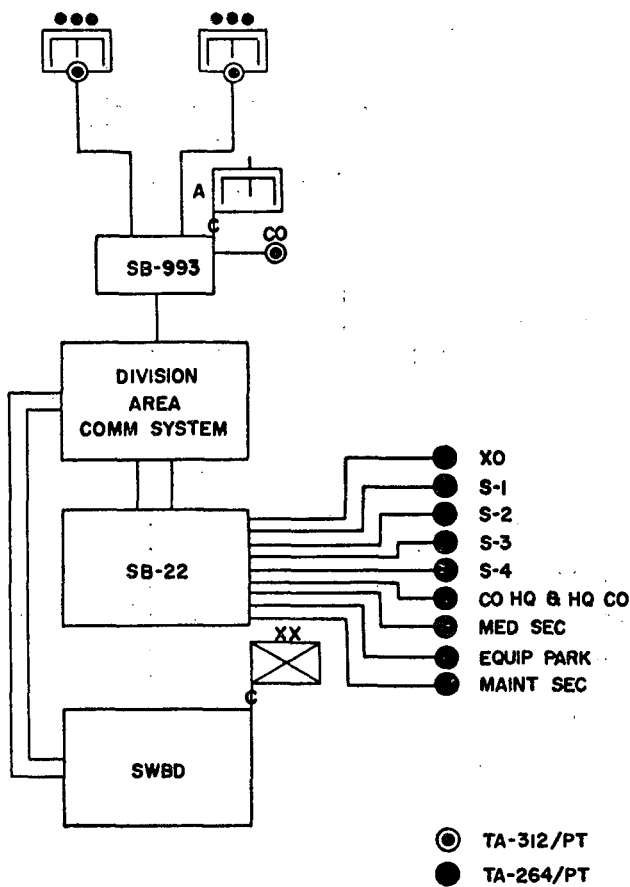
a. Messengers are not authorized in the engineer battalion TOE, but selected personnel such as vehicle operators are cross-trained as messengers as an additional duty. Normally, messengers make use of any available transportation (par. 36).

b. Panel sets are issued to each unit; other visual means may be improvised (par. 37).

c. Sound communication is used in accordance with current instructions (par. 38).

191. Communication With Supporting Engineer Units

A supporting engineer unit normally establishes and maintains communication with the supported infantry division engineer battalion. This communication is established through either the division or corps area communication system, depending on the location of unit headquarters. The supporting unit also operates in the engineer battalion



NOTES:

1. Co's B,C,D, and E, same as Co. A
2. Equipment on TOE and not shown above used for displacement and as otherwise required.
3. Telephone TA-1/PT used at work sites and from Hq and Hq Co to support platoons.
4. Line companies connected into Bn Swbd by use of area comm system facilities.

Figure 66. Type wire system, infantry division, engineer battalion.

command net which provides simultaneous contact with the division engineer and the engineer battalion.

Section II. TACTICAL APPLICATION OF COMMUNICATION

192. General

The communication system of the infantry division engineer battalion is flexible. Its composition depends primarily on the disposi-

tion and employment of the subordinate elements of the battalion. Different types of tactical operations have relatively little effect on the use of the communication means. However, signal equipment organic to the battalion may not always be adequate. In such cases, communication assistance is requested from the division signal battalion. Communication methods for various special operations are covered in chapter 18.

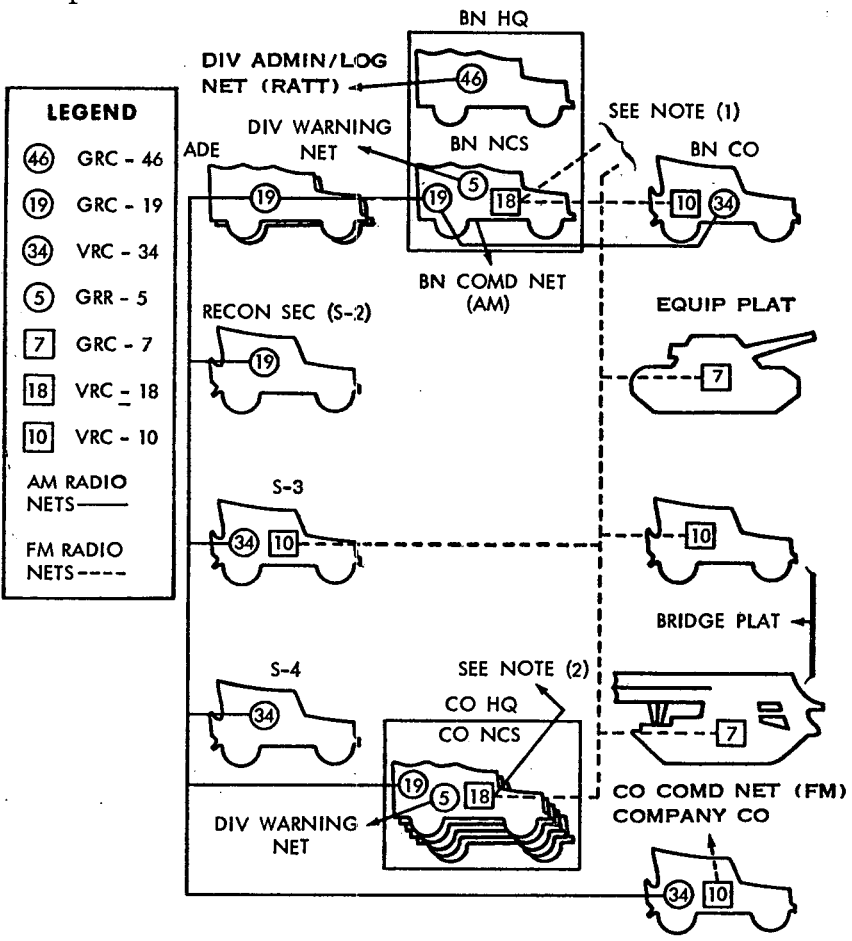
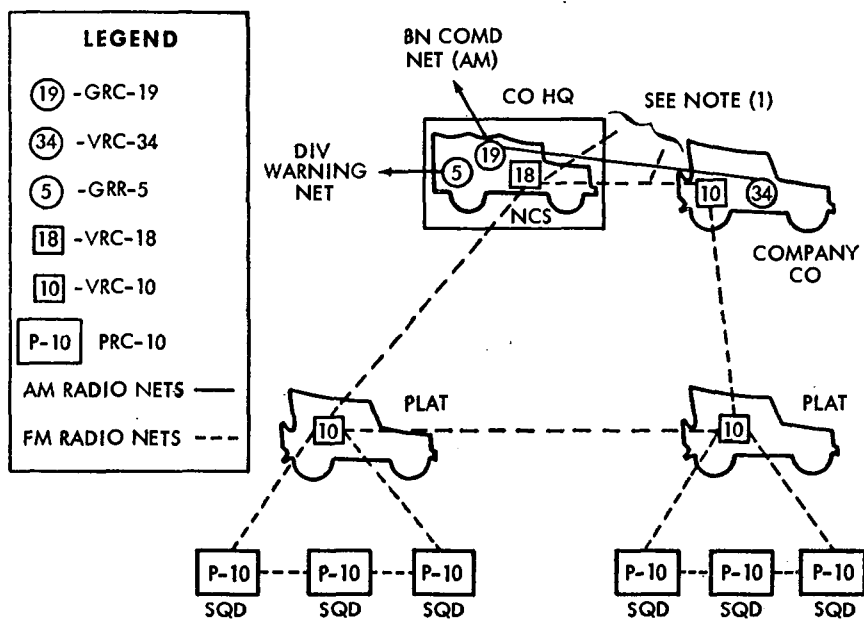


Figure 67. Type radio net within the infantry division, engineer battalion.

193. Communication in Concentration Area

The engineer battalion establishes only minimum essential com-



NOTE:

- (1) OPERATES IN COMPANY COMMAND NET (FM)
MONITORS BATTALION COMMAND NET (FM) OR SPT'D UNIT NET

Figure 68. Type radio net within the infantry division, engineer company.

munications in a concentration area. Maximum use is made of existing wire facilities.

194. Communication During Marches and Halts

a. Marches.

- (1) During tactical marches, reinforced engineer companies are normally attached to or in support of leading battle groups. The remainder of the engineer battalion marches with the division troops serial. Supported units maintain communication with supporting units. Division headquarters maintains communication with engineer battalion headquarters, and battalion headquarters maintains communication with the battalion units not attached in support missions.
- (2) Normally, communication is by radio unless radio listening silence is ordered. Motor and/or aircraft messengers may be employed to supplement or replace radio.

b. Halts. During brief halts, communication is maintained as during the march. During prolonged halts, wire lines may be laid, following the same channels used during the march.

195. Communication During Development

The requirements are similar to those outlined in paragraph 194.

It is essential to maintain close contact between supported and supporting units.

196. Communication During the Attack

a. During the attack, elements of the infantry division engineer battalion are assigned in support of battle groups.

b. Communication is established at engineer work sites for controlling traffic, disseminating work progress information, and requisitioning personnel, supplies, and equipment. Existing wire facilities and all other communication means are used during the attack.

197. Communication During Reorganization

Communication within the engineer battalion and between supporting and supported units during reorganization is of primary importance. Since the elements of the battalion occupy relatively stable positions, there are no special communication problems. Communication requirements and procedures are similar to those outlined for marches and halts in paragraph 194.

198. Communication During Pursuit

Requirements vary widely during the pursuit but are similar to those discussed in paragraphs 194 through 196.

199. Communication During Defense

Engineer missions include active support of forward units and general engineer work throughout the division area. Communication requirements include the maintenance of close contact between supported and supporting units, with division headquarters, and within the engineer battalion. Radio and wire facilities should be augmented by liaison personnel. A supporting engineer unit maintains contact as prescribed in paragraph 191.

200. Communication When Reorganized for Combat

When employed in infantry combat, the engineer battalion will reorganize the communication systems as shown in figure 48, type battle group command net, within the capabilities of equipment and personnel.

201. Communication During Retrograde Movements

The engineer battalion provides engineer support to the division in retrograde movements as in other types of combat tactics. Communication between supporting and supported units must be close and constant so the commander's plan may be carried out. All available means of communication are used. The extent of communication established at delaying positions varies with the length of time the position will be occupied.

CHAPTER 11

AIRBORNE DIVISION ENGINEER BATTALION

202. Organization

The airborne division engineer battalion consists of a headquarters and headquarters company and two identical airborne division engineer companies. It is organized and equipped to provide combat engineer support to the airborne division during airborne operations and subsequent sustained ground operations.

203. Comparison With Infantry Division Engineer Battalion

In comparison with the infantry division engineer battalion, the airborne division engineer battalion has fewer personnel in headquarters and headquarters company and three fewer engineer companies. Because of its reduced strength and lack of combat engineer vehicles, the airborne division engineer battalion has few communication personnel and less communication equipment than the infantry division engineer battalion. The principal difference between the two types of engineer battalions is in the method of transportation to the tactical site. Once the airborne division engineer battalion has landed and assembled in the objective area or has been committed in ground combat, its operations are similar to those of the infantry division engineer battalion.

204. Tactical Application of Communication

The special conditions peculiar to airborne operations discussed in chapters 5 and 9 apply to the airborne division engineer battalion. On landing, all units use their signal equipment to facilitate assembly. The tactical use of communication facilities after units have assembled is similar to that discussed in chapter 10. Figures 69 through 74 show typical communication nets within the airborne division engineer battalion.

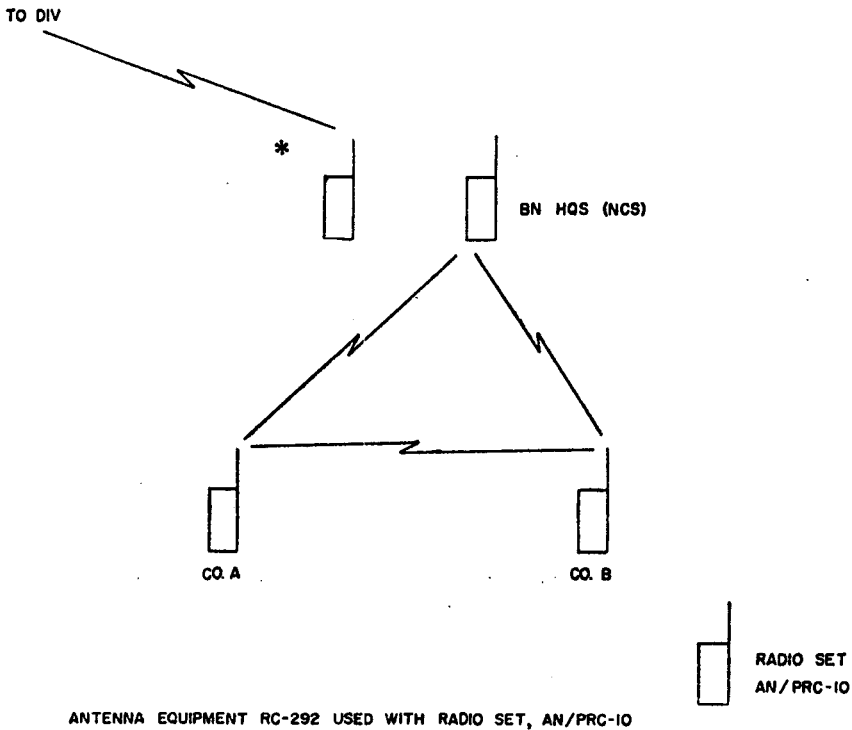


Figure 69. Type airborne division engineer battalion assault radio net.

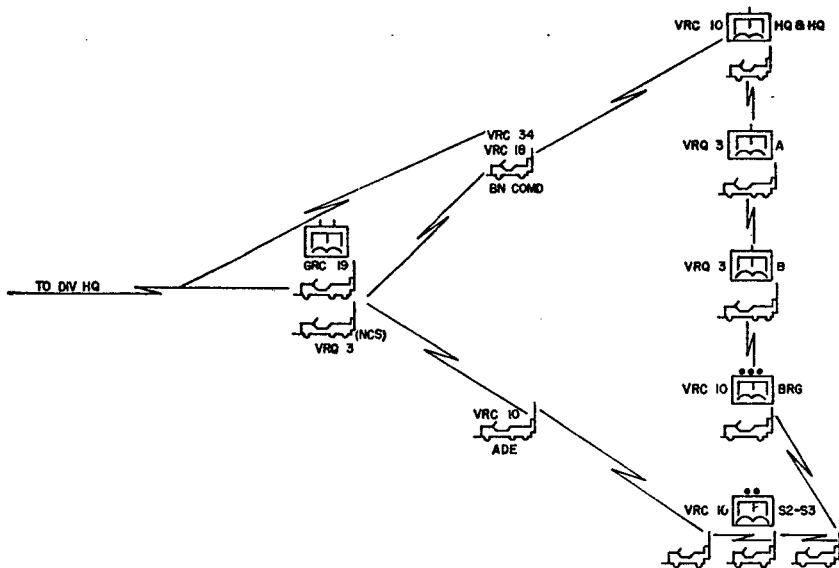


Figure 70. Type radio net, airborne division engineer battalion.

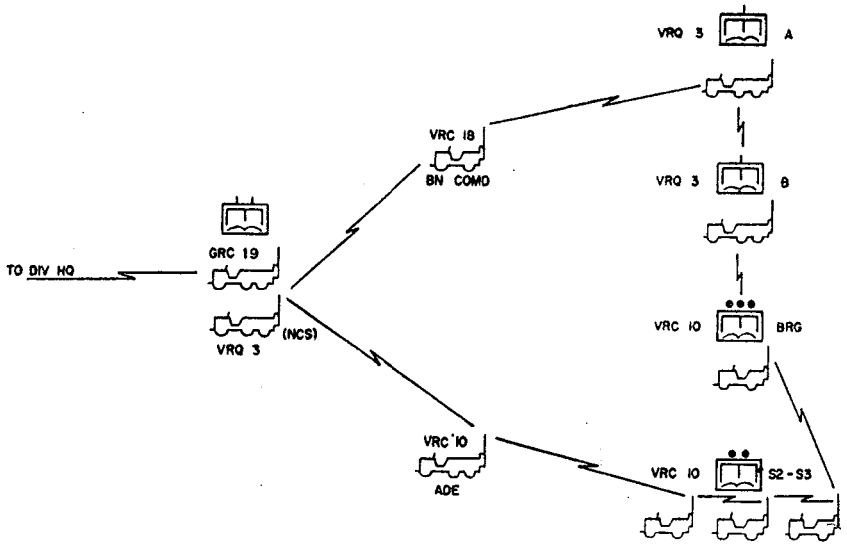


Figure 71. Type radio net, engineer company, airborne division engineer battalion.

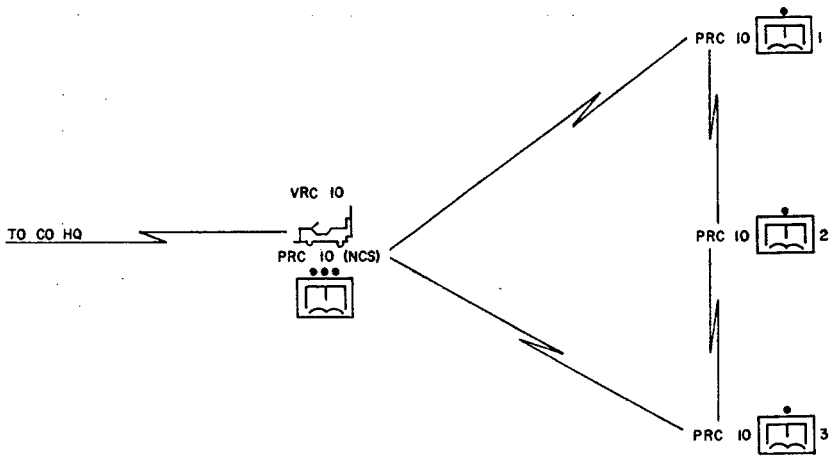


Figure 72. Type radio net, engineer platoon, airborne division engineer battalion.

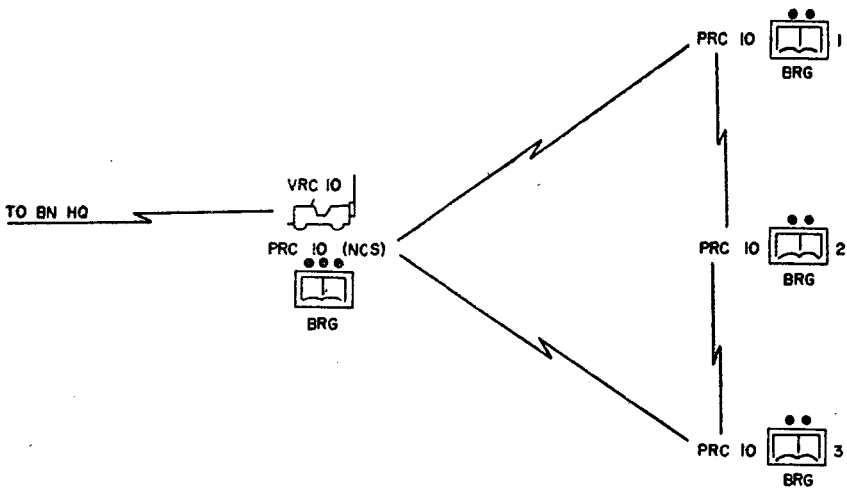


Figure 73. Type radio net, bridge platoon, airborne division engineer battalion.

