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DEPARTMENT OF THE ARMY FIELD MANUAL

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SIGNAL BATTALION AIRBORNE DIVISION

HEADQUARTERS, DEPARTMENT OF THE ARMY
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SIGNAL BATTALION
AIRBORNE DIVISION

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CHAPTER 1

INTRODUCTION

1. Purpose

This manual provides Army doctrine and guidance for the employment of the personnel and equipment of a signal battalion, airborne division.

2. Scope

a. This manual presents the organization, mission, and capabilities of the signal battalion, airborne division, manned and equipped under TOE 11–215( ) and provides doctrinal guidelines for the tactical employment and operation of the battalion and its subordinate components. Since employment and concept of operations are similar in certain environments to those of other divisional signal battalions, this manual should be used in conjunction with FM 11–50.

b. Commitment in an internal defense (ID) role entails significant modification of standard tactical missions, concepts, and methods of employment and deployment. Chapter 11 provides supplemental doctrinal guidance specifically aimed at assisting the commander, staff, and other personnel of an airborne signal battalion to effectively meet communication support requirements peculiar to the (ID) environment. It also provides general information on matters other than communications support which will require increased emphasis by the signal battalion when employed in an ID role.

c. The discussions of missions, organization, personnel, and equipment are based upon the latest issues of Tables of Organization and Equipment (TOE). All references to TOE are by basic number only; Department of the Army Pamphlet 310–3 should be consulted for letter suffix of the latest edition.

3. Applicability

a. The methods and procedures set forth herein are intended as guides only and should be considered flexible. Judgment, logic, and experience should be exercised in interpreting and applying doctrinal guidelines in order to provide the most effective communications support to the commander in consonance with his policies, the tactical situation, and resources available.

b. The material presented is applicable, unless otherwise indicated, to nuclear and nonnuclear warfare, and to an internal defense environment. Material peculiar to internal defense is contained in chapter 11.

4. Comments on Publication

Users of this manual are encouraged to submit recommendations for changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of text in which change is recommended. Reasons should be provided to insure understanding and to enable complete evaluation. Comments are to be forwarded directly to the Commanding Officer, U.S. Army Combat Developments Command Communications-Electronics Agency, ATTN: Doctrinal Literature Division, Fort Monmouth, New Jersey 07703.

5. References

a. Publications and other reference materials pertaining to subjects within the scope of this manual are listed in Appendix I.

b. Appendix II summarizes the technical characteristics of the major items of signal equipment authorized the airborne division signal battalion. It may be used to obtain general information on the capabilities and limitations of the equipment.

c. Appendix III is a type vehicle loading plan for an airborne division signal battalion.

CHAPTER 2

THE SIGNAL BATTALION, AIRBORNE DIVISION

Section I. MISSION AND ORGANIZATION

6. General

The signal battalion, airborne division (TOE 11–215( )) is organized and employed functionally to support the concept of headquarters fragmentation. In carrying out its mission, the signal battalion is responsible for establishing and operating a flexible, responsive, and reliable signal communication system for the airborne division. This responsibility encompasses not only provision for command/control and combat support communications, but also those communications required for combat service support throughout the division area.

7. Mission

The basic mission of the signal battalion, airborne division, is to enhance the combat effectiveness of the airborne division by establishing, operating, and maintaining an efficient and reliable division signal communication system capable of meeting the requirements of the division commander and his staff. Specific missions include—

a. Providing command communications for echelons of an airborne division headquarters and an airborne division support command headquarters.

b. Providing required communication support to brigade headquarters, and other assigned or attached major subordinate units.

c. Establishing, operating, and maintaining a division common-user signal communication system.

d. Performing direct support maintenance of cryptographic equipment for the division and organizational maintenance of equipment organic to the battalion.