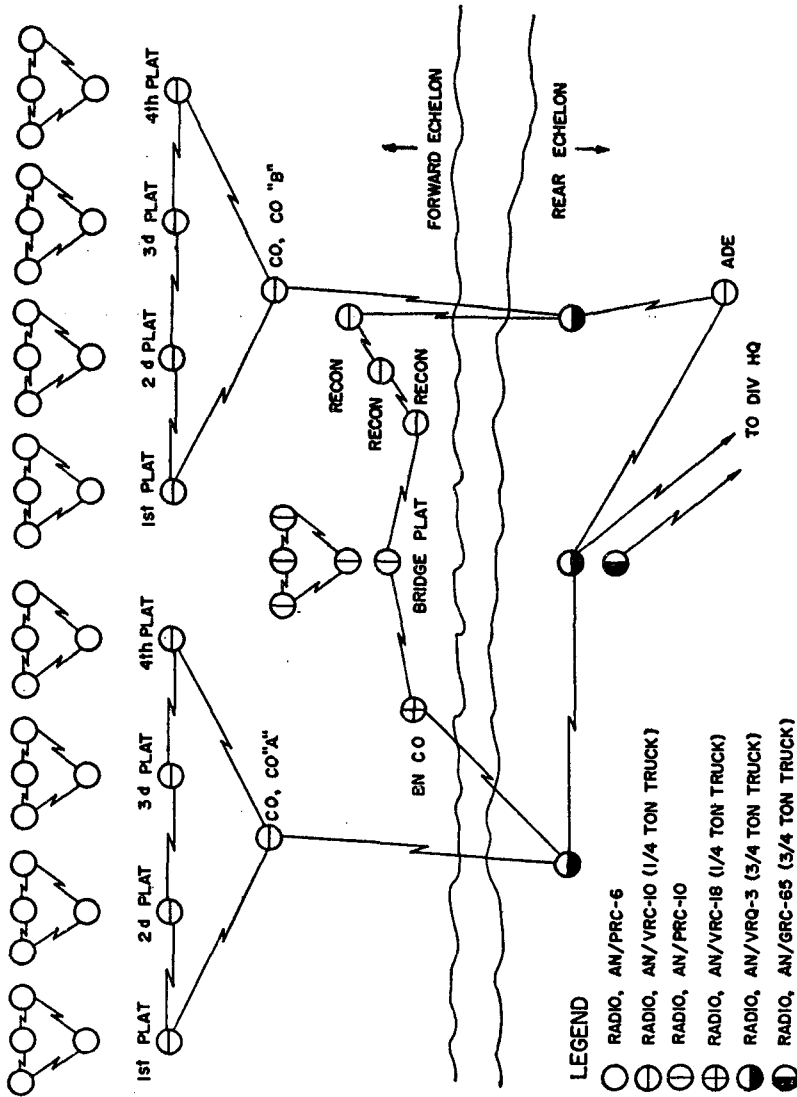


Figure 74. Type radio net for airborne division engineer battalion when reorganized for combat.

CHAPTER 12

INFANTRY DIVISION CAVALRY SQUADRON

Section I. GENERAL

205. Organization

The armored cavalry unit organic to the infantry division is the infantry division squadron (fig. 75). Organization charts of the squadron's headquarters and headquarters troop and one of its armored cavalry troops are shown in figures 76 and 77.

206. Mission and Capabilities

The mission of the squadron is to perform reconnaissance and provide security for the unit to which it is assigned or attached; and to engage in offensive, defensive, and delaying actions as an economy of force unit. Its capabilities include—

- a.* Providing security and performing reconnaissance for the infantry division.
- b.* Executing combat missions as an economy of force unit.
- c.* Operating over wide areas and at extended distances from other units.
- d.* Operating as an armored task force when suitably reinforced.
- e.* Changing direction rapidly and assuming new missions.

207. Communication Personnel

The squadron communication platoon, commanded by the squadron communication officer, contains 20 men. Communication personnel are also assigned to the squadron headquarters section and the support platoon headquarters to operate section radios. The communication officer also serves as a staff officer, in which capacity he advises the commander and staff on signal matters. Each armored cavalry troop is authorized a communication chief, two radio mechanics, and two intermediate speed radio operators.

208. Radio Communication

Radio is the primary means of communication. It provides the commander and his subordinates with the best means of communication for command, control of fire support, and contact with higher headquarters.

- a.* The hub of radio communication in the cavalry squadron is the squadron command post which maintains communication with higher,

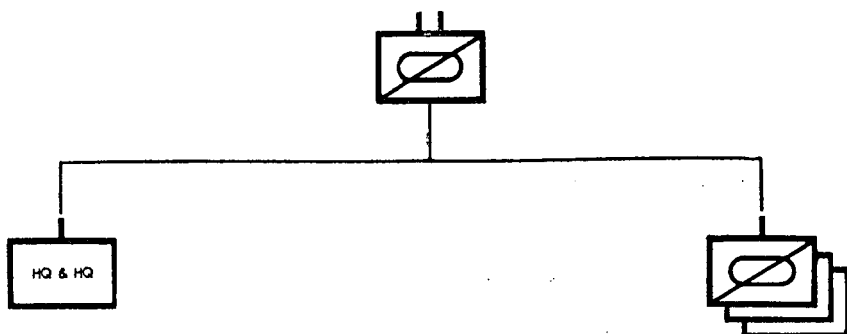


Figure 75. Organization of infantry division cavalry squadron.

adjacent, attached, supporting, and subordinate units. Staff officers and sections are equipped with vehicle-mounted medium-powered radio sets. The radio nets in which this equipment is operated and the specific staff officer or section concerned are as follows:

- (1) *Squadron command net, FM.* This net links the squadron commander, fire support representatives, the staff, and troop commanders. The squadron commander uses it to command and control the troops and attached units. A portion of the FM radio equipment mounted in the operations armored personnel carrier is the net control station.
- (2) *Squadron command net, AM.* This net provides a long-range communication link between the command post and the troops. It is particularly well suited for transmitting detailed messages. AM radio equipment mounted in the operations armored personnel carrier is the net control station.
- (3) *Squadron logistical net, FM.* This net provides the S1 and S4 with voice communication links for administrative and logistical traffic within the squadron and between the squadron and the troops. Attached or supporting units operate in the net as required. FM radio equipment mounted in the S1-S4 armored personnel carrier is the net control station.
- (4) *Division CG/command net, FM.* A portion of the FM radio equipment mounted in the operations armored personnel carrier is operated in the division FM command net to provide an FM link between the squadron command post and division.
- (5) *Division command/operations net, RATT.* A station at the squadron command post operates in this net. It provides long-range communication between division and squadron headquarters.
- (6) *Division intelligence net, RATT.* The intelligence officer uses this net for reporting and receiving intelligence infor-

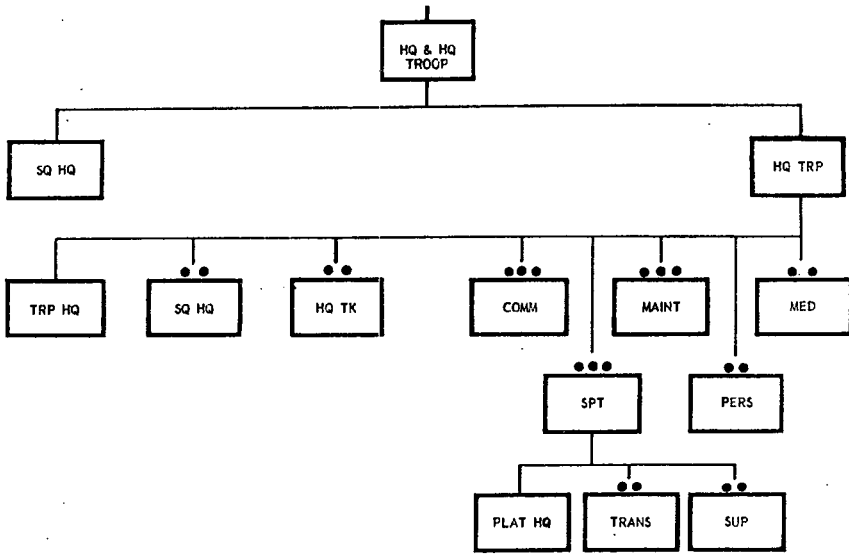


Figure 76. Organization of headquarters and headquarters troop, infantry division cavalry squadron.

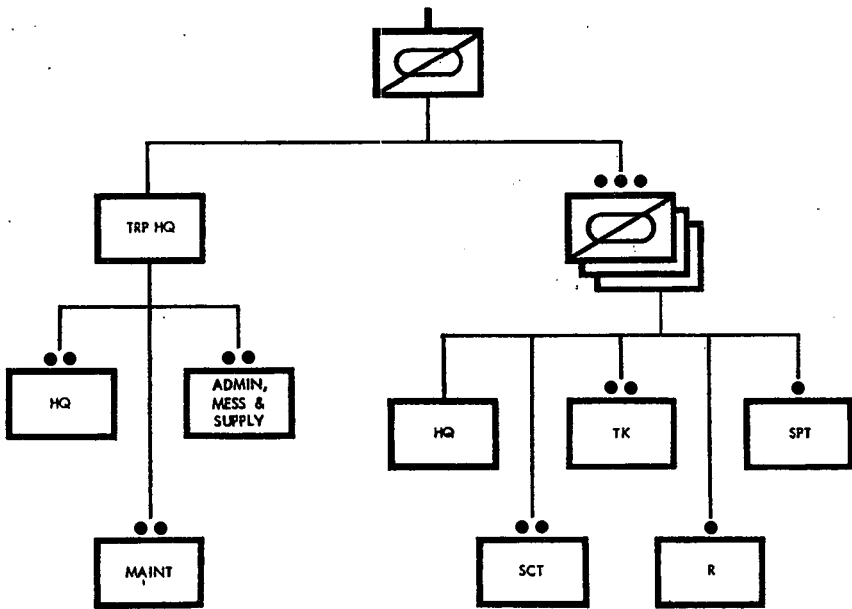


Figure 77. Organization of an armored cavalry troop, infantry division cavalry squadron.

mation. The radioteletypewriter equipment is mounted in his armored personnel carrier and is operated in the division intelligence net.

- (7) *Division air request net, AM.* AM equipment mounted in the S3 Air's armored personnel carrier is operated in this net for requesting tactical air support. An AM radio receiving set mounted in this vehicle is operated in the division warning broadcast net, AM. The vehicle is also equipped with a UHF air-to-ground radio and a mounted FM radio set which may be operated in conjunction with each other by retransmission. This permits a forward air controller with the squadron to communicate with tactical aircraft with any FM radio in the squadron.
- (8) *Division administrative/logistical net, RATT.* RATT equipment mounted in the S1-S4 armored personnel carrier is operated in this net to provide long-range communication between division and the squadron headquarters.

b. The squadron commander may form a command group to operate forward of the command post. Such a group, consisting of the squadron commander, the squadron operations officer, and artillery liaison officer, a forward air controller, and such other staff officers as desired by the squadron commander, is considered a subdivision of the command post. The command group enables the squadron commander to more closely supervise combat operations, make timely decisions, and change plans. The command group remains highly mobile and well forward during operations. It must maintain continuous communication with subordinate units and the command post to insure rapid transmission of new developments in the situation, new or supplementary orders from higher headquarters, and other pertinent information or directives. The squadron commander and operations officer have vehicle-mounted medium-powered radio equipment that permits them to operate in the squadron and division FM command nets. The forward air controller has radio equipment he can operate in the squadron FM command net and a UHF radio in the tactical air direction net to communicate with tactical aircraft.

c. Typical radio net diagrams for the squadron and one of its armored cavalry troops are shown in figures 78 and 79.

209. Wire Communication

Wire is a supplementary means of communication in the squadron. It is used when radios are on listening silence, in defensive or stabilized operations, and in assembly areas. The wire system is installed and operated by the squadron communication platoon. Wire lines are laid to key staff personnel, each organic troop, and attached units. Wire lines from supporting units are integrated into the system. Lateral wire lines are laid to adjacent units whenever possible to increase the capability and flexibility of the system. A wire team from the division signal battalion lays wire lines from the division main

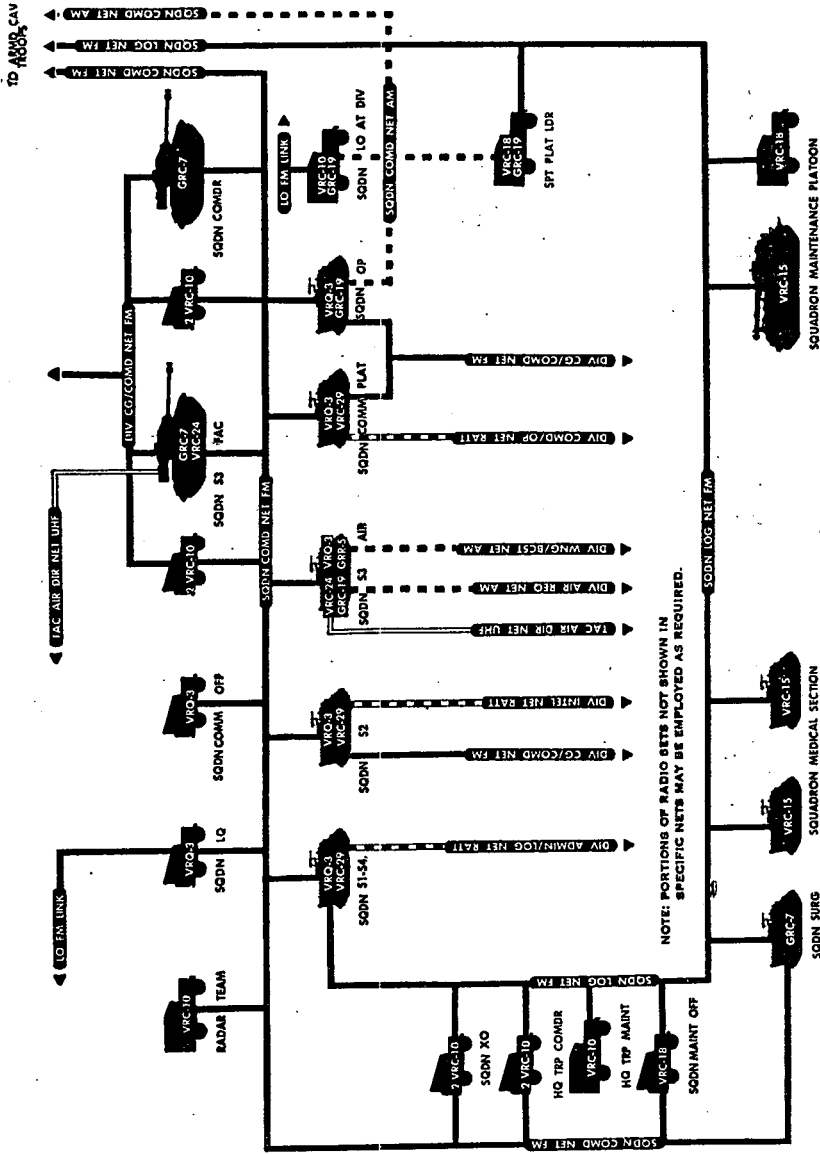


Figure 78. Type radio net, headquarters and headquarters troop, infantry division cavalry squadron.

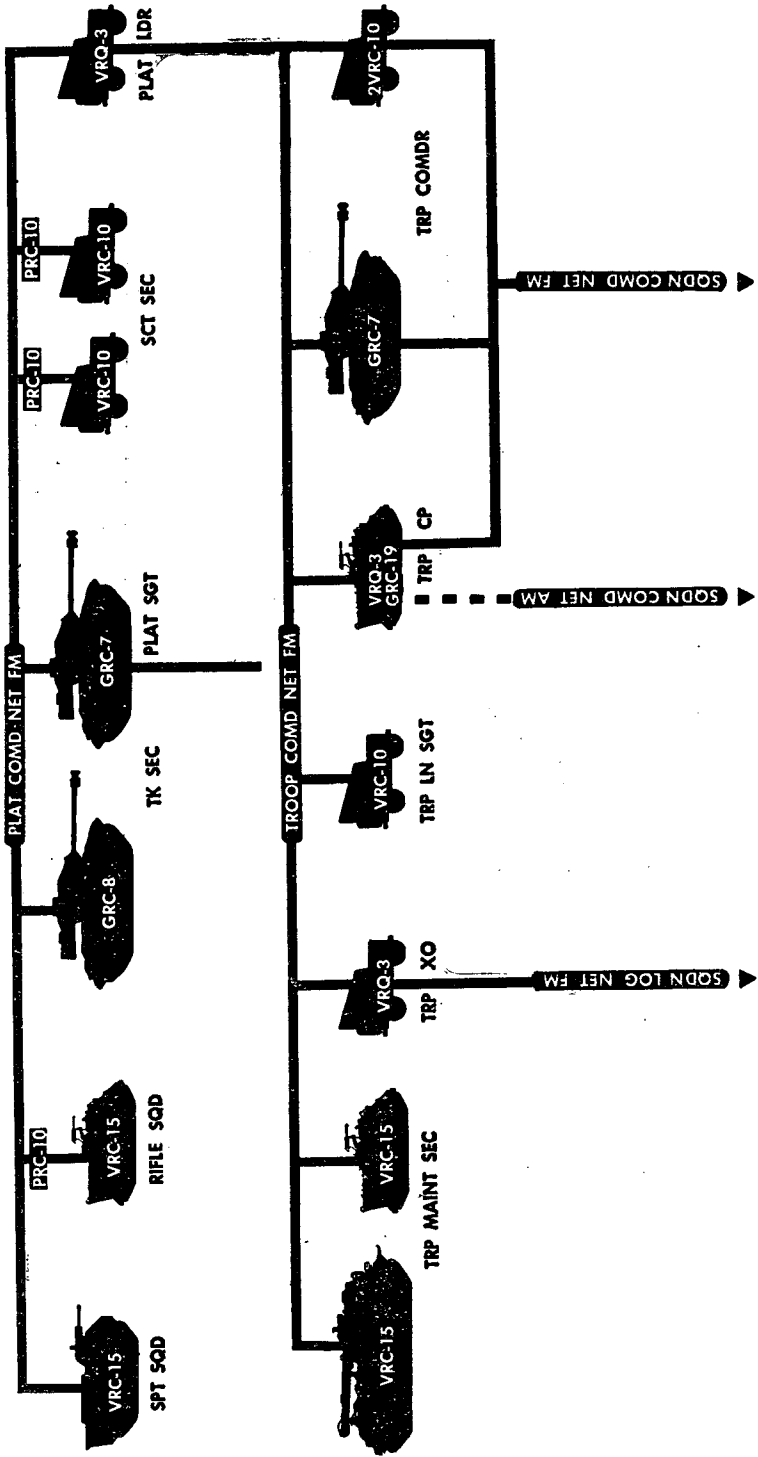


Figure 79. Type radio net, armored cavalry troop, infantry division cavalry squadron.

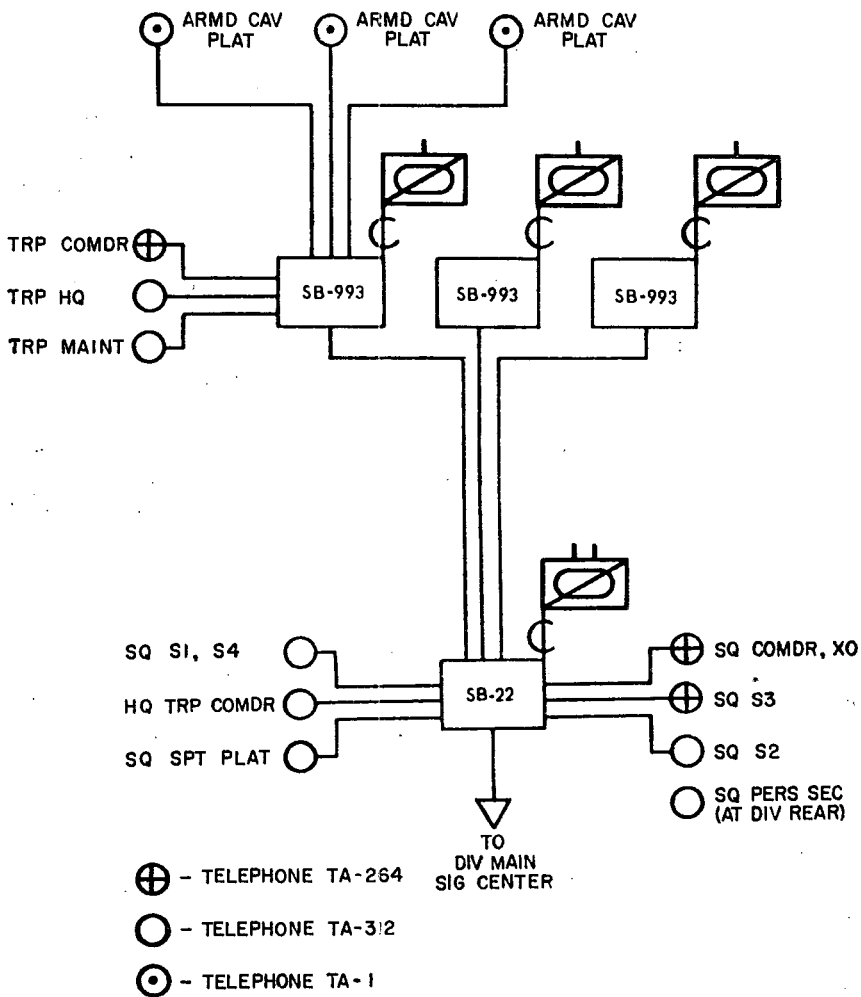


Figure 80. Type wire system, infantry division cavalry squadron.

command post to the squadron command post. Figure 80 shows a typical wire system diagram for the squadron.

210. Messenger Communication

Motor messengers are used to provide messenger service to subordinate elements of the squadron. They are normally controlled by the message center except during marches, when they are decentralized to the squadron staff sections. Division headquarters normally operates special and scheduled messenger service to the squadron.

211. Sound and Visual Communication

The squadron uses sound and visual communication to the maximum. Identification panels are used to identify vehicles and ground posi-

tions to friendly aircraft. Prearranged meanings are assigned in the SOI extract for use of pyrotechnics, light, flag, and sound signals. Generally, these are used to direct the movement of small elements and for identification. Visual signals should, whenever possible, be screened from enemy observation. Sound signals are used chiefly to spread alarm, attract attention, and transmit short messages of prearranged meaning.

Section II. TACTICAL APPLICATION OF COMMUNICATION

212. Planning

The success of communication in the squadron depends on timely and adequate planning. Communication personnel are kept informed of plans for current and proposed operations. The squadron communication officer joins the commander in formulating the overall plan for each operation. Communication details are coordinated with higher, subordinate, attached, supporting, and adjacent units. Planning is continuous and must be flexible to meet changing situations.

213. Communication on Motor Marches

Radio and mounted messengers are the principle means of communication used during motor marches. Visual communication is also used extensively. When radio is employed, security measures must be considered.

214. Communication in Assembly and Bivouac Areas

Radio communication is kept to a minimum in assembly and bivouac areas. Unit SOP's, SSI, and the signal portion of operation orders prescribe its use. Visual, sound, and messenger communication are used to the fullest extent. The use of wire depends on the time available to install. Signal orders, SOI extracts, and prearranged signals are prepared in the assembly area and disseminated to all units concerned. All commanders, staff officers, and key personnel must be informed of the signal plan for impending operations.

215. Communication During Offensive Operations

Radio is used to the maximum; wire communication is limited. Messenger, visual, and sound are used as supplementary means. Communication security is of paramount importance; the decision to use clear text depends on the urgency of the message, the tactical situation, and enemy reaction time. Communication must be closely coordinated for all offensive operations. This is especially important in a passage of lines. The maximum use of radio facilities is necessary in exploitation and pursuit because of the extended dis-

tances of operation. Captured military and civilian wire circuits should be used when available.

216. Communication During Defensive Operations

The extent of the communication system established for a defensive operation depends on the time available. Wire may be used extensively; radio nets remain open. Supplementary means of communication are used extensively for security reasons and to thwart enemy interference. In a delaying defense, communication operations are like those used in the attack because of the distances separating the engaged units. Wire is used within the headquarters area and frequently between strong points. Prior to enemy contact, the use of radio is restricted and communication is largely by messenger or other means. Alternate and lateral wire lines are laid between units or groups as time permits. Wire lines to reserve and blocking positions should be integrated into the existing communication system.

217. Communication During Retrograde Movements

The type of communication depends on the type of retrograde movement. Although radio is the primary means during such movements, in a withdrawal from action it is normal to maintain listening silence and depend on other means of communication for contact with elements left on the position. In delaying actions and retirement, all available means of communication are utilized. Detailed planning and coordination are required. See FM 17-70 for a more thorough coverage of communication during retrograde movements.

CHAPTER 13

INFANTRY DIVISION ARMOR BATTALION

Section I. GENERAL

218. Organization

One armor battalion is organic to the infantry division. It is both an administrative and a tactical unit with supply, medical, and maintenance facilities. Its organization is shown in figure 81. The

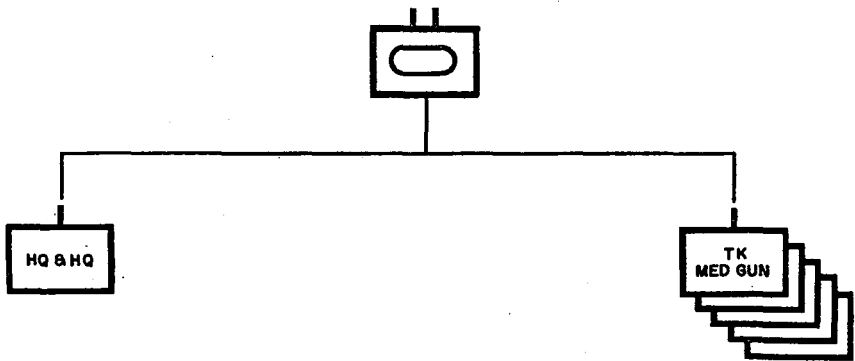


Figure 81. Organization of infantry division, armor battalion.

organization of its headquarters and headquarters company and one of its tank companies are shown in figures 82 and 83 respectively.

219. Mission and Capabilities

The mission of the armor battalion is to close with and destroy enemy forces, using firepower, maneuver, and shock action in coordination with other arms. The unit has the capability of—

- a. Attacking or counterattacking under hostile fire.
- b. Destroying enemy armor by firepower.
- c. Supporting infantry units by firepower, maneuver, and shock action.
- d. Exploiting after breakthrough with high cross-country mobility.
- e. Exploiting rapidly the effects of nuclear weapons.
- f. Conducting a retrograde operation when reinforced.
- g. Participating in the defense.

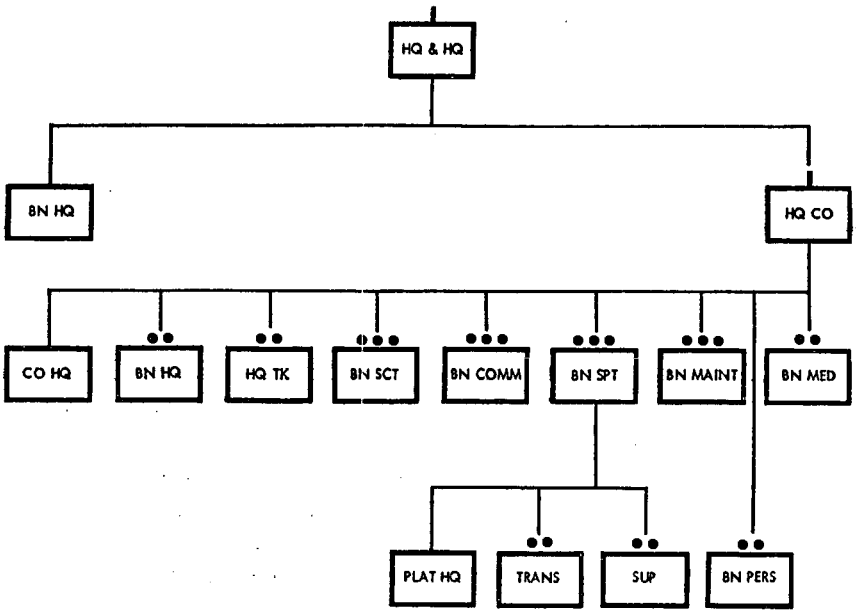


Figure 82. Organization of headquarters and headquarters company, infantry division armor battalion.

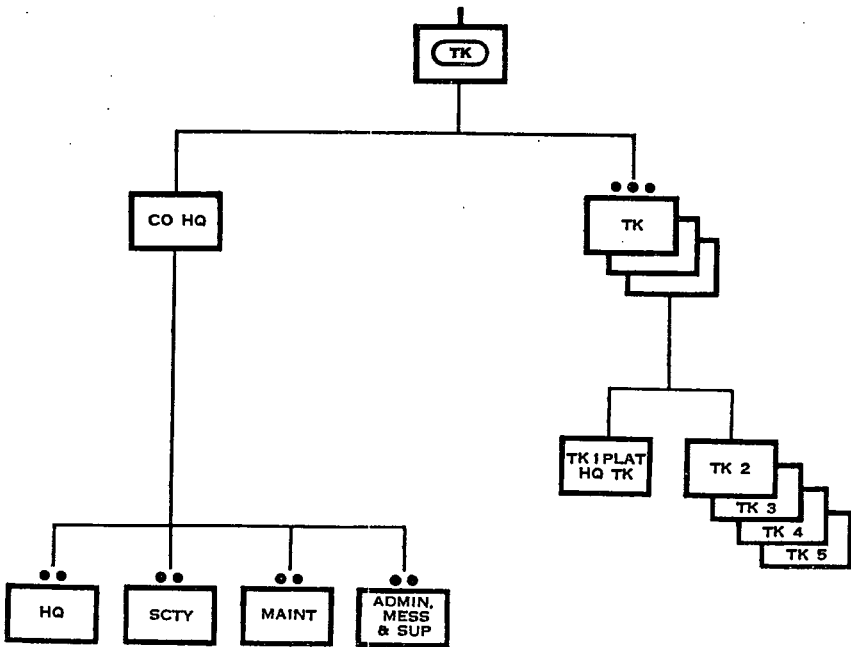


Figure 83. Organization of tank company, infantry division armor battalion.

220. Communication Personnel

The battalion communication platoon, commanded by the battalion communication officer, contains a total of 13 personnel. Three radar operators are assigned to the battalion scout platoon. A radio mechanic is authorized for each tank company. The communication officer serves also as a staff officer. He advises the commander and staff on signal matters.

221. Radio Communication

Radio is the armor battalion's primary means of communication. It is supplemented by wire, messenger, visual, and sound.

a. The battalion command post is the nerve center of radio communication. It maintains communication with higher, adjacent, attached, supporting, and subordinate units.

b. Radio equipment organic to the battalion includes medium-power AM (voice, RATT, and CW) sets and medium- and low-power FM vehicle-mounted and portable sets. FM radio equipment is operated in the infantry band (38.0–54.9 mc) and the common band (47.0–58.4 mc).

c. The armor battalion operates the following radio nets:

- (1) *Battalion command net, FM.* This net links the battalion commander, his staff, subordinate commanders, fire support representatives, and commanders of attached units. The battalion commander uses it to command and control the companies and attached units. The FM radio facility in the operations command post vehicle is the net control station.
- (2) *Battalion logistical net, FM.* This net links the battalion executive officer and supply officer with the support platoon leader, transportation section, battalion maintenance platoon, battalion maintenance officer, headquarters company commander, and the company executive officers. This net is used for transmitting administrative and logistical traffic. The FM radio facility in the S1–S4 vehicle is the net control station.
- (3) *Scout platoon command net, FM.* This net enables the scout platoon leader to command and control his platoon by radio. The platoon is authorized portable radio sets for operation in this net when dismounted.

d. The armor battalion operates in the following nets of higher headquarters:

- (1) *Division OG/command net, FM.* The battalion commander, the operations officer and his section, and the battalion liaison officer at division normally operate in this net.
- (2) *Division command/operations net, RATT.* A station at the battalion command post operates in this net. It provides

long-range communication between division and the battalion headquarters.

- (3) *Division air request net, AM.* The battalion S3 Air operates a station in this net to request tactical air support. His radio equipment is identical to that of the cavalry squadron S3 Air (par. 208a(5)).
- (4) *Division administrative/logistical net, RATT.* RATT equipment mounted in the S1-S4 armored personnel carrier is operated in this net to provide long-range communication between division and the battalion headquarters.
- (5) *Division warning/broadcast net, AM.* A receiving set mounted in the S3 Air's vehicle is operated in this net.
- (6) *Tactical air direction net, UHF.* This net provides a forward air controller with a direct link to tactical aircraft. The S3 Air monitors the net to receive spot reports from tactical air.

e. The battalion commander may form a command group to operate forward of the command post. Its composition and purpose are identical to those of the cavalry squadron commander's command group (par. 208b).

f. Typical radio nets for the armor battalion and one of its tank companies are shown in figures 84 and 85.

222. Wire Communication

The battalion wire system is installed and operated by the battalion communication platoon. It is normally used during periods of radio listening silence, in defensive and stabilized operations, and in assembly areas. Wire lines are laid to each organic and attached company and to adjacent units. Local lines are installed to the staff sections as required. Lines from supporting units are integrated into the system. A wire team from the division signal battalion lays wire to the battalion headquarters. Figure 86 shows a typical wire system for the battalion.

223. Messenger Communication

Messengers are the most secure means of communication in the battalion. They are used especially for transmitting maps, photographs, and other bulky documents. They are the most expeditious means for transmitting long messages over short distances. Division headquarters normally operates a special and scheduled messenger service to the battalion.

224. Sound and Visual Communication

See paragraph 211.

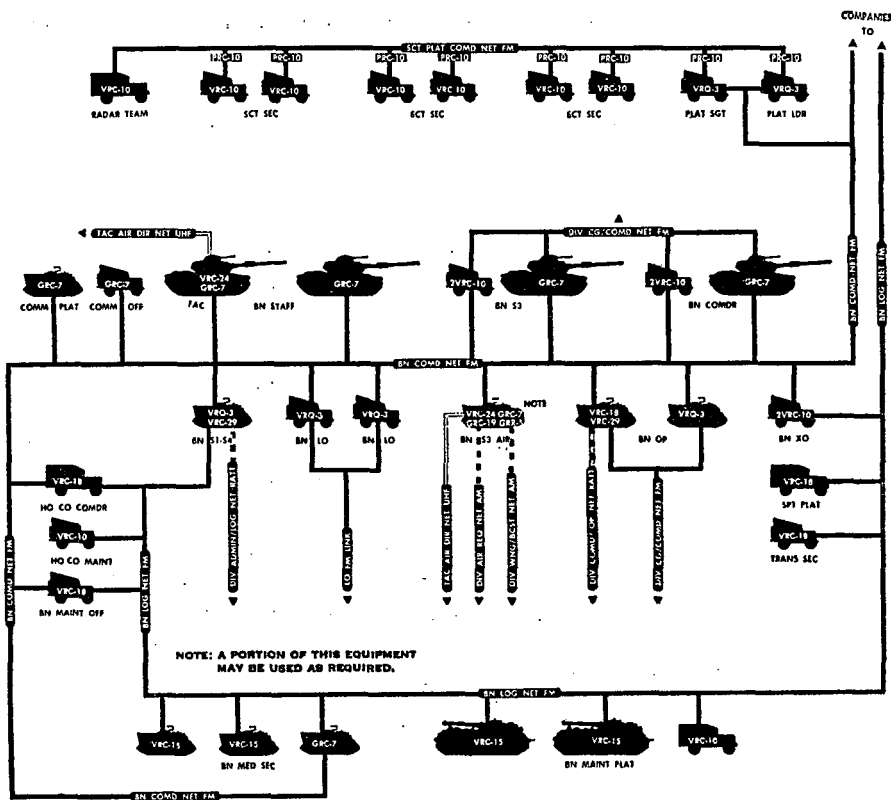


Figure 84. Type radio net, headquarters and headquarters company, infantry division armor battalion.

Section II. TACTICAL APPLICATION OF COMMUNICATION

225. Planning

The planning for the communication system must be timely, adequate, and well coordinated. The system must support the battalion's tactical organization and plan. The communication plan must be flexible enough to parallel the flexibility in task organization of the battalion.

226. Communication on Motor Marches

Radio and mounted messengers are the principal means of communication, but visual communication is also used extensively. The "march message center" operates in the communication platoon carrier. The remainder of the message center personnel is decentralized to the administrative-logistics and operations carriers. A mounted messenger should be available behind the operations carrier to facilitate the handling of message traffic throughout the column.

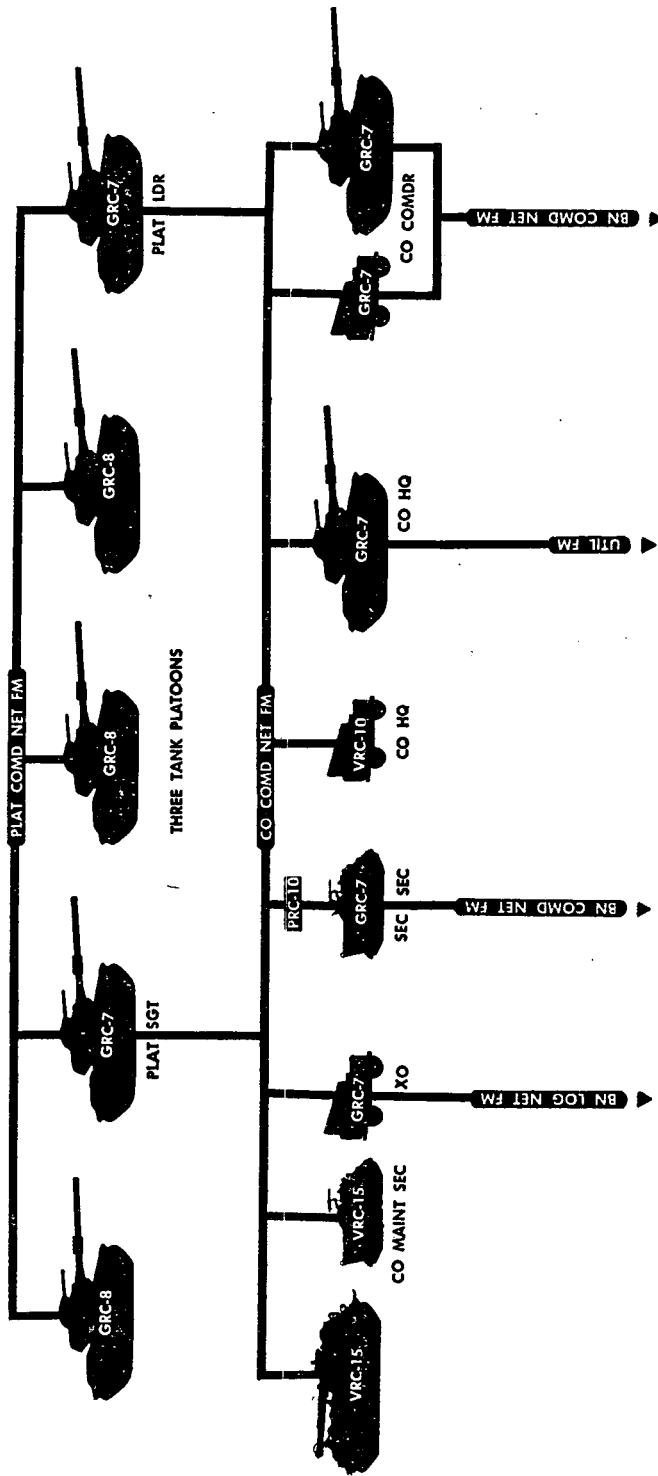


Figure 85. Type radio net, medium tank company, infantry division armor battalion.

227. Communication in Assembly and Bivouac Areas

See paragraph 214.

228. Communication During Offensive Operations

See paragraph 215.

229. Communication During Defense Operations

See paragraph 216.

230. Communication During Retrograde Movements

See paragraph 217.