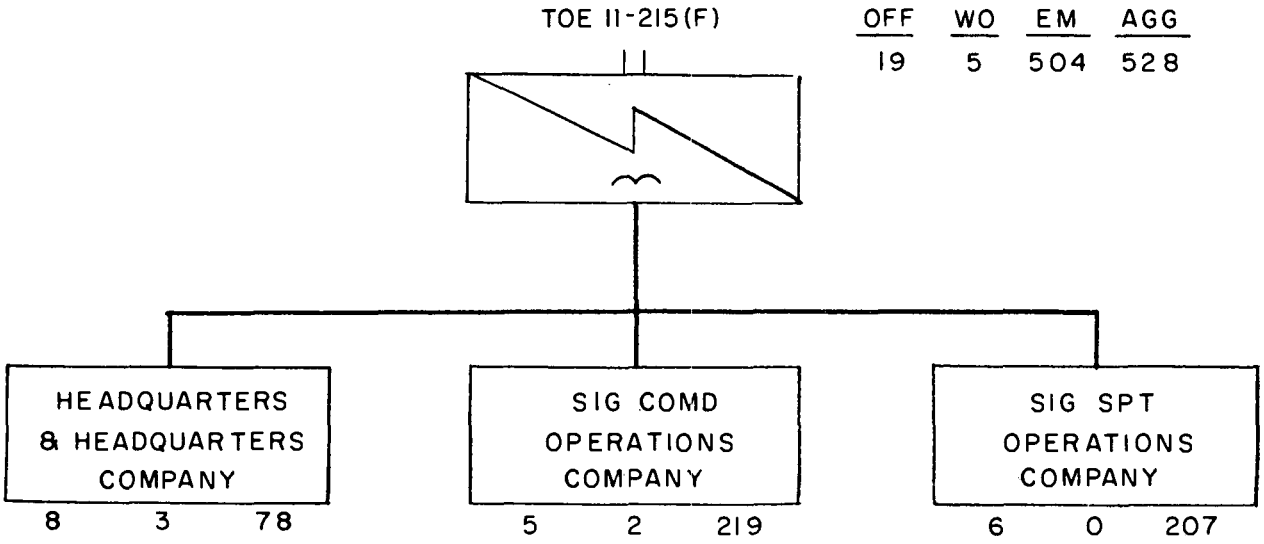


Figure 1. Signal battalion, airborne division.

8. Organization

The division signal battalion is organic to each airborne division, and is organized as indicated by figure 1. Department of the Army orders for organization of a new signal battalion designates the operating companies of the battalion, company A (signal command operations), and company B (signal support operations).

Section II. CAPABILITIES AND LIMITATIONS

9. Facilities Provided

At full strength the signal battalion, airborne division normally provides the following:

a. Signal staff planning and supervision of the division communication system.

b. Signal staff direction and supervision of communication training.

c. Command/control and staff supervision of organic and attached signal units.

d. Technical assistance on signal communication matters.

e. Twenty-four hour operation of a maximum of six signal centers; one at the main and alternate echelon of division headquarters; one in each of the three brigade areas; and one at support command headquarters.

f. Twenty-four hour operation of a communications center and a telephone switching central at division rear echelon.

g. A radio relay and carrier terminal and a radio wire integration (RWI) station for division artillery, and the division aviation battalion, (airfield).

h. Limited direct support maintenance of cryptographic equipment for the division.

i. Organizational maintenance of vehicles, power generators, armament, and signal equipment organic to the battalion.

10. Required Support Services

The signal battalion, airborne division is dependent upon—

a. Other divisional units for medical, dental, and religious services; for maintenance of personnel records; and for supplemental motor transportation.

b. The division aviation battalion or other army air units for aerial wire-laying operations, air messenger services, and aerial FM radio relay.

c. Division support command for direct support maintenance other than cryptographic maintenance.

d. Corps or higher echelon for photographic services.

e. Signal units of higher headquarters for the radio teletype, and radio relay terminal equipment and personnel required to enter higher headquarters command radio nets and multi-channel communications systems.

11. Defense Capability

Individuals of the signal battalion can engage in effective coordinated defense of their unit area or installation. Isolated elements of the battalion, such as radio relay teams and forward signal centers are greatly dependent upon supported units for effective defense of their installation against a major attack.

12. Mobility

a. The signal battalion, airborne division has sufficient vehicles to transport 100 percent of TOE equipment and approximately 71 percent of authorized personnel strength. See appendix III.

b. The signal battalion, airborne division is 100 percent air transportable in medium transport aircraft.

13. Augmentation

The signal battalion, airborne division requires augmentation of both personnel and equipment to effectively support the division during sustained operations over an extended period of time.

CHAPTER 3

HEADQUARTERS AND HEADQUARTERS COMPANY, SIGNAL BATTALION

Section I. MISSION AND ORGANIZATION

14. General

The headquarters and headquarters company (TOE 11–216( )) is organized to provide the command and staff elements required to plan, coordinate, and control the airborne division signal communications system, communications training, and other related activities. The company also provides the elements required for internal control, staff supervision, and administration and logistic support of the signal battalion.

15. Mission

The primary mission of the headquarters and headquarters company is to provide for com-