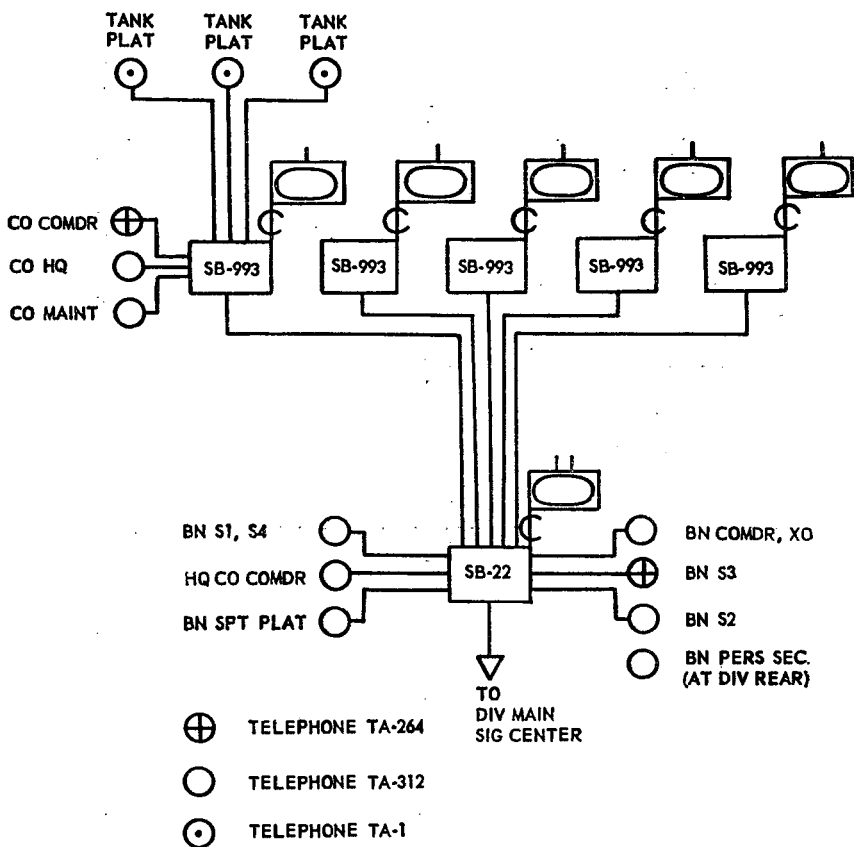


Figure 86. Type wire system, infantry division armor battalion.

CHAPTER 14

INFANTRY DIVISION MEDICAL BATTALION

Section I. GENERAL

231. Organization

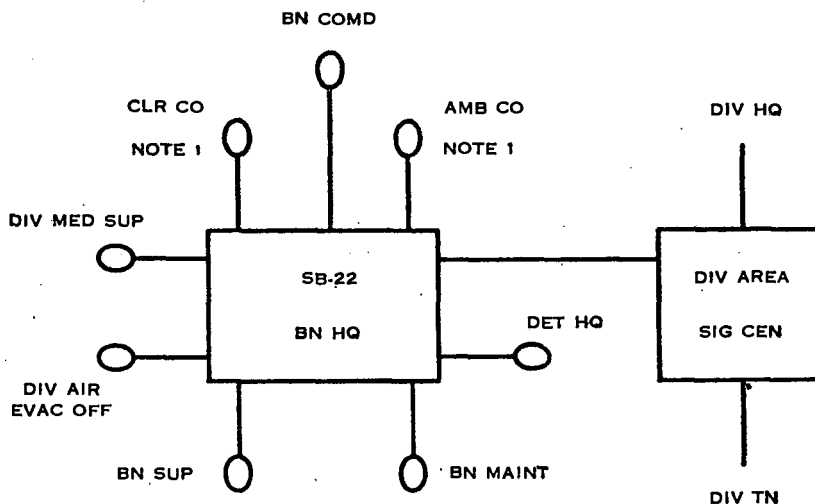
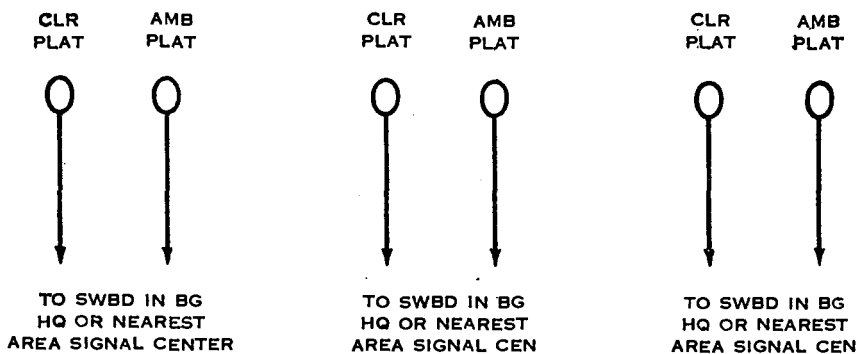
a. The medical battalion has a headquarters and headquarters detachment, an ambulance company, and a clearing company. The ambulance company consists of a company headquarters and three identical ambulance platoons. The clearing company consists of a company headquarters, three identical clearing platoons, and a neuro-psychiatric section.

b. The operations and training officer (S3) is also the communication officer. Communication personnel consist of a communication chief, intermediate speed radio operators, radioteletype operators, a switchboard operator, and a wireman. The division surgeon's section is authorized one intermediate speed radio operator, and the maintenance section has a senior radio mechanic and a radio mechanic. The communication chief assists the communication officer in supervising communication. Company headquarters of the ambulance company is authorized two intermediate speed radio operators, and each platoon has two radiotelephone operators. The company headquarters of the clearing company and each clearing platoon are authorized two intermediate speed radio operators each. Additional personnel are designated and trained to assist assigned communication personnel and provide messenger service.

232. Wire Communication

a. The number of telephones and local and trunk circuits included in the battalion wire system depends on the equipment and time available, the requirements of the situation, and the capabilities of communication personnel. The fundamental principle observed is to install no more than is necessary for control.

b. Medical units are very limited in personnel and equipment for establishing, operating, and maintaining wire systems. The available equipment is distributed in accordance with the communication plan. A medical unit may request assistance from the supported unit in establishing the system (fig. 87).



NOTE 1.

MAY BE PROVIDED BY SWITCHING THROUGH AREA COMMUNICATION SYSTEM IF COMPANY HEADQUARTERS IS NOT LOCATED NEAR BATTALION HEADQUARTERS.

Figure 87. Type wire system for the infantry division medical battalion.

233. Radio Communication

Long-range AM and FM radio sets and a monitoring radio are operated in battalion and division nets as indicated in figure 88. These sets are allocated to the division surgeon's section and the medical battalion headquarters. The unit headquarters, headquarters of the ambulance and clearing companies, the division surgeon, and the clearing platoons are in the battalion command net. The available radio equipment lends itself to a flexible communication system which may be easily adapted to any situation. Strict radio discipline is constantly enforced.

Section II. TACTICAL APPLICATION OF COMMUNICATION

234. General

The medical battalion provides division level medical service, including normal evacuation of battle group aid stations, and emergency evacuation of separate battalion aid stations, operation of the division clearing stations, and provision of medical supply and emergency dental service for the division. Timely evacuation of the battle group aid stations requires speedy, reliable communication that can operate under all conditions of weather, distance, and terrain.

235. Medical Battalion

a. The signal battalion provides the medical battalion with communication to division which permits contact with all units included in the division area communication system. The medical battalion depends primarily on the area communication system for wire communication to the clearing and ambulance companies.

b. The battalion operates radios in the division warning, administrative, and command nets, and in the division trains command net. The clearing platoons and ambulance platoons operate radios in the battalion net.

c. Scheduled messenger service is established between the battalion, the ambulance company, and the clearing company. The battalion also uses ambulance drivers on normal trips for messenger communication.

236. Ambulance Company

The ambulance company command post normally is established where it can best maintain control of the operations of the subordinate platoons. Communication to the battalion headquarters is by radio, wire, and messenger (ambulance drivers); and to the ambulance platoons, by radio and messenger. The ambulance shuttle may be controlled at the clearing station and at the infantry battle group aid stations.

237. Clearing Company

a. This organization can operate three separate clearing stations with a capacity of 80 patients each, provide emergency dental care for personnel of the division, and operate a central psychiatric treatment facility. In addition, each of the three clearing platoons can be divided into two sections, each capable of providing treatment for the limited period of time required for displacement. Radio and telephone communication means are available to the company headquarters and each clearing platoon. The clearing company is only 10 percent mobile.

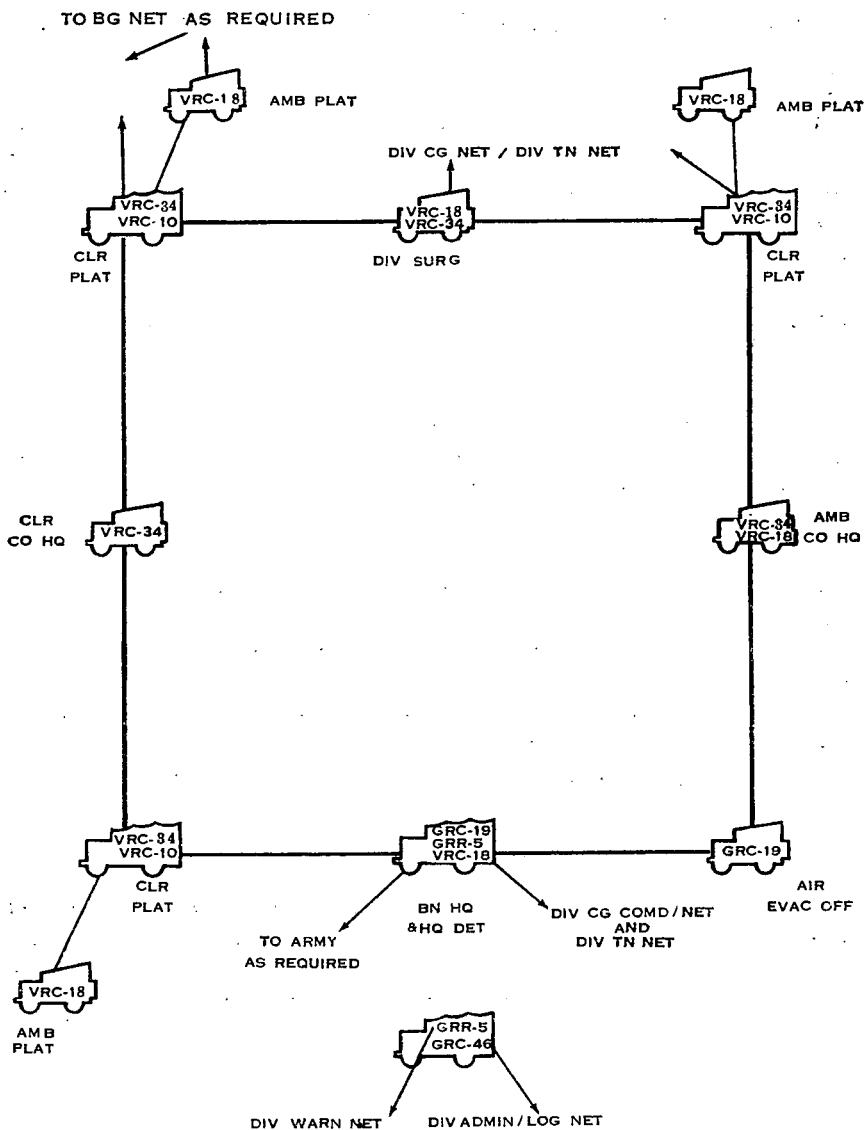


Figure 88. Radio nets for infantry division medical battalion.

b. Clearing platoons normally support battle groups on an area basis. In general, two forward clearing stations operate in the combat support area with the third providing area medical support for the division trains area.

c. The clearing company command post is normally established where it can best maintain control of the operations of its subordinate platoons. Its communication is by radio, wire, and messenger. Am-

ulance drivers operating on normal routes and missions usually carry messages and information pertaining to the evacuation system between elements of the ambulance and clearing companies. They also transport medical supplies for the battle group aid stations. Radio and telephone communication are maintained between the company command post and operating clearing stations.

CHAPTER 15

SUPPORT GROUP, AIRBORNE DIVISION

Section I. HEADQUARTERS AND HEADQUARTERS DETACHMENT

238. General

The support group headquarters and headquarters detachment provides command, staff planning, supervision of logistic operations at division level (less engineer construction and the supply of maps and water), and administrative support (except medical and maintenance) to the units organic or attached to the support group. The support group operates the division logistical operations center (DLOC), an agency established for the coordination and supervision of all those logistical operations which cannot be better handled on a preplanned or supply-agency-direct-to-user basis. The DLOC provides a single agency to which all units of the division, assigned or attached, may direct requests for other than routine support or medical supplies. The DLOC will normally be established in the objective area.

239. Support Group Command Post

The establishment of a support group command post is dependent on the type of operation. When the support group remains in the marshaling area, communications are provided by the marshaling area communication section.

a. In the objective area during early linkup or other short duration operations, divisional service support units are located in battle group areas of responsibility. These units utilize communication facilities established for the battle group. When it is necessary or desirable to group several such elements together, an integrated security area may be established under a designated officer. Upon establishment of a separate area, a command post is usually established.

b. In long duration operations or other combat operations in which the division is committed for an extended period of time, the division normally establishes a rear area. When occupying a separate area, the support group is provided with a separate signal center in the division area communication system. The support operations platoon of the command operations company provides facilities for the support group signal center.

240. Radio Communications

Radio communications for support group headquarters other than staff vehicular radios are provided by the support operations platoon. Stations are operated in the administrative net, base net, command net No. 2, and the division CG/command net.

241. Wire Communications

Trunk circuits connecting the support group headquarters into the area communication system are provided by the wire section of the command operations company. Local telephone and telephone switching facilities are provided by the support operations platoon.

242. Staff Vehicular Radios

Support group headquarters command and staff vehicular-mounted FM-voice (three AN/VRQ-3 and one AN/VRC-10) radios and required driver-radio-telephone operators are provided by the headquarters section of the support group headquarters and headquarters detachment. Portable FM-voice (three AN/PRC-10) radios are also provided for use during initial airborne assault operations, if vehicular mounted radios are not available. A vehicular-mounted FM-voice (AN/VRQ-3) radio is provided in detachment headquarters for use by the detachment commander.

Section II. HEADQUARTERS AND MAIN SUPPORT COMPANY, AIRBORNE DIVISION MAINTENANCE BATTALION

243. General

The headquarters and main support company provides scheduled preventative maintenance service except for medical, aircraft, and quartermaster air-type items; and repair parts supply support, for all elements of the division during periods of noncombat.

244. Communications

Basic communication between elements of the headquarters and main support company is by telephone. However, one FM-voice (AN/VRC-10) vehicular mounted radio is provided in the battalion headquarters section to permit the battalion commander (who is also the division ordnance officer and the division maintenance officer) to maintain preset channels in the support group command net and the emergency repair company command net.

Section III. EMERGENCY REPAIR COMPANY, AIRBORNE DIVISION MAINTENANCE BATTALION

245. General

The emergency repair company provides emergency repair service for all equipment except medical, aircraft, and quartermaster air-type items for all divisional units in the assault area. It also provides technical assistance service and second and third echelon maintenance by contact party for all divisional units in garrison and before and after field or combat operations. Finally, it provides repair parts supply support for all equipment being supported within an airhead.

246. Communications

Wire communications are provided to link all subordinate elements of the company in a company wire net. However, during the initial stages of the assault, primary reliance will be on FM-voice radios as follows:

a. Shop Office. One vehicular mounted AN/VRQ-3 is provided in order to maintain stations in both the support group command net and the company command net.

b. Company Headquarters. A vehicular mounted AN/VRC-10 provides entry into the company command net for the company commander.

c. Battle Group Support Platoons. Each platoon is provided a vehicular-mounted AN/VRC-10. This radio normally operates in the command net of the supported battle group, but checks in to the command net of the emergency repair company on a scheduled basis.

d. Others. Each mechanical maintenance section (two) and electronic maintenance section (two) is provided with a vehicular-mounted AN/VRC-10 for use, as required, in the command net of the supported unit or the command net of the emergency repair company.

Section IV. SUPPLY AND TRANSPORT COMPANY

247. General

The supply and transport company supports the division by providing all classes of supply, except repair parts and secondary items, medical supplies, aircraft parts and supplies, quartermaster air-type equipment maps, and water. It also provides and operates transportation means, except aircraft, to supplement means available to other elements of the division.

248. Communications

Basic communication between elements of the supply and transport company is by telephone; however, minimum essential radios to support the initial airborne assault are provided as follows:

a. Office of the Division Supply Officer. One vehicular-mounted FM-voice (AN/VRQ-3) is provided to permit the division supply officer (who is also the division quartermaster) to maintain stations in both the support group command net and the supply and transport company command net.

b. Others. The supply platoon headquarters and the transportation platoon headquarters are each provided with a vehicular-mounted FM-voice (AN/VRC-10) radio for communications in the command net of the supply and transport company. In addition, the class III section and the class V section of the supply platoon are each provided with a vehicular-mounted FM-voice (AN/VRC-10) radio for communication in the command net of the supply platoon.

Section V. QUARTERMASTER PARACHUTE SUPPLY AND MAINTENANCE COMPANY

249. General

The quartermaster parachute supply and maintenance company provides for the division through the requisition, inspection, packing, storage, maintenance, and issue of quartermaster air-type equipment required for aerial delivery of personnel, supplies, and equipment. It also provides inspection and technical assistance in packing, rigging, and loading supplies and equipment.

250. Communications

The company has no organic radio sets; intracompany communications and communications with external agencies is entirely by wire. If radio communications are required, they must be provided from outside sources (e.g., supporting logistics command).

Section VI. MEDICAL COMPANY

251. General

a. The medical company provides medical service for the airborne division and attached elements. It consists of the division surgeon section, company headquarters, an evacuation platoon, three identical clearing platoons, and three surgical teams. The evacuation platoon is organized with a platoon headquarters, five ambulance sections, and five litter bearer sections.

b. The operations officer is also the communication officer. Communication personnel in the company headquarters consist of a wireman, who is also the switchboard operator, and three light truck drivers who also function as radiotelephone operators. Each of the three clearing platoons includes a light truck driver who is also a radiotelephone operator. Additional personnel are designated and

trained to assist assigned communication personnel and provide messenger service.

252. Wire Communication

The medical company has very limited personnel and equipment for establishing, operating, and maintaining a wire system. The available equipment is distributed in accordance with the communication plan. The fundamental principle observed is to install no more than is necessary for control (par. 232a).

253. Radio Communication

FM sets are operated in company and other command nets as indicated in figure 89. These sets are allocated to the company headquarters, the evacuation platoon with five ambulance sections, and the three clearing platoons. The company headquarters, the evacuation platoon, each ambulance section, and the clearing platoons are in the company command net. The available radio equipment lends itself to a flexible communication system which may be readily adapted to any situation. Strict radio discipline is constantly enforced.

254. Tactical Application of Communication

The medical company provides division level medical service, including normal evacuation of battle group aid stations, emergency evacuation of separate battalion aid stations, and emergency dental service for the division. Timely evacuation of the battle group aid stations requires speedy and reliable communications which can operate under all conditions of weather, distance, and terrain.

a. Airborne Medical Company.

- (1) The signal battalion provides the medical company with communication to division that permits contact with all units included in the division area communication system. Wire communication between the company headquarters and the clearing and evacuation platoon is effected through use of the area communications system.
- (2) The company operates radios in the division support group net. The evacuation and clearing platoons operate radios in the company net.
- (3) Messenger service is established with the company headquarters, the evacuation platoon, and the clearing platoons. The company uses ambulance drivers on normal trips for messenger communication.

b. Evacuation Platoon. Liaison personnel of the evacuation platoon accompany the battle group(s) assault echelon to coordinate the evacuation of casualties to the division clearing station(s). Communication to the medical company headquarters and clearing station(s) is by radio and messenger.