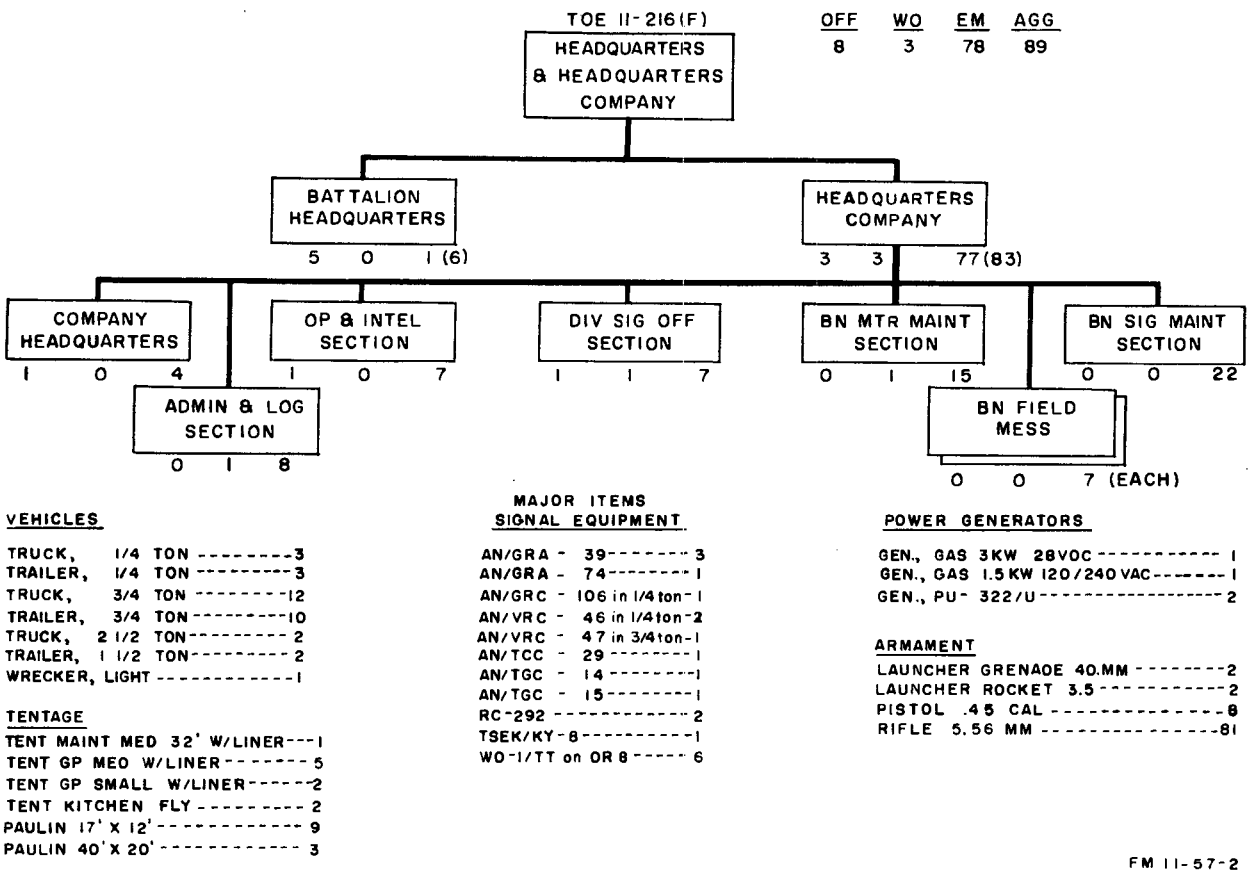


Figure 2. Organization headquarters and headquarters company, signal battalion, airborne division.

mand/control and administration of the signal battalion, and to provide the staff elements required to permit the DSO to effectively direct and coordinate the establishment and maintenance of an efficient division communication system. Specific missions include—

a. Directing and coordinating operations and training of the signal battalion and providing the headquarters facilities with which the battalion commander exercises control.

b. Providing the airborne division with a signal officer and staff and necessary staff facilities.

c. Providing supplemental maintenance and administrative and logistic support for the operating companies.

d. Providing direct support maintenance of cryptographic equipment for the division and performing organizational maintenance of organic company equipment.

16. Organization

The headquarters and headquarters company is organic to each signal battalion, airborne division, and is organized as indicated by figure 2.

Section II. CAPABILITIES

17. Facilities Provided

At full strength headquarters and headquarters company is capable of providing the following:

a. The command/control and staff elements required to plan, direct, and coordinate the training and operation of the signal battalion, airborne division.

b. The signal staff section for an airborne division headquarters.

c. Administrative and logistic support for the signal battalion, to include—

(1) Liaison with the administration company, airborne division.

(2) Organizational maintenance of signal equipment for the signal battalion.

(3) Organizational motor and power generator maintenance to supplement the capabilities of the operating companies.

(4) One consolidated mess or two field messes.

d. Limited direct support maintenance of cryptographic equipment for the airborne division.

18. Defense Capability

Individuals of headquarters and headquarters company can engage in effective coordinated defense of the unit area.

19. Mobility

a. Headquarters and headquarters company has sufficient vehicles to transport 100 percent of TOE equipment and approximately 72 percent of authorized personnel strength. See appendix III.

b. Headquarters and headquarters company is 100 percent air transportable in medium transport aircraft.

Section III. COMPOSITION

20. Battalion Headquarters

a. The battalion headquarters includes the battalion commander, who is also the division signal officer (DSO), the battalion executive officer, the sergeant major, and the battalion staff who assist the battalion commander in carrying out his mission. This section exercises command supervision over all units assigned or attached to the battalion.

b. In addition to commanding the signal battalion, the DSO is a member of the division special staff. His actions are based on the policies of the division commander, the tactical situation, and the division SOP. The DSO exercises staff supervision over all signal communication activities of the division. This staff supervision responsibility includes communication training, communications-electronics

security, and cryptographic maintenance. In addition the DSO renders technical advice, as required, on signal supply and maintenance matters.

21. Company Headquarters

The company headquarters includes the company commander, first sergeant, supply specialists, and company clerk. This section is responsible for internal administrative support for the company to include company supply.

22. Administrative and Logistics Section

This section includes the personnel and equipment required for the support of the internal administration and logistics of the battalion.

a. The battalion adjutant S1 exercises operational control and staff supervision of the administrative personnel of the section. The personnel NCO serves as liaison to the administration company of the division support command which maintains the permanent personnel records for the signal battalion.

b. The logistic personnel of the section are under the immediate supervision of the unit supply technician (warrant officer) and under the operational control and staff supervision of the battalion S4. The unit supply technician is normally assigned as the battalion property book officer.

23. Operations and Intelligence Section

This section includes the personnel and equipment required to plan, coordinate, and supervise the utilization of the operational elements of the battalion. The section operates under the operational control and staff supervision of the battalion S3. The assistant S3 has the additional duty of battalion S2, intelligence officer.

a. A division systems control center (para 64) is normally established by this section to coordinate all matters relating to the communication activities of the operating elements of the battalion.

b. A noncommissioned officer is included in this section as chemical NCO to assist the battalion S3 in all aspects of chemical, biological, and radiological (CBR) operations.

24. Division Signal Officer Section

This section includes the assistant division signal officer (ADSO), the cryptographic technician (WO), and the enlisted complement and equipment required for operation of the division signal office.

a. The ADSO serves as the direct assistant to the division signal officer (DSO) in supervising all communications-electronics operations of the division.

b. Responsibilities of this section include—

(1) Publishing and distributing of the division Standing Signal Instructions (SSI), Signal Operation Instructions (SOI), and the division telephone directory.

(2) Providing input for paragraph 5 of division plans and orders

(3) Preparing the signal portion of the division SOP.

25. Battalion Motor Maintenance Section

This section includes the motor maintenance technician (warrant officer) and the personnel and equipment required to provide organizational motor and power generator maintenance for headquarters and headquarters company. It also provides supplemental motor and power generator maintenance for other elements of the signal battalion. The section is under the command control of the unit maintenance technician and under the operational control and staff supervision of the battalion S4.

26. Battalion Signal Maintenance Section

This section includes the personnel and equipment required to provide organic organizational signal maintenance for the signal battalion and limited direct support cryptographic maintenance for the division. The section operates under the direct control of the section chief and under the operational control and staff supervision of the battalion S4.

27. Battalion Field Mess

a. This section includes the personnel and equipment required to establish one consolidated battalion mess, or two field messes.

b. This section operates under the direct control of the headquarters company commander when a consolidated mess is established. In the field, one mess is located at division main and a second mess is located at division alternate. These messes are the responsibility of the appropriate signal unit commander as set forth in signal battalion SOP. Normally the mess located at division main is placed under the control of the headquarters company commander while the mess at division alternate is placed under the control of the signal command operations company commander.

CHAPTER 4

SIGNAL COMMAND OPERATIONS COMPANY, SIGNAL BATTALION

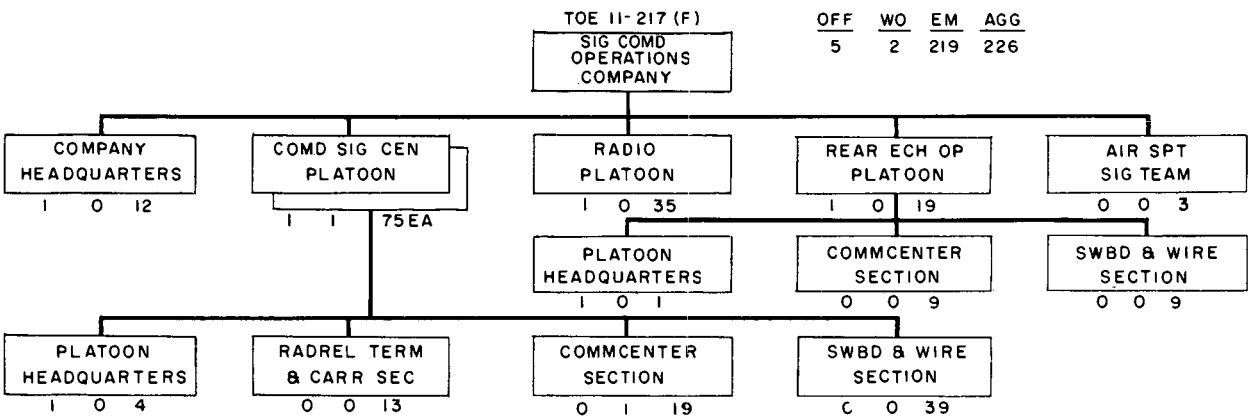
Section I. MISSION AND ORGANIZATION

28. General

The signal command operations company (TOE 11–217( )) is organized to provide the operational elements required to install, operate, and maintain their assigned portion of the division signal system.