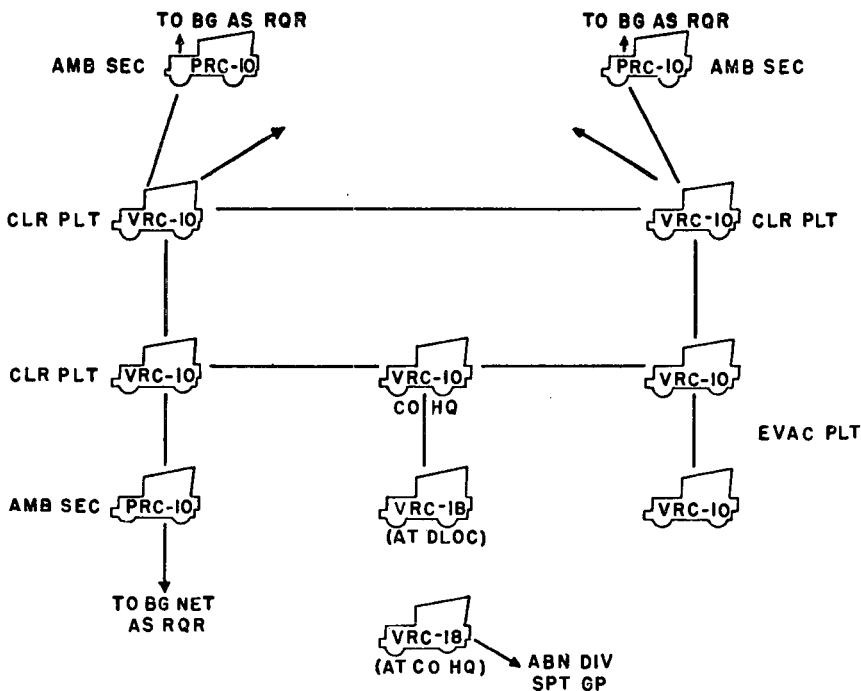
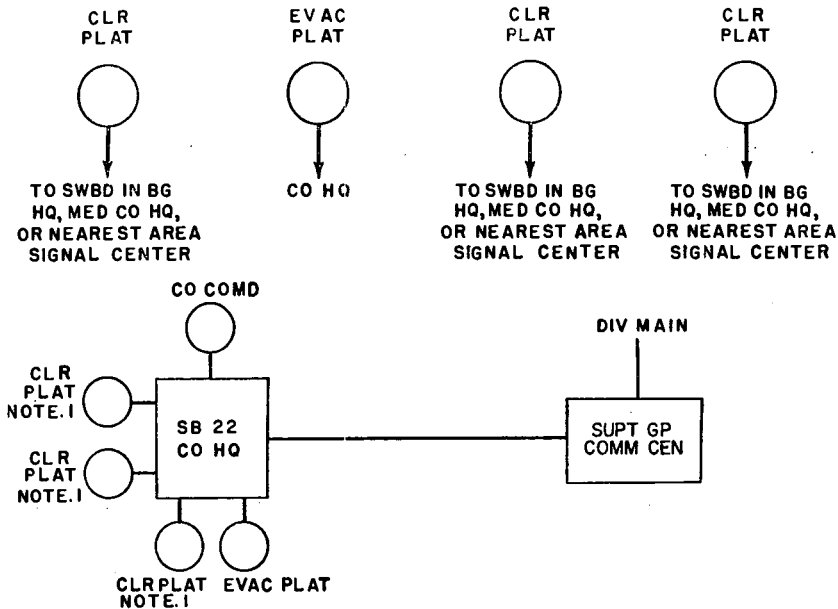


Figure 89. Type radio nets for airborne division medical company.



NOTE. 1
MAY BE PROVIDED BY SWITCHING THROUGH AREA COMMUNICATION SYSTEM IF PLATOON HEADQUARTERS IS NOT LOCATED NEAR COMPANY HEADQUARTERS.

Figure 90. Type wire system for airborne division medical company.

CHAPTER 16

INFANTRY DIVISION TRANSPORTATION BATTALION

Section I. GENERAL

255. Organization

a. The infantry division transportation battalion consists of a headquarters and headquarters company, one truck transport company, and two armored carrier companies.

b. The battalion TOE provides for a communication officer and enlisted assistants to form the battalion communication section. The communication officer, assisted by the enlisted communication chief, supervises the installation, operation, security, and maintenance of the battalion communication system. He arranges for second echelon maintenance of communication equipment for the battalion, provides message center services for the battalion, assists in training radio operators for the battalion and subordinate units, furnishes technical advice and assistance to the S4 regarding signal supply, and prepares orders and instructions needed to insure tactical and technical control of the communication system.

c. Signal communications must be carefully planned and closely coordinated between the battalion communication officer and the communication officers of the supported units to insure that all radio nets are properly organized and operating on assigned frequencies.

256. Need for Communication

a. The division transportation section, which includes the division traffic headquarters, will normally operate at the division main command post where close liaison can be maintained with appropriate staff members. The various elements of the battalion are frequently widely dispersed, when—

- (1) An armored carrier company is in direct support of or attached to a battle group.
- (2) An armored carrier platoon is assigned a mission with an infantry company.
- (3) The truck transport company is operating from the division trains area.

b. This geographical dispersion and the need for direct control present numerous problems in establishing and maintaining effective communication between all elements of the battalion.

c. While the battalion is engaged in the movement of the combat elements of the division to the assembly area, or in the assault or exploitation phases of operations, signal communication is of vital importance to the battalion commander and his subordinate commanders. Success or failure in battle is directly related to the effectiveness of the signal communication system employed in exploiting the resources of the transportation battalion.

257. Wire Communication

a. Wire communication parallels radio and is utilized wherever practical (fig. 91).

b. Wire is utilized to the greatest extent possible in defensive situations, in stabilized operations, in bivouac areas, and in assembly areas. It is more secure than radio and should be used when radio communication is kept to a minimum for security reasons.

258. Radio Communication

a. Radio is the most used means of communication in the battalion. It gives the battalion commander an effective means for the control of his command.

b. The battalion communication equipment is available for use by the supported tactical commanders to supplement their communication equipment in coordinating and controlling their forces.

c. The battalion command post is the nerve center of radio communication. It maintains communication with higher, attached, and subordinate units.

d. Type radio nets within the transportation battalion are shown in figure 92.

259. Messenger, Visual Signals, and Sound Communication

a. Driver-messengers are used when required as a means of communication. Five driver-messengers are in the truck company and one is in the armored carrier company.

b. Visual signals and sound are used as required. The primary requirement when they are used is prearrangement of meanings to insure uniform actions desired.

Section II. TACTICAL APPLICATION OF COMMUNICATION

260. General

a. The mission of the transportation battalion is to provide tactical mobility to combat elements of the division; to provide the division with a pool of vehicles for logistical movement of personnel and supplies. To achieve this goal, it is essential that all elements of the battalion remain fluid, flexible, and responsive to orders and directives received through a smoothly functioning communication net.

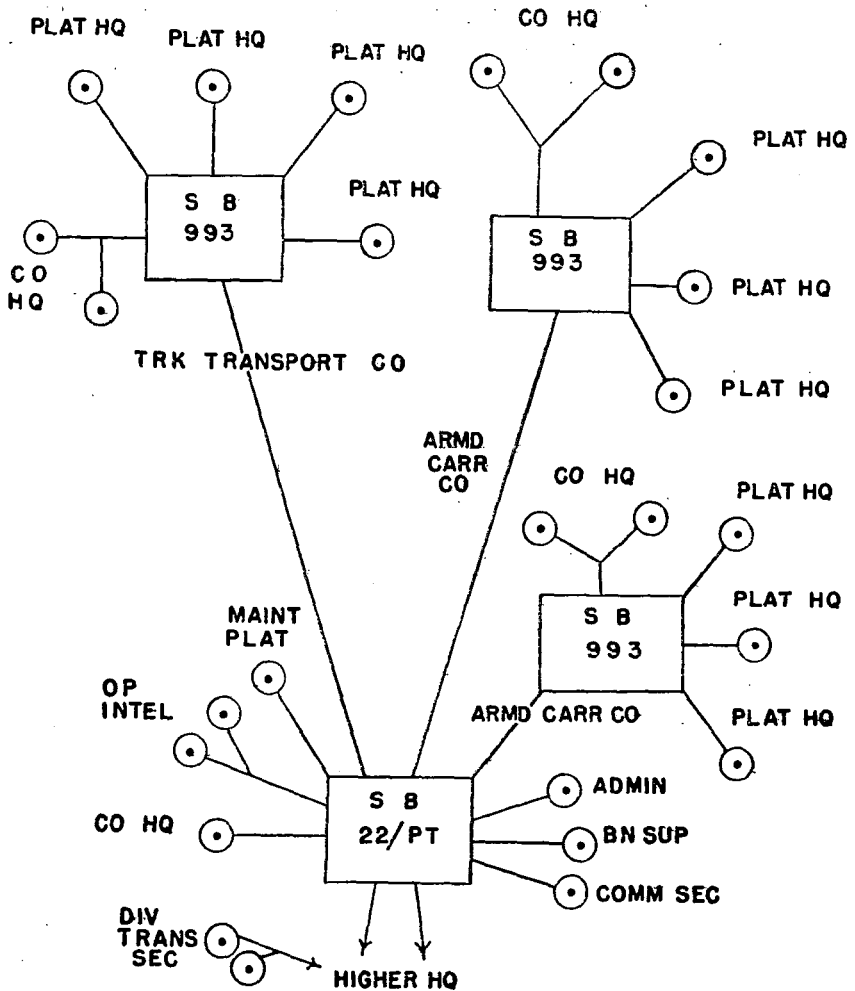


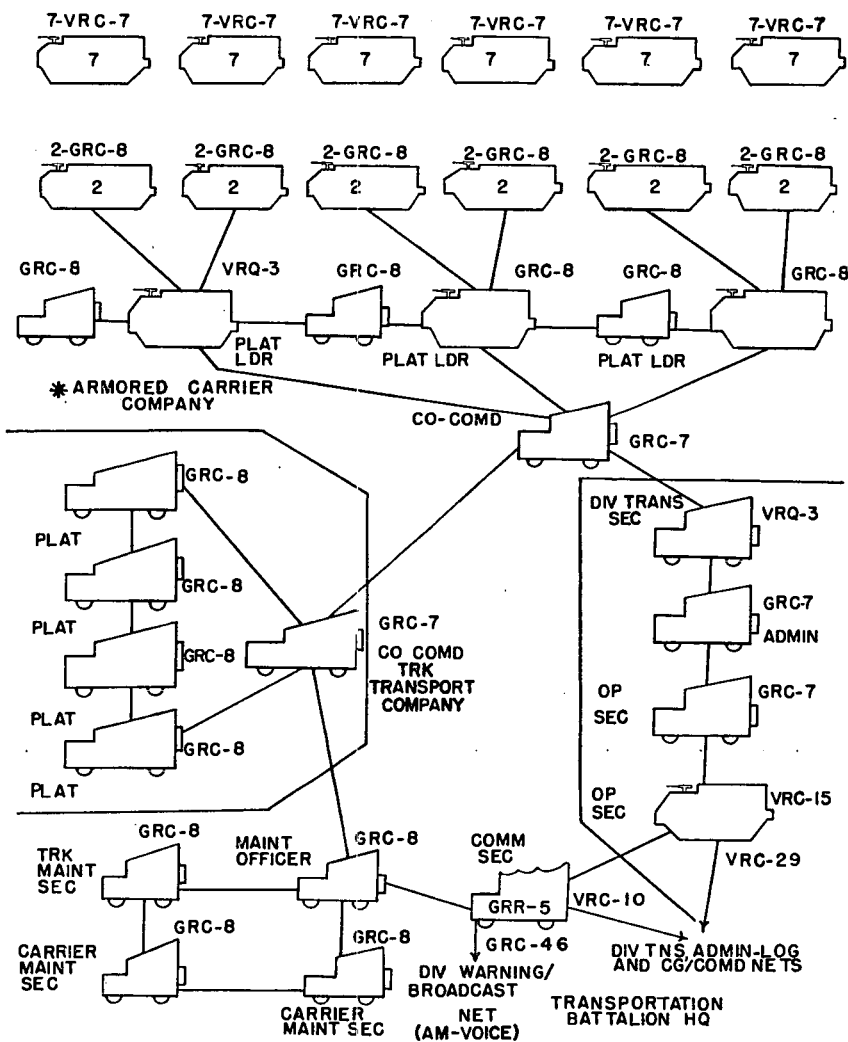
Figure 91. Type wire system for infantry division transportation battalion.

b. The following principles must be adhered to in establishing and operating a communication system:

- (1) All means of communication available to the battalion must be used. This avoids overloading any one means and minimizes the effect of a disruption.
- (2) Command liaison must be established with division trains headquarters, subordinate, adjacent, and supported units.
- (3) When working with tactical forces, the battalion communication system must be organized to fit the task organization and the system must be integrated with the net of the supported unit.

261. Transportation Battalion

a. The battalion communication center is located at or near the battalion command post in the division trains area. The communication section is responsible for the installation and operation of a communication net that will permit effective operations by the battalion's various operating elements. This includes provisions for tying into the division air warning net, the division administrative/logistical net, and the division command net (fig. 92).



*The other Armored carrier company is organized identically.

Figure 92. Type radio nets for infantry division transportation battalion.

b. The signal plan must provide for necessary communication facilities for the division transportation section located at or near the division main command post. The operations of the division traffic headquarters require extensive coordination with other staff sections and effective communication with divisional elements.

262. Truck Transport Company

a. The truck transport company will normally be located in the division trains area. The company consists of a company headquarters and four truck platoons, each with a platoon headquarters and two truck squads.

b. The company is equipped with vehicle-mounted FM radios designed to provide for company control and liaison with battalion headquarters. Radios available to platoon leaders provide for communication with company headquarters, highway regulating points, and supported units.

c. A wire system is normally developed in defensive and stabilized operations and in bivouac areas. The battalion communication section lays the battalion wire line and local lines for the companies.

263. Armored Carrier Company

a. The armored carrier company is normally located in the forward area and is composed of a company headquarters and three carrier platoons of a platoon headquarters and two carrier squads. The primary mission of the company is to provide certain combat elements of the division protected tactical mobility and a means for resupply of combat elements of the division when the avenue of approach is covered by enemy ground observed fire.

b. The vehicle-mounted FM radios of the company provide for company control and liaison with battalion headquarters.

c. For tactical operations, the company may be attached on a mission basis for a specific time period or may be placed in support of division units. When attached to the assault elements of the division, the radios in the carrier platoon headquarters and squads are used by the command elements of the assault forces for control purposes.

- (1) The tactical combat force commander uses the AN/VRQ-3 radio in the first platoon headquarters' vehicle to control his forces.
- (2) When the carrier company is attached to the infantry battle group, the infantry company commanders use the AN/GRC-8 radios in the second and third platoon headquarters' vehicles to control their forces.
- (3) The carrier squad leader's radios are used by infantry platoon leaders for control purposes when carriers are serving in an attached role.

- (4) The armored carrier company commander uses his AN/GRC-7 radio to monitor the company net for planning and conducting vehicle recovery, coordinating with the infantry staff on tactical requirements, and supervising company operations.

CHAPTER 17

INFANTRY DIVISION ORDNANCE BATTALION

Section I. GENERAL

264. Organization

a. The infantry division ordnance battalion consists of a headquarters and main support company and a forward support company.

b. The battalion commander is also the division ordnance officer. As battalion commander he commands, controls, and supervises the ordnance battalion. As division ordnance officer he is responsible for supervising all aspects of ordnance service within the division and for keeping the division commander and staff informed of the ordnance situation.

c. Administrative and communications support for the entire battalion headquarters, including the division ordnance office, is provided by personnel of the battalion headquarters section of the main support company. The radioteletypewriter team chief and operators comprise the communications element. The operations of the communications element are controlled by a communications officer appointed by the battalion commander.

d. The organization, functions, and operations of the ordnance battalion, including signal communications in the battalion, are covered in detail in FM 9-25.

265. Need for Communication

a. The battalion headquarters and main support company are normally located together in the division service area. The main support company serves as a base of operations for ordnance service in the division. The forward support company normally operates separately from the headquarters and main support company. Its elements are located to provide ordnance support to forward units of the division.

b. The ordnance battalion, which is an integral part of the infantry division, is also designed for mobility, rapid movement, and employment in several locations. Signal communication is of vital importance to the ordnance battalion since its support elements may operate at considerable distances from battalion headquarters and from each other.

266. Wire Communication

- a. Wire communication is utilized wherever practical.
- b. The ordnance battalion can install, operate, and maintain a battalion wire net as shown in figure 95.
- c. Installation of field wire lines from the area signal center to the using unit is a responsibility of the area signal center team.

267. Radio Communication

- a. Radio is used to parallel and supplement wire circuits.
- b. Type radio nets within the ordnance battalion are shown in figure 93.

Section II. TACTICAL APPLICATION OF COMMUNICATION**268. General**

The ordnance battalion provides the division with direct support ordnance service, except for class V and explosive disposal support. The headquarters and main support company provide class II and IV direct support ordnance service for rear elements of the division, serve as a base of supply for the ordnance battalion, and provide supplementary support to the forward support company. The forward support company provides class II and IV direct support ordnance service for forward elements of the division. Ordnance support is, in general, provided on a task and area basis, with elements providing support to specified units and to a portion of the division area. Full and effective use of communication is essential in the accomplishment of the ordnance mission.

269. Radio Communication Within the Ordnance Battalion

The ordnance battalion has organic radio and radioteletypewriter (RATT) equipment which will normally operate in the following radio nets (fig. 93).

a. *Division Administrative and Logistics Net (AM/RATT)*. Two vehicular-mounted radioteletypewriter sets organic to the headquarters section of the headquarters and main support company are operated in this net. One of the sets is used at the battalion command post, while the second is used by the division ammunition officer. Figure 94 shows the stations which comprise this net.

b. *Division Warning Broadcast Net (AM-Voice)*. Battalion headquarters has one radio receiver which is used expressly to monitor this net.

c. *Battalion Command Net (FM-Voice)*. The battalion commander, battalion headquarters, and the company commander of the forward support company operate stations in this net. This net provides communication for command and control of the ordnance bat-

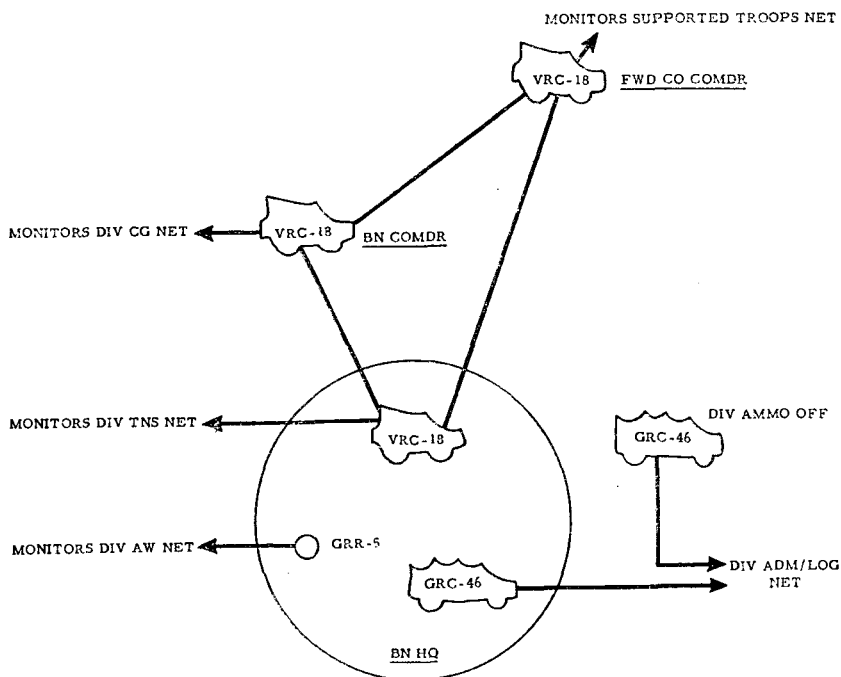


Figure 93. Type radio nets, ordnance battalion, infantry division.

talion. If the distance between the forward support company and battalion headquarters is too great to permit direct FM communication, communication may be established through the division area radio/wire integration net.

d. Other Divisional Command Nets. The vehicular-mounted FM sets used in the battalion command net are equipped with auxiliary receivers to permit monitoring other divisional radio nets. In the forward support company, the company commander utilizes his auxiliary receiver to monitor the supported troops net. The auxiliary receiver of the battalion headquarters radio set is used to monitor the division trains command net, while the battalion commander's auxiliary receiver is used to monitor the division commanding general/command net.

270. Wire Communication Within the Ordnance Battalion

a. Because of the distances involved, the battalion headquarters and the various elements of the battalion are not directly connected by wire. Instead, the elements of the battalion will arrange to enter the division area communication system at the nearest signal or switching center (fig. 95).

b. Each of the companies of the battalion is equipped with a switchboard. Telephones are provided for the principal sections of each

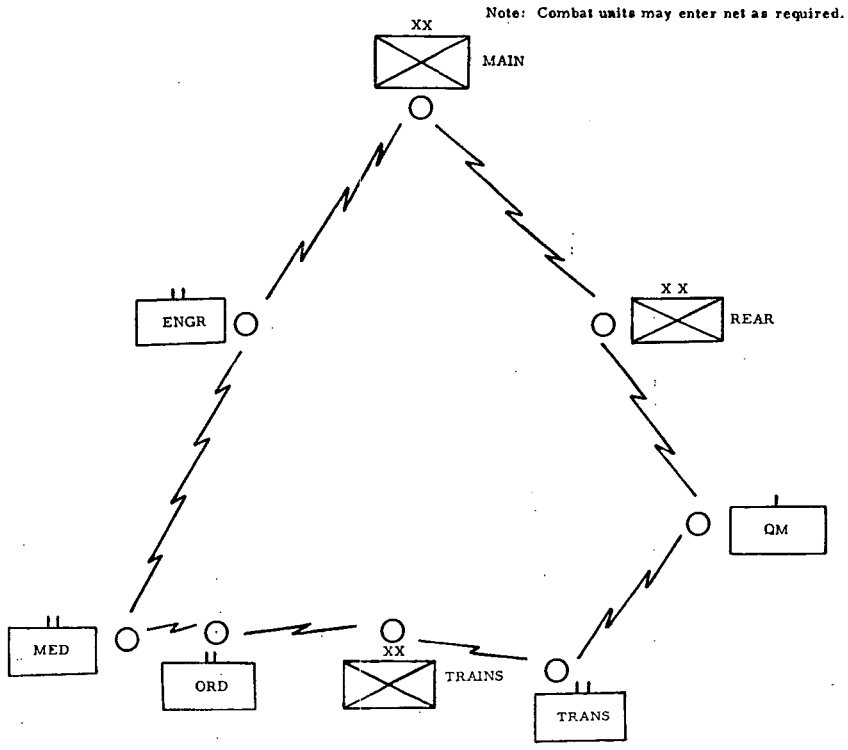


Figure 94. Division administrative/logistics net.

company, company commanders, the battalion commander, and key staff officers of the battalion. Because of switchboard limitations, some of the telephones provided the main support company must be partied. Figure 95 depicts a method in which this may be done.

c. Each of the direct support platoons of the forward support company will be connected into the wire net through the local net of the unit it is supporting or through the nearest switching center. Each of these platoons is equipped with one telephone.

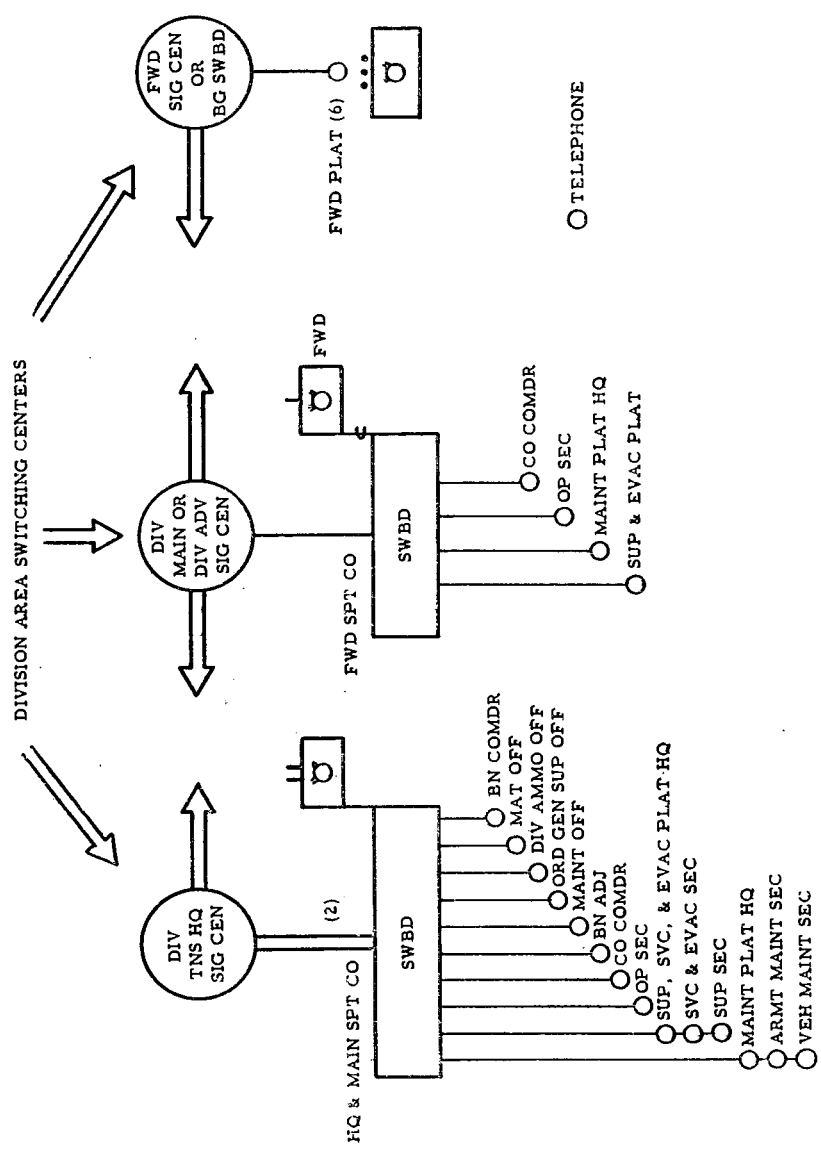


Figure 95. Type wire net, ordnance battalion, infantry division.

CHAPTER 18

INFANTRY DIVISION AVIATION COMPANY

Section I. GENERAL

271. General

a. The infantry division aviation company is organized and equipped to support the infantry division with fixed- and rotary-wing aircraft. The mission of the company is to increase the combat effectiveness of the infantry division by providing immediately responsive aviation support (fig. 96).

b. This chapter outlines a communication system for the infantry division aviation company. Details of the aviation company operations are found in FM 1-5 and FM 1-100.

272. Division Area Communication System

a. Except for radio, the aviation company depends on the infantry division area communication systems for communication with company elements operating away from the aviation company airfield. Aviation combat support elements operating in the battle group area depend on the forward signal centers for connection into the area communication system.

b. In addition, the aviation company requires trunkline connection into the division area communication systems. This includes long lines and channels for use with other divisional units in lieu of or to supplement organic communication on a common-user basis.

273. Communication Personnel

a. Each platoon or section in the company has personnel whose duties are to install, operate, and maintain the communication system within their area of responsibility. For details on these personnel, see the table of organization and equipment and FM 1-5.

b. The communication officer, under the supervision of the executive officer, is the commander's principal assistant on signal matters and is responsible for the installation, operation, and maintenance of the company's communication system. Additional duties are given in FM 1-5.

274. Radio Communication

a. General.

- (1) The communication system required by the aviation company must be extremely flexible and provide communication not normally provided by other company level units. It has the requirement for long-range voice communication between ground elements and from ground-to-air and air-to-air stations. In addition, communication is required with other divisional units for coordination of aviation activities. The aviation company is equipped with AM, RATT, UHF, and FM radio equipment to fulfill these requirements. Aircraft-mounted radios employ line-of-sight equipment, which extends the transmitting and receiving range of radio to greater distances. This presents a problem of transmission security in that the enemy may intercept transmissions made by airborne radios easier than by ground radios.
- (2) The basic FM radio employment by aircraft of the aviation company has a frequency capability enabling communication in infantry, armor, artillery, and common frequencies bands, while ground radios in the aviation company are infantry or artillery band (or a coordination infantry and artillery band) radios. The aircraft FM radio has a capability of homing in on ground sets, which is a valuable aid in locating airfields and heliports, message drop or pickup points, and isolated units. Aircraft UHF radio equipment is available for air-to-air communication, air traffic control, and emergency use. Vehicular-mounted radios include AM and RATT radios plus VHF equipment for air traffic control and communication with aircraft from other services.

b. Company Nets. The communication section, normally located at aviation company airfield, is the main communication operational element of the aviation company. This section, with other company elements, maintains communication with higher, adjacent, supported, attached, and subordinate units. The radio nets in which this equipment is operated and the platoon or section concerned are as follows:

- (1) Operations net links the company commanders (fig. 97), and is used by the company commander to command and control the platoons and attached units. The FM radio in the operations platoon is the net control station.
- (2) This net provides a medium-range communication link between the division aviation section and platoon leaders (fig. 97). The AN/GRC-46 in the communication sections is the net control station. The company commander's vehicle does not have an AM capability but is given this capability through the communication section.

- (3) **Air traffic control net UHF.** The UHF air traffic control net is employed at the aviation company airfield to control air traffic. The air traffic control section is the net control station for this net when it is required.

c. Platoon Nets. The platoons of the aviation company are provided with vehicle-mounted FM and/or AM radios to maintain control over the platoon sections as required and for contact with company and supported units.

(1) *Operations platoon.*

(a) This platoon has an FM capability and is given an AM capability by the aviation company communication section. This then allows the operations platoon to maintain contact with the division aviation section, higher, adjacent, supporting units, and organic platoons of the aviation company.

(b) The air traffic control and approach control sections control the flow of air traffic to and from the aviation company airfield. The air traffic control section also maintains ground-to-air contact with division aircraft within the range capability of the radio transmitters.

Note. The communication section provides communication support for the aviation company communication systems. This section provides radios and operators to operate the FM, AM, and RATT radios in the nets required for continuous operations by the division. In addition, this section will maintain continuous operations of the company AM and FM nets with the assistance of the operations platoons and platoon elements.

(2) *Aerial surveillance platoon.* This platoon is composed of manned aircraft, drones, and ground control vehicles and systems. This platoon employs FM and UHF radios in its aircraft and platoon net. It also has FM and RATT radios mounted in its organic ground vehicles. The RATT equipment can operate in the division intelligence net or the corps flight operations net when required.

(3) *Direct support platoon.* This platoon has both FM and AM radio sets to operate in the company nets and to maintain control of platoon sections.

(a) For discussion on the artillery support section, see FM 1-5.

(b) For discussion on the combat support section, see FM 1-5.

(4) *General support platoon.* The general support platoon has FM and AM radio sets for operation within the company nets. Contact with individual aircraft is by means of the vehicle-mounted radio and the aircraft FM radio. The sections within the platoon are not provided ground-mounted radios. The aircraft of this platoon has a UHF capability for air-to-air contact.

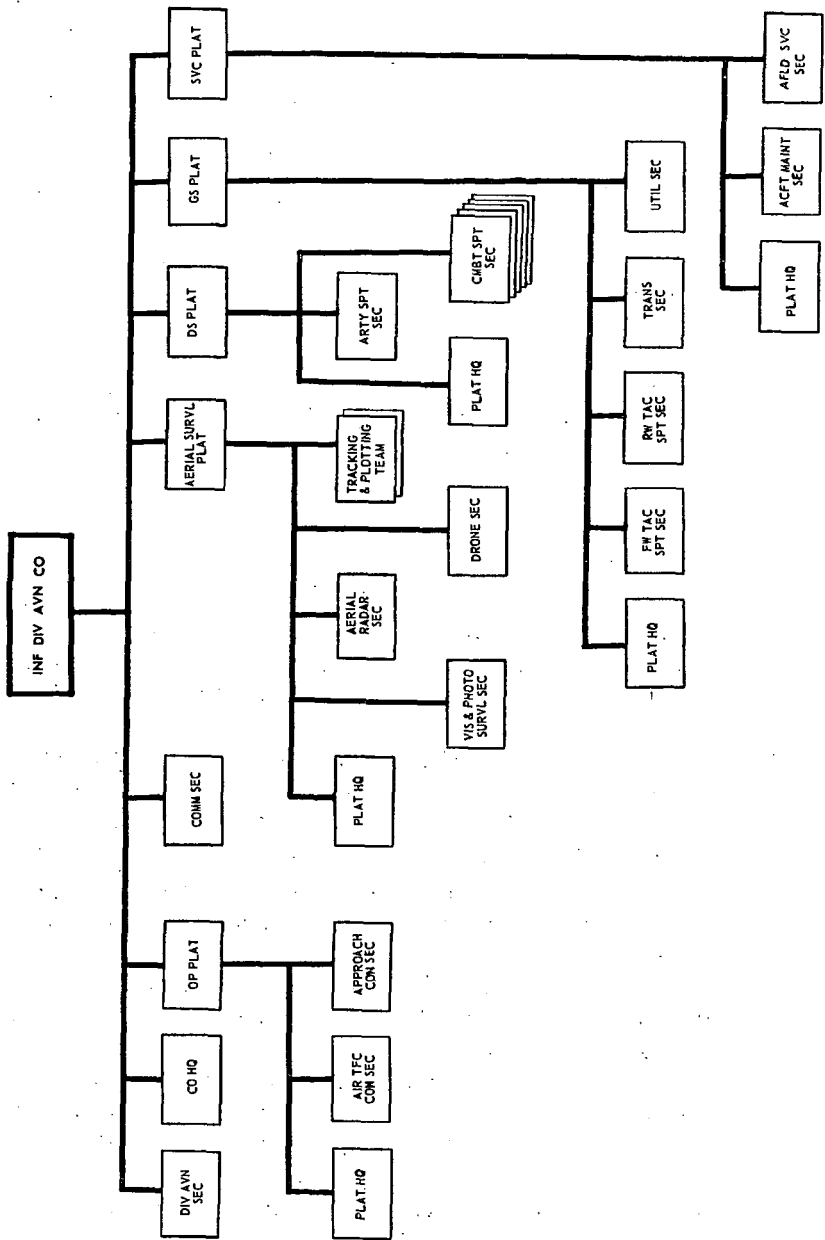


Figure 96. Organization of the infantry division aviation company.

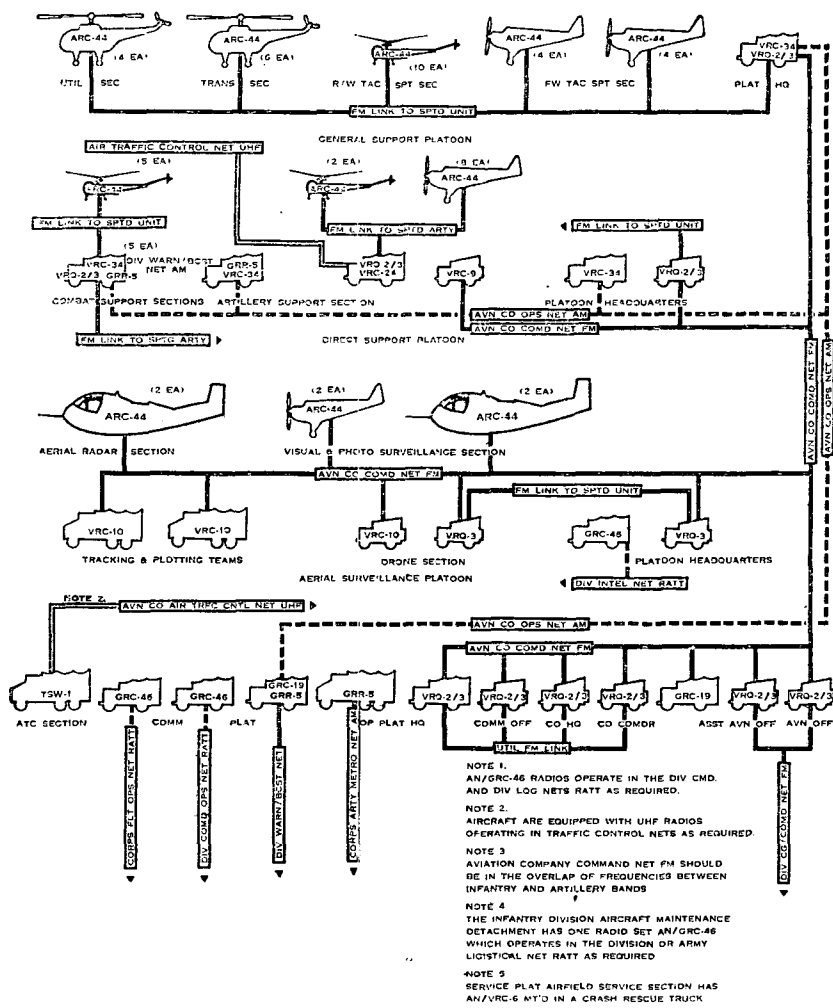


Figure 97. Type radio nets for the infantry division aviation company.

(5) *Service platoon.* The service platoon is not provided with radios. Required radio communications for the platoons are transmitted by the communication section. The crash and rescue squad has VRC-6 radio for contact with the air traffic control and approach control sections.

d. *Radio Nets of Higher Headquarters.* The aviation company operates in the nets of higher headquarters (fig. 97) as follows:

(1) *Division CG/command net, FM.* The division aviation commander normally operates in this net. The assistant division aviation commander may monitor this net. This net provides the division commander with a direct channel of communication to his aviation commander.

- (2) *Division command/operation net, AM-RATT.* This net is used for operational command and control of the division. When required, the aviation company leaves this net to operate in the administrative/logistical net ((4) below).
- (3) *Division intelligence net, AM-RATT.* The intelligence officer uses this net for reporting and receiving intelligence information. The aerial surveillance platoon of the aviation company operates a station in this net.
- (4) *Division administrative/logistical net, AM-RATT.* No specific radio set is available to enter this net on a full-time basis, but an AM radio set ((2) above) is used as required.
- (5) *Division warning/broadcast net.* An AN/GRR-5 receiver is located in the communication section and direct support platoon for monitoring this net. Air warning information received on this net is retransmitted over appropriate nets to reach aircraft and ground elements of the aviation company as required.
- (6) *Corps flight operations net, RATT.* The company operation platoon operates a radioteletype station in this net, and coordinates company air activity with the corps flight operation center.
- (7) *Corps artillery metro net, AM.* The operations platoon monitors this net and receives weather data and other meteorological information as pertains to flight operations.

275. Wire Communication

a. Wire provides internal communication for the platoon or sections at the aviation company airfield (fig. 98). Wire is used when radios are on listening silence in defensive or stabilized operations. Supported units provide local telephone service for those elements of the company not located near the base airfield.

b. The communication section is responsible for the installing and operation of the aviation company wire system. Initial installation assistance is provided by the division signal battalion and aviation company personnel available. Wire lines are laid to key personnel and to each platoon section. Within the capability of the company, lateral wire lines are laid to adjacent units to increase the capability and flexibility of the communication system. The division signal battalion lays wire lines from the division main command post to the aviation company's command post. Corps signal troops provide a sole-user circuit between the flight operations center at corps and the aviation company airfield.

276. Messenger Communication

Foot messengers are used for short-distance communication at the base airfield installation. Aerial messengers provide special or scheduled messenger service to all subordinate company elements located at satellite airfields. Division headquarters normally operates special and scheduled messenger service to the company.

277. Sound and Visual Communication

The company makes maximum use of sound and visual communication. Sound signals are used chiefly to spread alarm, attract attention, and transmit short messages of prearranged meaning. Identification panels identify airfield locations and routes within the airfield installation area. Prearranged meanings are assigned in the signal operation instruction (SOI) for use of pyrotechnics, lights, flags, panels, and aircraft maneuvers.