29. Mission

The primary mission of the signal command operations company is to provide efficient and reliable command communication support for all echelons of division headquarters. Specific missions include—



VEHICLES

TRUCK,	1/4 TON	24
TRAILER,	1/4 TON	24
TRUCK,	3/4 TON	26
TRAILER,	3/4 TON	13
PLATFORM,	1/2 TON	6

TENTAGE

TENT MAINT MED 32' W/LINER	1
TENT GP SMALL W/LINER	9
PAULIN 17'x 12'	1
PAULIN 40'x 20'	3

MAJOR ITEMS SIGNAL EQUIPMENT

AN/GRA-39	2	CX-162/100'	4
AN/GRA-50	11	CX-162/500'	20
AN/GRA-74	11	CX-162/1000'	10
AN/GRC-106 in 1/4 ton	4	CX-163	34
AN/GRC-106 in 3/4 ton	1	CX-4566/250'	60
AN/GRR-5	3	CX-4760	40
AN/GSA-7	2	CX-7474	2
AN/MGC-17	2	J-1077	16
AN/MRC-68	8	MX-2915	2
AN/VRC-24 in 3/4 ton	1	RC-292	12
AN/VRC-46 in 1/4 ton	6	SB-22	2
AN/VRC-49 in 1/4 ton	2	SB-86	5
AN/VRC-2	6	SB-611	2
AN/TCC-29	4	TA-207	5
AN/TGC-14	4	TA-312	181
AN/TGC-15	4	TSEC/KL-7	6
WD1/TT on DR 8	30	TSEC/KW-7	14
WD1/TT in RL-159	104	TSEC/KY-8	2
WD1/TT on MX-306	180	KLX-7/TSEC	3
		TSEC/HL-18	3

POWER GENERATORS

GEN, GAS 3KW 28 VDC	16
GEN, PU-322	3

ARMAMENT

LAUNCHER GRENADE 40-MM	9
LAUNCHER ROCKET 3.5	3
MACHINE GUN LIGHT W/TRIPOD	1
PISTOL, 45 CAL	10
RIFLE 5.56 MM	216

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Figure 3. Organization signal command operations Company, signal battalion, airborne division.

a. Installing and operating command signal centers at a main and alternate echelon of division headquarters.

b. Installing and operating a communication center and a telephone switching central at the rear echelon of division headquarters.

c. Providing area signal center support for units located in the vicinity of any echelon of division headquarters.

d. Establishing and operating an assigned portion of the division common user signal communication system.

e. Providing and operating net control and other stations in division radio nets to include the division warning broadcast net.

30. Organization

The signal command operations company is organic to each signal battalion, airborne division. It is designated Company A (Command Operations), _____ Signal Battalion and is organized as indicated by figure 3.

Section II. CAPABILITIES

31. Facilities Provided

At full strength, the signal command operations company is capable of providing the following :

a. Signal centers at two echelons of division headquarters to include simultaneous operation on a 24-hour basis of—

(1) Message center, motor messenger, cryptographic, and teletypewriter facilities.
(2) Manual telephone switchboard and local telephone subscriber system.
(3) Radio Teletypewriter, AM/SSB Voice, and FM/Voice radio stations in division radio nets, to include net control as required.
(4) FM radio/wire integration station.
(5) Radio relay and carrier terminal stations in the division multi-channel communication system.
(6) Patching and switching facilities for wire and radio relay trunk circuits of the division signal communication system.
(7) Area signal center support for units located in the vicinity of echelons of division headquarters.
(8) Communication facilities for the division air request net and the in-flight report net (Air Force spot receiver system) at division main headquarters.

b. Communications center, telephone switchboard, and subscriber telephone service at division rear.

c. Organizational maintenance of company vehicles, power generators, and armament.

32. Defense Capability

Individuals of the signal command operations company can engage in effective coordinated defense of their installations.

33. Mobility

a. The signal command operations company has sufficient vehicles to transport 100 percent of TOE equipment and approximately 66 percent of authorized personnel strength. See appendix III.

b. The signal command operations company is 100% air transportable in medium transport aircraft.

Section III. COMPOSITION

34. Company Headquarters

The company headquarters includes the company commander and first sergeant who provide command control and coordination of company administrative support operations. It also includes the personnel and facilities to operate the company supply, and to perform organizational maintenance of company vehicles and armament.

35. Two Command Signal Center Platoons

Two command signal center platoons are organized to provide the personnel and equipment required to install and operate division communication system facilities at division main and alternate CP's. The two platoons permit simultaneous operation of identical signal centers to support both a main and alternate division CP on a 24-hour basis. Each platoon consists of a platoon headquarters and three operating sections.

a. Two Platoon Headquarters. Each platoon headquarters includes a platoon leader and platoon sergeant who exercises command control over the three operating sections of the platoon. Two powermen are included in each headquarters to provide organizational power-generator maintenance for the platoon. One switchboard operator is also included in each platoon headquarters.

b. Two Radio Relay Terminal and Carrier Sections. Each radio relay terminal and carrier section includes a section chief and 12 other personnel. Each section is organized to provide four teams to install and operate radio and associated carrier equipment at either division main or alternate CP. Each team consists of three men and is equipped with one AN/MRC–68 which is normally utilized as a dual terminal.

c. Two Communication Center Sections. Each communication center section includes a cryptographic technician (warrant officer), a communication center supervisor (NCO), and 18 other personnel. It is organized to provide the following at either division main or division alternate CP:

(1) A six man message center team equipped with appropriate tentage and auxiliary equipment.

(2) A four man teletypewriter team equipped with a Central Office Teletypewriter Set AN/MGC–17 mounted in truck, ¾ ton. Appropriate cryptographic devices are provided.

(3) Four motor messenger teams of two men. Each team is equipped with one truck, ¼ ton.

d. Two Switchboard and Wire Sections. Each switchboard and wire section includes a section chief (NCO) and 38 other personnel. It is organized to provide the following at either division main or division alternate CP:

(1) A three-man circuit control team equipped with Communication Patching Panel SB–611/MRC mounted on truck, ¾ ton.

(2) Eight switchboard operators equipped with two manual Telephone Switchboards SB–86/P.

(3) Three telephone installer repairmen.

(4) Three wire teams of five men, each equipped with a truck, ¾ ton, field wire, 26-pair cable, and appropriate wire laying and recovery equipment.

(5) Three wire teams of three men, each equipped with a platform, ½ ton, field wire, 26-pair cable, and appropriate wire laying and recovery equipment.

36. Radio Platoon

The radio platoon includes the platoon leader, a platoon sergeant, and 32 other personnel. It is organized to provide the following at each of two division CP locations.

a. Three single sideband (SSB) radio teletypewriter (RATT) teams of three men. Each team is equipped with a Radio Teletypewriter Set AN/VSC–2 mounted in truck, ¼ ton.

b. A two-man SSB and FM radio team equipped with Radio Sets AN/GRC–106 and AN/VRC–46 mounted in truck, ¼ ton.

c. A three-man SSB radio team equipped with Radio Set AN/GRC–106 mounted in truck, ¼ ton.

d. A two-man radio-wire integration (RWI) FM radio team equipped with Radio Set AN/VRC–49, and auxiliary equipment mounted in truck, ¼ ton.

37. Rear Echelon Operations Platoon

The rear echelon operations platoon is organized to provide the personnel and equipment required to install and operate the division communications system facilities at division rear echelon. The platoon consists of a platoon headquarters and two operating sections.

a. Platoon Headquarters. The platoon headquarters includes the platoon leader and the platoon sergeant who exercise command control over the two operating sections of the platoon.

b. Communications Center Section. The communications center section includes a communications center supervisor (NCO) and eight other personnel. It is organized to provide the following at division rear echelon.

(1) A four-man message center team equipped with appropriate tentage and equipment.

(2) A four-man teletypewriter team equipped with Teletypewriter Sets AN/TGC–14, and AN/TGC–15, appropriate cryptographic devices, and a ¾ ton truck.

(3) No provision is provided for motor message service at the division rear CP.

c. Switchboard and Wire Section. The switchboard and wire section includes nine personnel and is organized to provide the following at division rear echelon:

(1) One switchboard team of four men, equipped with a manual Telephone Switchboard SB–86/P.

(2) One wire team of five men, equipped with a, truck, ¾ ton, field wire, five-pair cable, and appropriate wire laying and recovery equipment.

38. Air Support Signal Team

This team consists of three personnel equipped with Radio Set AN/GRC–106 and Radio Set AN/VRC–24 mounted in truck, ¾ ton. The team operates as NCS in the division air request net for the tactical air support element (TASE) of the division operations center (DTOC) (para 89).