Section II. TACTICAL APPLICATION OF COMMUNICATION

278. Planning

Timely and adequate planning is necessary for successful communication. Planning must be continuous and flexible; details must be coordinated with the headquarters concerned. The communication officer assists the commander in planning each operation and keeping communication personnel informed of current and proposed operations.

279. Communication During Offensive Operations

a. During offensive operations, radio is used to the maximum and wire, messenger, visual, and sound as required.

b. Communication personnel must insure—

- (1) Adequate planning is accomplished for continuous communication between aviation elements and supported units.
- (2) Alternate frequencies are available to prevent failure of the communication system in the event of enemy electronic countermeasures.
- (3) Security is emphasized.
- (4) Uninterrupted communications are maintained during displacement of the aviation company airfield.
- (5) Navigational communication aids remain operational the maximum amount of time.

280. Communication During Defensive Operations

During defensive operations, radio is the primary means of communication for aircraft. Wire, messenger, visual, and sound should

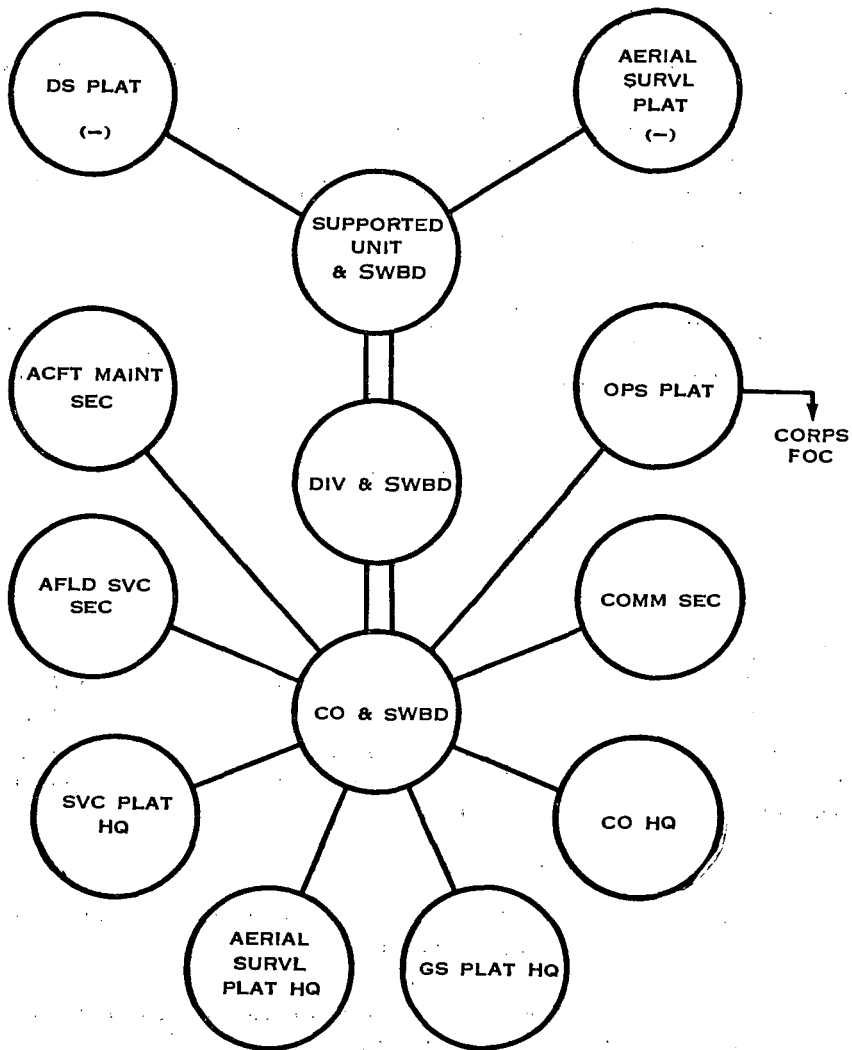


Figure 98. Type wire system for the infantry division aviation company.

be used whenever possible to maintain security and reduce enemy intelligence at the aviation company airfields.

281. Communication During Retrograde Movements

Radio is the primary means of communication during a retrograde movement, with wire, messenger, visual, and sound being used whenever possible. Forces left in contact retain the means to deceive the enemy through the apparent continuation of normal radio traffic.

282. Communication Facilities Provided by the Aviation Company

a. Command and Liaison. Command and liaison include extensive use of army aviation for control and transportation. For example, a commander may effectively utilize a helicopter for a command post or route of march control.

b. Radio Relay. Aircraft of the aviation company used as airborne radio relay stations increase the effectiveness of FM radio communication over extended distances. In the infantry division, the pilot and observer of the aircraft act as a voice relay for the commander.

c. Air Wire Installation. Wire laying may be performed by both fixed- and rotary-wing aircraft over obstacles. The distance this wire can be laid is limited only by the capacity of the aircraft and container.

d. Propaganda Dissemination. Army aircraft are capable of propaganda dissemination by both audio and leaflet means.

e. Messenger and Courier Service. The use of aircraft to augment ground facilities should be practiced, especially on priority matters with daily schedules.

283. Airborne Division Aviation Company

See FM 57-100 and FM 1-5.

CHAPTER 19

INFANTRY DIVISION MILITARY POLICE DETACHMENT

284. Organization

The infantry division military police detachment is an element of the division headquarters company. The detachment is organized into a detachment headquarters and two military police platoons with three military police squads each. The division provost marshal section is located within the special staff organization of division headquarters.

285. Mission

The mission of the military police detachment is to increase the combat effectiveness of the infantry division by providing it and its elements with close and continuous military police support.

286. Capabilities

The capabilities of the infantry division military police detachment include—

- a.* Enforcement of military law, orders, and regulations.
- b.* Control of the circulation of individuals.
- c.* Vehicular traffic control.
- d.* Protection of property.
- e.* Handling prisoners of war.
- f.* Operation of checkpoints, information posts, and straggler posts.
- g.* Criminal investigation.

287. Communication Personnel

The primary means of communication for the military police detachment is FM radio. The radios assigned to the squads, platoons, detachment headquarters, and the provost marshal section are operated by members of these units as part of their normal duties.

288. Radio Communication

a. Radio provides the military police detachment with the flexibility of communication which the employment of this organization makes necessary. Under the operational control of the division provost marshal, the detachment is characteristically broken down into platoons, patrols, control points, and stationary posts. The vehicular and portable FM radios organic to the detachment provide the detachment commander and his subordinates with the best means of communi-

cation for command, control of military police operations, and contact with higher headquarters.

b. The military police detachment internal radio nets are—

- (1) *Military police detachment command net, FM.* This net provides the primary means for command, control, and coordination of military police operations in the division area. The detachment commander controls the net and places stations in it as required to facilitate the military police mission. This net provides a flow of information among patrols, escorts, traffic control points, and related agencies. Various elements of the detachment use this net for control and coordination of traffic patrols in the division area. In addition to the detachment commander, the two platoon leaders and the six military police squads, the provost marshal, and the provost marshal representative at DLOC normally operate stations in this net.
- (2) *Military police detachment utility control net, FM.* This net is established by the detachment commander for use in special situations requiring radio communication within a localized area. Typical situations in which it is utilized are in coordinating and controlling vehicular traffic through a defile, in controlling riot control activities, and in moving large numbers of prisoners of war. The net is controlled by the senior individual involved in the particular operation. In emergencies and when previous arrangements for such use have been made with the signal officer, the VRQ-3 and VRC-10 sets of the military police detachment command net may operate in the utility control net for short periods of time and on low power. Indiscriminate operations of these vehicular sets in utility control net must be avoided in order to preclude overextension of the planned range of such net.

c. Elements of the military police detachment operate radio equipment in external nets as follows:

- (1) *Division CG/command net, FM.* The provost marshal maintains a station in this net for contact with division headquarters. In certain situations, the military police detachment commander may also operate a station in this net.
- (2) *Division warning/broadcast net, AM.* The detachment commander is equipped with an AM receiver for monitoring this net.
- (3) *Monitoring.* In addition, military police elements may from time-to-time monitor the FM command nets of armored division military police units with which they are operating. FM receivers for this purpose are provided to the provost

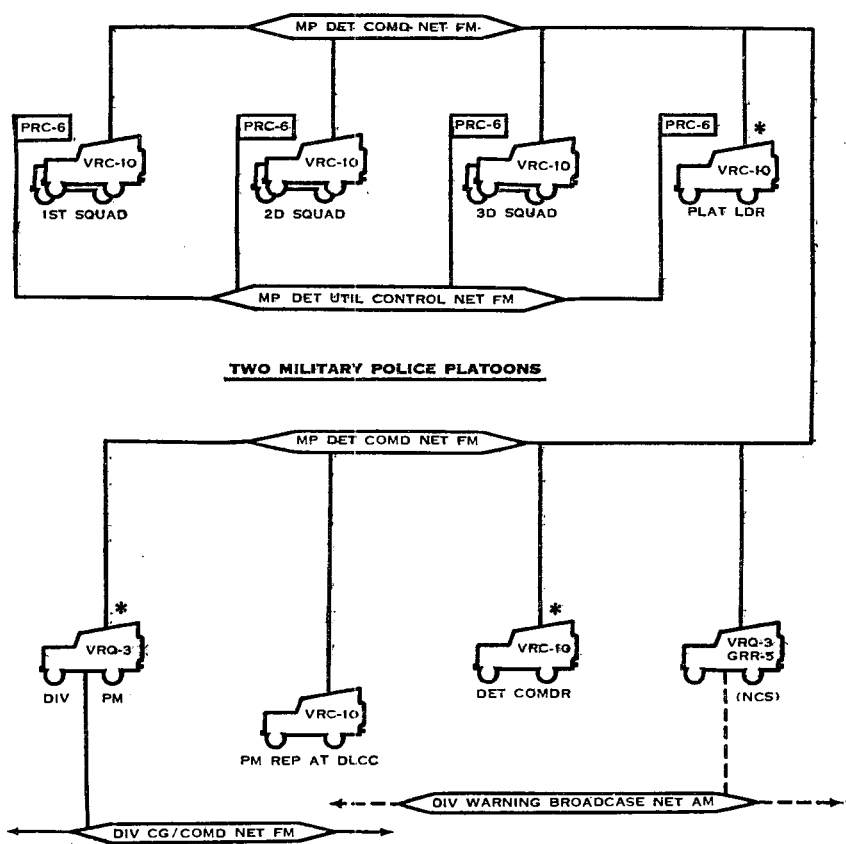
marshal, the detachment commander, and the two military police platoon leaders.

d. The internal and external radio nets in which the military police detachment operates equipment are shown in figure 99.

289. Supplemental Means of Communication

a. In addition to its primary FM radio communication and normal infantry use of supplemental means, the military police detachment may use special means, such as public address systems, sirens, marking panels, and directional lights. Extensive use is made of fluorescent paint and tape for lane or route marking. Arm-and-hand signals used by military police have been specially developed for traffic control.

b. Limited internal wire circuits may be established, but the division area communication system is used by military police elements for wire communication outside the detachment headquarters area and the confines of a prisoner of war collecting point. When an element of the detachment is in support of a division unit such as a battle group or battalion and wire communication is required, the supported unit must furnish the equipment necessary for the operation of wire circuits.



*NOTE: VEHICLES HAVE MOUNTED A RADIO RECEIVER R-108. THIS RECEIVER MAY BE USED AS A MONITOR IN THE FM COMMAND NET OF AN ARMORED DIVISION MILITARY POLICE COMPANY WITH WHICH AN ELEMENT OF THE INFANTRY DIVISION DETACHMENT IS WORKING.

Figure 99. Type radio nets for the infantry division, military police detachment.

CHAPTER 20

AIRBORNE DIVISION MILITARY POLICE DETACHMENT

290. Organization

The airborne division military police detachment is an element of headquarters company, airborne division command and control battalion. It is organized into a detachment headquarters, a provost marshal section, and two military police platoons with three military police squads each. It is organized and equipped to provide military police service throughout the division area, including enforcement of military law, traffic control, and handling of prisoners of war.

291. Comparison With Infantry Division Military Police Detachment

Basically, the airborne division military police detachment is organized like the infantry division military police detachment. Less communication equipment, dictated primarily by the different method of transportation to the operational site, is provided in the airborne detachment. However, as in the infantry division detachment, the principal means of communication is FM radio; and essentially the same radio sets are utilized. The employment of supplemental means of communication differs little.

292. Radio Communication

a. The external radio net in which the military police detachment normally operates equipment is the division CG/command net, FM. The provost marshal maintains a station in this net for contact with division headquarters.

b. The internal radio nets of the airborne division military police detachment are similar to the internal nets of the infantry division military police detachment. The two nets are—

- (1) *Military police detachment command net, FM.* Stations are operated in this net by the detachment commander, the provost marshal, the two military police platoon leaders, and the six military police squads (two stations in each squad).
- (2) *Military police detachment utility control net, FM.* This net is established by the detachment commander as required for controlling and directing localized military police operations. The net uses portable FM radios organic to the two military police platoons and is controlled by the senior in-

dividual involved in the specific operation for which the net is established.

c. The internal and external radio nets in which elements of the military police detachment operate equipment are shown in figure 100.

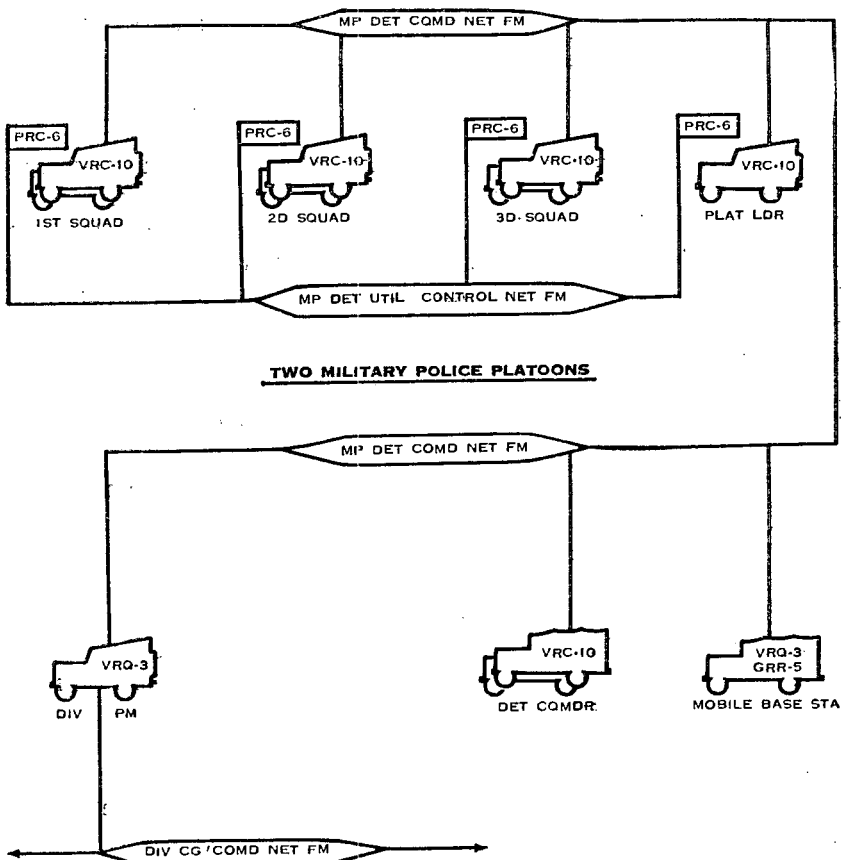


Figure 100. Type radio nets for the airborne division military police detachment.

CHAPTER 21

COMMUNICATION FOR SPECIAL OPERATIONS

293. General

a. Signal communication is essential for all types of operations, but its importance is greatly increased for those operations where conditions of weather or terrain impose additional control problems for the command. Most problems can be overcome or greatly reduced by prior planning, preparation of equipment, and special training of signal and communication personnel. Operation under extremes of climate or terrain, however, present special communications problems that are considered individually in this chapter.

b. All signal communication planning should be based on the actual conditions that will be encountered; for example—

- (1) If an operation is contemplated in an area of extreme cold or deep snow, personnel must be trained to communicate in intense cold, and communication equipment must be made ready to withstand the climate.
- (2) In an airborne operation, the amount of signal equipment initially available is limited; thus, planning for the resupply of critical signal items takes on great importance.

c. Signal and communication personnel should be thoroughly trained for the type warfare in which they are to participate. This training should present problems typical of those to be encountered in the operation, and conducted under realistic conditions. If a complete training program is not possible, all personnel must be thoroughly oriented as to the conditions they will encounter.

294. Attack of Fortified Position

a. General. It is difficult to control assaulting forces in an attack on a fortified position because of noise and confusion. This demands great coordination between the assaulting infantry units and the supporting force of artillery, tanks, and engineers. To obtain this coordination, a good reliable communication system is essential. Indeed, the success of the assault depends largely on the effectiveness of the communication developed for it.

b. Communication Considerations. All means of communication are used to provide control of the assaulting forces and to obtain coordination between them and their supporting forces. Radio nets must provide them with common channels. Wire lines are installed

between adjacent units. Arm-and-hand signals, panels, and pyrotechnics are useful for close coordination of the attacking force. Messengers are also used as the situation requires.

c. Limitations of Communication.

- (1) Permanent fortifications normally have dependable underground wire communication systems which reduce reliance on radio. This gives the defense greater communication security and permits wider latitude in jamming techniques against radio nets of the attacking force. Jamming poses quite a problem for the attacker. Most frontline units use small portable radio sets to control and coordinate attack maneuver. These radio sets are extremely susceptible to jamming techniques.
- (2) The wire lines of the attack force are vulnerable to artillery fire and to tank and other vehicle traffic.
- (3) If radio circuits are jammed and wire lines are destroyed, the attacking force must rely on messengers, flags, panels, and pyrotechnics.

d. Reference. For additional information on communication for an attack on a fortified position, see FM 31-50.

295. Operation at Riverline

a. General. Communication during an attack to force a river crossing is similar to that required in other attacks. Command posts are located close to the river to avoid early displacement and facilitate control. Initially, wire and messengers are the most used means; other means are restricted until the attack has been discovered. A minimum wire system is installed for use during occupation of assembly areas and attack positions. The use of motor messengers in the forward areas may be restricted for security reasons.

b. Communication for the Crossing. Wire circuits are established across the river as soon as practical, but the nature of river crossings requires an almost complete reliance on radio during the assault. Radio is preferable because it requires no physical links between stations and can be used over long distances between moving units. It provides tactical control, fire control, and control of aircraft, and is used for administrative purposes and liaison between the various units. The heavy load placed on radio communication necessitates the establishment on the far shore of telephone (wire and radio relay) communication as soon as possible after the assault. Other means are exploited, including sound, visual, and messenger.

c. Limitations on Communication. The commander of a unit may place security restrictions on radio and visual communication prior to a river crossing. This is done to conceal the operation from the enemy as long as possible. As soon as security restrictions are re-

moved, all means of communication are used. Wire lines are extremely vulnerable to enemy artillery fire and to friendly tank and vehicle traffic. For this reason, wire lines should be buried at all crossing sites or placed across the river below or above the crossing sites when time allows.

d. References. For further information on communication for a river crossing, see FM's 100-5 and 7-40.

296. Night Combat

a. General. The movement, control, and coordination of an attack during darkness are extremely difficult because of limited visibility. For this reason, a night operation must be planned in great detail. Reconnaissance of the area must be made during daylight, and an adequate and reliable communication system must be provided to coordinate and control the attack. Prior planning, reconnaissance, and the communication system must make up for the control and coordination lost because of limited visibility.

b. Communication Considerations. All means of communication are provided for night operations, especially wire, radio, and messenger. Visual and sound communications are used as alternate or standby means. Before the attack, wire lines are laid as far forward as possible and laterally between adjacent units. Except when radio silence is imposed, normal radio nets are operated to control and coordinate the assaulting and supporting forces. Coordination between adjacent assault units is provided by portable radios, messengers, wire, and sound.

c. Limitations of Communication. Wire, messenger, and visual communications are more difficult to install and maintain. Arm-and-hand signals, smoke, and panels are ineffective. Messengers may have trouble finding their way, and therefore should be completely oriented on the routes. They should survey the routes by daylight when possible. Signal and communication centers, radio stations, and switchboards must operate under blackout restrictions, so they must be provided with blackout facilities.