CHAPTER 5

SIGNAL SUPPORT OPERATIONS COMPANY SIGNAL BATTALION

Section I. MISSION AND ORGANIZATION

39. General

The signal support operations company (TOE 11–218 ( )) is organized to provide the operational elements required to install and operate signal facilities for the division communication system at the division support command and in the vicinity of each brigade headquarters. In addition this unit furnishes

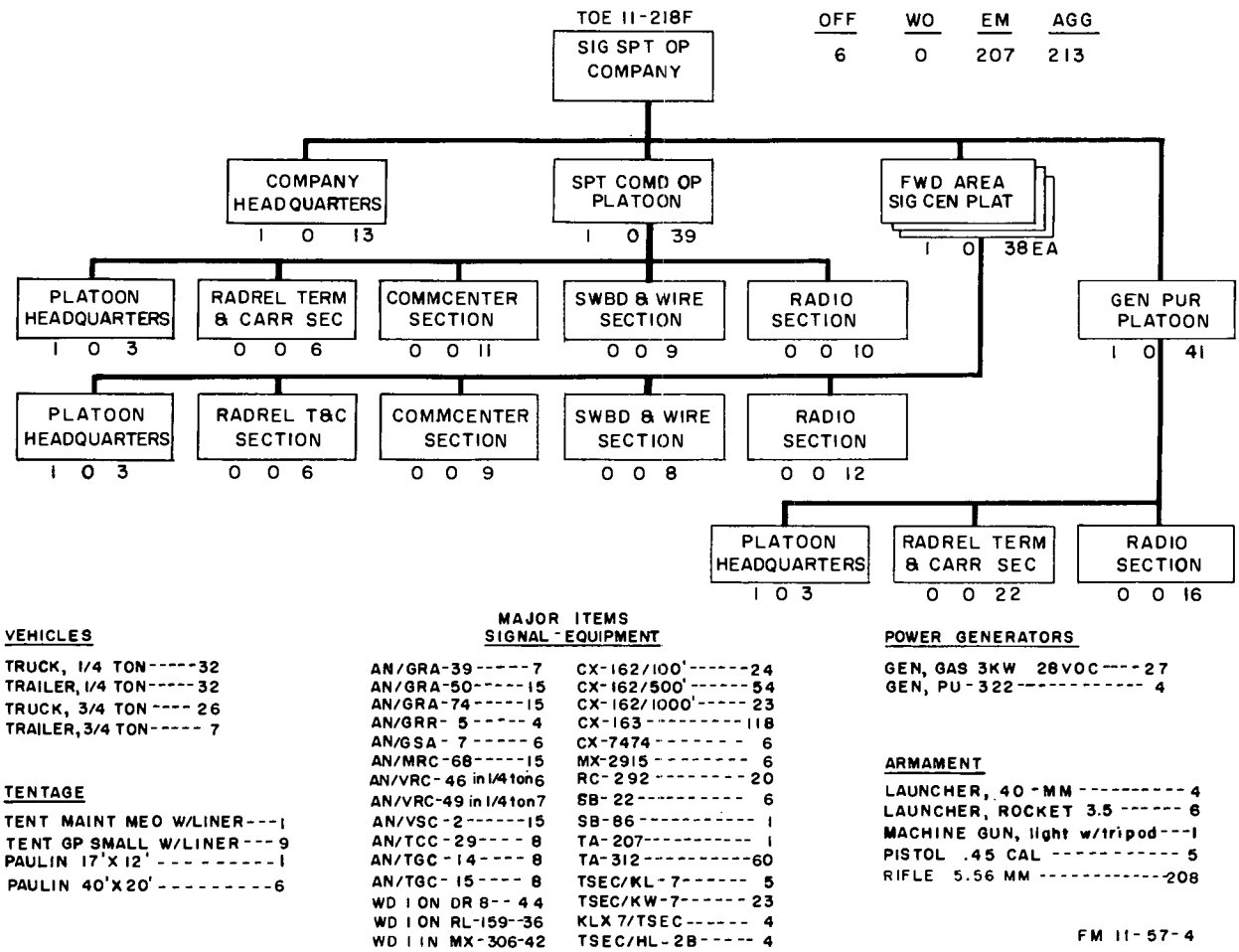


Figure 4. Organization signal support operations company, signal battalion, airborne division.

personnel and equipment to provide direct support supplemental communications for the division artillery and the division aviation battalion.

40. Mission

The primary mission of the signal support operations company is to provide signal communications for support command headquarters, and supplemental communication support for three brigades, division artillery and the division aviation battalion. Specific missions include—

a. Installing and operating a command signal center for support command headquarters.

b. Installing and operating area signal centers in the three brigade areas.

c. Providing direct access trunks into the division multi-channel radio-relay network for the three brigades, division artillery, and the division aviation battalion.

d. Providing access into appropriate division RATT nets and the division RWI network for the three brigades, division artillery, and the division aviation battalion.

e. Providing access into the division communication system for each support command Forward Service Support Element (FSSE).

f. Providing limited motor messenger support for support command headquarters (para 97*b*).

41. Organization

The signal support operations company is organic to each signal battalion, airborne division. It is designated Company B (Support Operations) _____ Signal Battalion and is organized as indicated by figure 4.