297. Combat in Towns

a. General. Combat operations conducted in towns are difficult to coordinate and control, and the effectiveness of signal communication is significantly reduced. The communication system employed must be sufficiently flexible to meet any emergency. The planning for the system visualizes maximum use of all existing commercial and military communication facilities.

b. Communication Considerations. The communication system used in support of town combat does not differ greatly from the system employed in other operations. To achieve the necessary flexibility, all authorized communication means are utilized.

c. Limitations on Communication. Radio communication is often seriously affected by steel buildings and powerlines. This requires the substitution of messengers and additional wire circuits. Visual communication has limited use because of the obstructed field of vision. Because of falling debris and tank and other vehicle traffic, it is desirable to install wire lines underground where possible; sewers, tunnels, and subways can be utilized. This requirement makes wire installation more time consuming. Motor messenger service is often nullified because of the impassable conditions of town roads. These limitations emphasize the need to use all communication facilities when drawing up the communication scheme for a combat operation in a town.

d. Reference. For further information on communication for combat in built up areas, see FM 31-50.

298. Combat in Woods (Temperate Climate)

a. General. The installation, maintenance, and operation of a combat communication system in wooded areas in a temperate climate pose no major problem. But the particular aspects discussed in *c* below must be considered when making communication plans.

b. Communication Considerations. All available means of communication can be used in support of combat operations in wooded areas. Normal wire circuits, radio nets, and messenger routes are provided. On the immediate front, arm-and-hand signals and pyrotechnics can be employed.

c. Limitations of Communications. Wooded areas have some adverse effects on all types of communication. For example—

- (1) Wire installation teams frequently have to operate on foot. This significantly increases the time needed for installation and maintenance.
- (2) Radio stations should be sited on any available high ground with antennas free and clear of trees and bushes. This can be especially critical in the case of the low-powered radio nets of frontline units.
- (3) Because of the lack of well-defined roads, messenger speed is slowed considerably.
- (4) The limited visibility in wooded areas reduces the usefulness of ground-to-air signaling.

299. Mountain Operations

a. General. In mountainous terrain, the supporting communication facilities are difficult to install and maintain. Authorized equipment is supplemented by packboards, climbing equipment, and snow transport. In some instances it may be necessary to resort to helicopters and pack animals for moving equipment and supplies.

b. Communications Considerations. Wire and radio are the most used means of communication, with wire being more dependable. Some of the typical specific communication considerations follow:

- (1) In defense operations, extra telephones over and above TOE authorizations may be required.
- (2) Helicopters and fixed-wing aircraft can be used to lay wire over otherwise inaccessible terrain.
- (3) Small portable radio sets over and above TOE allowances may be required.

c. Limitations.

- (1) Mountainous terrain reduces the wire laying capability of all units. Avalanches and occasional falling rocks present an ever-present hazard to wire lines.
- (2) Helicopters may be required to assist in lifting signal equipment into position and in periodic logistic support of isolated radio and radio relay sites.
- (3) Motor messenger service is limited by the scarcity of good roads.
- (4) Dead spaces and terrain obstacles interfere with radio reception.
- (5) Very cold weather conditions require special considerations.

d. References. For further information concerning communication for mountainous operations, see FM 100-5 and FM 31-72.

300. Combat in Snow and Extreme Cold

a. General. Combat in snow and extreme cold is characterized by subzero temperatures, unrestricted but slow movement, and the employment of small tactical forces. Most signal equipment can be used effectively under these conditions if signal planning provides for all necessary expedients and equipment corrective measures such as adequate winterizing.

b. Communication Considerations. Radio relay is generally considered the most reliable communication means in arctic or subarctic areas. Due to the distances involved between divisional size units and the difficulty of overland movement, wire communication usually is short telephone trunks between battle group headquarters and major subordinate units, the installation and maintenance of wire communication facilities other than local lines is for the most part infeasible between elements of the division. Also, radio relay facilities must be backed up by other types of radio communication facilities since it would be impractical to depend entirely on radio relay trunking facilities. Radio stations must be carefully sited with their antennas elevated above the surrounding terrain. Foot messengers require special equipment such as snow shoes and skis. Vehicles for motor messengers must have high flotation and tractor type characteristics to get about on the snowy terrain. Air messenger

service is mandatory. Resupply of signal items to using units is complicated by lack of adequate road nets and inclement weather conditions (FM 31-71).

c. Limitations.

- (1) Wire installation and maintenance are extremely difficult because of the heavy snow, extreme cold, and the bulky clothing worn by the wire repair personnel. The combination of strong winds and falling snow soon buries wire lines laid on the ground and damages overhead lines.
- (2) Very cold weather makes the winterizing and weatherproofing of communication equipment imperative. For example, specially designed cold weather dry cell batteries or special warming devices are required for operation.
- (3) Radio communication is vulnerable to the electrical disturbances that accompany the aurora australis and aurora borealis, to mountain masks, and extremely cold temperatures.
- (4) Long periods of darkness restrict visibility and reduce the effectiveness of visual communication.

d. References. For further information concerning communication in snow and extreme cold, see FM 31-71.

301. Jungle Operations

a. General. It is difficult to control combat in jungles because of the dense vegetation that reduces visibility, hinders movement, and impairs the effectiveness of signal communication. All signal equipment is adversely affected by climatic conditions in jungle operations. Special equipment treatments such as fungiproofing will be necessary. These treatments have to be renewed periodically.

b. Communication Considerations. All means of communication must be utilized in jungle operations. Normally, wire is the most dependable. It can be laid along roadways, trails, and on beaches. Aircraft and helicopters can lay it over dense vegetation. All communication equipment must be wiped dry daily as a safeguard against corrosion and deterioration from fungus growth.

c. Limitations on Communication. Communication over jungle terrain poses the same limitations found in wooded areas in temperate climates, but the problems are more acute in the tropics. Some specific limitations follow:

- (1) Frequent rains and constant dampness reduce the effective range of wire circuits, so wire lines should be installed on trees and poles if possible. It also may be necessary to use amplifying telephonic devices. Because of the dense vegetation, wire must often be laid from the air.
- (2) Effective radio range is significantly reduced by the damp vegetation and shielding effect of jungle brush and trees. Radio operators must be trained to copy very weak signals.

(3) Messenger service is affected by the scarcity of good roads and trails.

(4) Visual communication is limited by the obstructing vegetation.

d. Reference. For further information on jungle operations, see FM 31-30.

302. Desert Operations

a. General. Military operations in the desert are characterized by wide dispersion and rapid mobility. Signal plans must provide mobility for all signal forces as well as radio equipment capable of communicating over great distances. In addition, planners must take into consideration the fact that signal equipment will be exposed to intensive heat, dust, and sand, and that greater maintenance will be required. The vast open reaches of desert make camouflage and security imperative for all signal installations.

b. Communication Considerations. All means of communication are employed to support combat operations in the desert. Radio is the most used means in mobile attack operations. When on the defensive, more reliance can be placed on wire. As a rule, radio sets have a longer effective range in a desert and wire lines are relatively easy to install. Radio sets should be mounted on vehicles when possible and wire lines should not be laid near congested areas. Visibility is generally good during daylight and all means of visual communication should be used to the utmost. Because of the great distances involved, motor messengers are fully utilized. For very long runs, aircraft should be used to transport messengers.

c. Limitations on Communication. Normally, all means of communication function effectively in the desert; any limitations are imposed by security restrictions or the type of operation. The severity of desert climates makes preventive maintenance programs for all signal equipment essential. Radio communication is highly susceptible to jamming because of the improved reception afforded by the open desert terrain. Wire lines are particularly vulnerable to artillery fire and tank and other vehicle traffic.

d. Reference. For further information on desert operations, see FM 31-25.

303. Amphibious Operations

a. Planning. Communication planning begins with the first knowledge of the impending operation and continues until the operation has been completed. Signal officers are given as much information to base their plans on as security permits.

b. Training Requirements. Troop concentration and specialized training precede embarkation. Communication personnel are trained

with other personnel in the use of cargo nets, small landing craft, and in waterproofing equipment. Specialized communication training includes communication exercises aboard landing craft and command ships. If possible, a rehearsal is conducted in which the entire landing force embarks on a training operation and lands on a beach similar to the objective. During the training and rehearsal phases, it is desirable to give artillery forward observer sections training in radio net operation with the fire support ships.

c. During Embarkation. Troop message centers are established on each ship before the troops go aboard. They facilitate the transmission of messages between the commander of troops, unit commanders, and the ship's communication office. Signal equipment is stowed to facilitate unloading; some items are hand-carried by operating personnel.

d. During the Voyage. Naval personnel provide communication between the ships in the convoy. Blinker lights and flags are the principal means used. Radio silence usually is prescribed until the landing starts. Details of the operation and final instructions pertaining to assault communication systems are given to communication personnel during the voyage.

e. After Landing. The communication systems are similar to those used in the attack. Radio is used until wire systems are installed. Wire lines must be laid carefully to prevent damage by troops and vehicles. This is especially important in the beachhead area. Messengers are used extensively by all units. Visual signals, particularly pyrotechnics, are used by leading assault elements to indicate arrival at phase lines and objectives. Marking panels are used to identify units and to mark frontline positions for friendly aircraft.

f. Fire Control. During the period between the landing of the first wave of infantry and the landing of the artillery, supporting fires are furnished by naval vessels, specially equipped support craft, and tactical aircraft. Naval gunfire normally is conducted by naval gunfire teams which go ashore with the assault elements. These teams are supplemented by artillery forward observers who are also trained to adjust naval gunfire; in some instances, artillery forward observers may take over completely the adjustment by liaison officers assigned to artillery battalions for this purpose. Radio is used for communication between artillery forward observers, naval gunfire teams, naval gunfire liaison officers, and fire support ships. Additional radios may be required and are procured before embarkation. Radio communication to the command ship is supplemented by a dispatch boat. All artillery and naval fires and air support missions are coordinated. Air support is directed by Air Force or Marine Corps tactical air control parties as appropriate.

g. Field Artillery. Direct-support field artillery normally is landed on call. Centralized fire direction within an artillery battalion is established as soon as practical. This may be a considerable time after the landing of the initial waves. The leading echelon of a direct-support artillery battalion headquarters lands at the same time as the advance echelon of the infantry battle group. It initiates prompt reconnaissance, establishes the battalion command post, and installs communication facilities. As soon as communication is established, firing batteries are brought under centralized command.

h. Consolidation Phase. During the consolidation phase, faulty or damaged equipment is repaired or replaced, casualties are replaced, and wire lines are shortened and serviced.

i. References. For further information on amphibious operations, see FM 60-5.

APPENDIX I

REFERENCES

AR 320-5	Dictionary of United States Army Terms.
AR 320-50	Authorized Abbreviations and Brevity Codes.
AR 380-40	Safeguarding Cryptomatter.
FM 1-5	Army Aviation Organization and Employment.
FM 1-100	Army Aviation.
FM 5-1	Engineer Troop Organizations and Operations.
FM 6-18	Mortar Battery, Airborne Division Battle Group.
FM 6-20	Field Artillery Tactics and Techniques.
FM 6-21	Division Artillery.
FM 6-40	Field Artillery Cannon Gunnery.
FM 6-140	The Field Artillery Battery.
FM 7-10	Rifle Company, Infantry and Airborne Division Battle Groups.
FM 7-19	Combat Support Company, Infantry Division Battle Group.
FM 7-21	Headquarters and Headquarters Company, Infantry Division Battle Group.
FM 7-40	Infantry and Airborne Division Battle Groups.
FM 7-100	Infantry Division.
FM 9-25	Ordnance Battalion, Infantry Division.
FM 11-10	Infantry Division, Signal Battalion.
FM 11-16	Signal Orders, Records, and Reports.
FM 11-17	Tactical Communications Center Operation.
FM 11-57	Signal Battalion, Airborne Division.
FM 17-33	Tank Units, Platoon, Company, and Battalion.
FM 17-35	Armored Cavalry Platoon, Troop and Squadron.
FM 17-70	Communication for Armor Units.
FM 21-5	Military Training.
FM 21-6	Techniques of Military Instruction.
FM 21-26	Map Reading.
FM 21-30	Military Symbols.
FM 21-75	Combat Training of the Individual Soldier and Patrolling.
FM 24-18	Field Radio Techniques.
FM 24-20	Field Wire and Field Cable Techniques.
FM 24-150	Electronics Warfare (U).
FM 27-10	The Law of Land Warfare.

FM 31-25	Desert Operations.
FM 31-30	Jungle Operations.
FM 31-50	Combat in Fortified Areas and Towns.
FM 31-60	River Crossing Operations.
FM 31-71	Northern Operations.
FM 31-72	Mountain Operations.
FM 32-5	Communication Security (U).
FM 41-5	Joint Manual Civil Affairs/Military Government.
FM 41-10	Civil Affairs/Military Government Operations.
FM 41-15	Civil Affairs/Military Government Units.
FM 44-2	Light Antiaircraft Artillery (Automatic Weapons).
FM 55-37	Transportation Battalion, Infantry Division.
FM 57-30	Airborne Operations.
FM 57-35	Airmobile Operations.
FM 57-100	The Airborne Division.
FM 60-5	Amphibious Operations, Battalion in Assault Landings.
FM 100-5	Field Service Regulations; Operations.
FM 100-11	Signal Communications Doctrine.
FM 100-15	Larger Units.
FM 101-5	Staff Officers' Field Manual; Staff Organization and Procedure.
TM 11-5135-15	Radio Set Control, AN/GSA-7.
DA Pam 108-1	Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.
DA Pam 310-3	Index of Training Publications.
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
JCS Pub 1	Dictionary of United States Military Terms for Joint Usage.

APPENDIX II

CHARACTERISTICS OF RADIO SETS IN THE INFANTRY AND AIRBORNE DIVISIONS

Type	Planning range	Signal	Channels	Type of operation	Frequency
AN/PRC-6	1.5 km	Voice, FM	Crystal controlled, 43	Portable	47-55.4 mc.
AN/PRC-9	5 to 8 km	Voice, FM	Continuous tuning, 120	Portable	27-38.9 mc.
AN/PRC-10	5 to 8 km	Voice, FM	Continuous tuning, 170	Portable	38-54.9 mc.
AN/GRC-7		Voice, FM			
RT-68/GRC	16 km	Voice, FM	Continuous tuning, 170 two preset.	Vehicular, ground	38-54.9 mc.
RT-70/GRC	1.5 km	Voice, FM	Continuous tuning, 115 two preset.		47-58.4 mc.
R-110/GRC		Voice, FM	Continuous tuning, 170 three preset.		38-54.9 mc.
AM-65/GRC					
AN/GRC-8					
RT-68/GRC	16 km	Voice, FM	Continuous tuning, 170 two preset.	Vehicular, ground	38-54.9 mc.
RT-70/GRC	1.5 km	Voice, FM	Continuous tuning, 115 two preset.		47-58.4 mc.
AM-65/GRC					
AN/GRC-9 (AN-)	32 km	CW, AM	Continuous tuning	Vehicular, field transportable.	2-12 mc.
GRC-87 (AN-)	16 km	MCW			
VRC-34) RT-77.	16 km	Voice			

AN/GRC-39	48-80 km	Voice, FM	Continuous tuning, 170	Mobile radio relay.	54-70.9 mc.
2 T-235/ GRC-10.					
2 R-125/ GRC-10.					
AN/GRC-19	80 km	Voice, AM	Continuous tuning	Vehicular	
	120 km	CW	Seven preset.		0.5-32 mc. 1.5-20 mc.
R-392/URR					
T-195/GRC-19.					
AN/GRC-26D	Extended	Voice, AM CW, AM TT, FSK MCW, AM	Continuous tuning	Mobile radio teletype station.	.5-32 mc.
R-390/URR (2 ea).					
T-368/URT					
AN/GRC-46	80 km	Voice, AM	Continuous tuning	Mobile radio tele- type station.	1.5-20 mc.
	120 km	CW, FSK	Seven preset.		.5-32 mc. 1.5-20 mc.
R-392/URR					
T-195/GRC-19.					
AN/GRR-5		Voice, CW, MCW, AM.	Continuous tuning, ten pre- set.	General use.	1.5-18 mc.
AN/VRC-9	16 km	Voice, FM	Continuous tuning, 120, two preset.	Vehicular	27-38.9 mc.
RT-67/GRC					
AN/VRC-10	16 km	Voice, FM	Continuous tuning, 170, two preset.	Vehicular	38-54.9 mc.
RT-68/GRC					
AN/VRC-15	16 km	Voice, FM	Continuous tuning, 170, two preset.	Vehicular	38-54.9 mc.
RT-68/GRC					
AM-65/GRC					

CHARACTERISTICS OF RADIO SETS IN THE INFANTRY AND AIRBORNE DIVISIONS—Con.

Type	Planning range	Signal	Channels	Type of operation	Frequency
AN/VRC-17	16 km.	Voice, FM	Continuous tuning	Vehicular	27-38.9 mc.
RT-67/GRC			120, two preset		27-38.9 mc.
R-109/GRC			120, three preset		
AN/VRC-18	16 km.	Voice, FM	Continuous tuning	Vehicular	
RT-68/GRC			170, two preset		38-54.9 mc.
R-110/GRC			170, three preset		38-54.9 mc.
AN/VRC-29	80 km. 120 km.	Voice, CW FSK, AM	Continuous tuning	Mobile radio tele- type station.	
T-195/GRC-19			Seven preset		1.5-20 mc. .5-32 mc.
R-392/URR					
AN/VRC-30		Voice, MCW, AM, FM.	Continuous tuning	Vehicular	
(AN-VRC-35)*					
AN/PRC-9	5-8 km.	Voice, FM	120	Portable	27-38.9 mc.
AN/VRC-14	16 km.	Voice, FM	120, two preset	Vehicular	27-38.9 mc.
AN/ARC-27	48 km, 300 meters altitude	Voice, MCW, AM.	1750, 18 preset plus guard	Vehicular	225-399.9 mc.
AN/VRQ-2	16 km.	Voice, FM	Continuous tuning, 120, two preset.	Vehicular	27-38.9 mc.
2 RT-67/GRC					
AN/VRQ-3	16 km.	Voice, FM	Continuous tuning, 170, two preset.	Vehicular	38-54.9 mc.
2 RT-68/GRC					
AN/ARC-27	Plane at 300 meters alti- tude, 48 km.	Voice, MCW, AM.	1750, 18 preset plus guard	Vehicular	225-399.9 mc.
AN/URC-4	Air-Ground, 1.6 km.	Voice, AM	Two fixed	Portable, pocket	120-240 mc.
Transmitter					
RT-159/					
URC-4.					
Receiver					130-260 mc.

RT-159/ URC-4	Determined by altitude	Voice, FM	Crystal controlled (280)	Aircraft	24-51.9 mc.
AN/ARC-44	Determined by altitude	Voice, FM	Crystal controlled (1750)	Vehicular	225-399.9 mc.
AN/VRC-24	80 km	FM	Continuous tuning	Vehicular	Chan A: 50-99.9 mc.
AN/MRC-54					Chan B: 100-224.75 mc.
3 R-417/ TRC-24.					Chan C: 225.0-399.75 mc.
3 T-302/ TRC-24.					Chan D: 400-600 mc.
AN/MRC-68	48-80 km	FM	Continuous tuning	Vehicular	54-70.9 mc.
2 R-125/ GRC-10.			170		
2 T-235/ GRC-10.					54-70.9 mc.
2 ea AN/ TCC-3.					54-70.9 mc.
AN/MRC-69	40 km (line of sight)	FM	Continuous tuning	Vehicular	Chan A: 50-99.9 mc.
2 R-417/ TRC-24.					Chan B: 100-224.75 mc.
2 T-302/ TRC-24.					Chan C: 225.0-399.75 mc.
2 ea AN/ TCC-7.					Chan D: 400-600 mc.

*In AN/VRC-35 the AN/VRC-27 is replaced by the AN/VRC-24.

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