Section II. CAPABILITIES

42. Facilities Provided

At full strength the signal support operations company is capable of providing the following:

a. A signal center at support command headquarters to include simultaneous operation on a 24-hour basis of—

(1) Message center, motor messenger, crytographic, and teletypewriter facilities.
(2) Manual telephone switchboard and a local telephone subscriber system.
(3) Radio teletypewriter stations for division radio nets.
(4) AN FM radio wire integration station.
(5) An FM automatic retransmission station.
(6) Radio relay and carrier terminal stations in the division multi–channel radio-relay network.
(7) Area signal center support for units located in the vicinity of support command headquarters.

b. Three forward signal centers to provide signal communications support for units in the division forward area, to include:

(1) Message center, cryptographic, and teletypewriter facilities.
(2) Limited motor messenger support (para 97*c*).
(3) Manual telephone switchboard service.
(4) Telephone and teletypewriter trunks to brigade headquarters.
(5) Radio teletypewriter stations for access into division nets.
(6) FM radio-wire integration station.
(7) Radio relay and carrier terminal stations for access into the division multi-channel radio relay network.

c. Two teams to provide signal communication support for division artillery and aviation battalion headquarters, to include—

(1) Radio teletypewriter stations for access into division nets.
(2) FM radio-wire integration station.
(3) Radio relay and carrier terminal station for access into the division multi-channel radio relay network.

d. Organizational maintenance of company vehicles, power generators, and armament.

43. Defense Capability

a. Individuals at the signal support operations company can engage in effective coordinated defense of their installations.

b. Forward signal centers and any radio relay or FM retransmission stations established in isolated locations are greatly dependent upon supported units for effective defense.

44. Mobility

a. The signal support operations company has sufficient vehicles to transport 100 percent of TOE equipment and approximately 76 percent of authorized personnel strength. See appendix III.

b. The signal support operations company is 100 percent transportable in medium transport aircraft.

Section III. COMPOSITION

45. Company Headquarters

The company headquarters includes the company commander and the first sergeant who provide the command control and coordination necessary for company operations. It also includes the personnel and facilities to operate the company supply and to perform the organizational maintenance of company vehicles and armament.

46. Support Command Operations Platoon

This platoon is organized to provide the personnel and equipment required to install and operate the division communications facilities at division support command headquarters, and to provide communication support for other units in the vicinity of support command headquarters. The platoon consists of a platoon headquarters and four operating sections.

a. Platoon Headquarters. The platoon headquarters includes the platoon leader and the platoon sergeant who exercise command control over the four operating sections of the platoon. Two powermen area also included in the headquarters to provide organizational power-generator maintenance for the platoon.

b. Radio Relay Terminal and Carrier Section. This section is organized and equipped to install and operate radio terminals and associated carrier equipment at support command headquarters to provide entry into the division multi-channel radio relay system. The section has two teams of three men. Each team is equipped with one AN/MRC–68 which is utilized as a dual terminal.

c. Communication Center Section. The communication center section includes a communication center supervisor (NCO) and ten other personnel. It is organized to provide the following at division support command headquarters.

(1) A four-man message center team equipped with appropriate equipment and tentage.

(2) A four-man teletypewriter team equipped with Teletypewriter Sets AN/TGC–15 and AN/TGC–16, appropriate cryptographic devices and a ¾ ton truck.

(3) A two-man motor messenger team equipped with a truck, ¼ ton.

d. Switchboard and Wire Section. The switchboard and wire section includes nine personnel and is organized and equipped to provide the following at support command headquarters.

(1) One switchboard team of four men, equipped with a Manual Telephone Switchboard SB–86/P.

(2) One wire team of five men, equipped with a ¾-ton truck. Sufficient five-pair cable and wire WD–1 are provided to install the internal wire distribution system for support command headquarters and a limited number of long locals for users in the immediate vicinity of support command headquarters.

e. Radio Section. The radio section includes the personnel and equipment required to provide the following at support command headquarters:

(1) Two SSB-RATT teams of three men each, equipped with Radio Teletypewriter Set AN/VSC–2 mounted on ¼-ton truck.

(2) A two-man radio wire integration (RWI) FM radio team equipped with Radio Set AN/VRC–49 and auxiliary equipment, mounted in truck, ¼ ton.

(3) A two man general purpose automatic retransmission FM radio team equipped with Radio Set AN/VRC–49, mounted in truck, ¼ ton.

47. Three Forward Area Signal Center Platoons

The three forward area signal center platoons are organized and equipped to provide the personnel and equipment required to install and operate division communication facilities in the brigade areas on a 24-hour basis. The platoons provide simultaneous operation of three signal centers in forward areas. Each center provides support for a brigade headquarters, a support command Forward Service Support Element (FSSE) and other units in the vicinity. Each platoon consists of a platoon headquarters and four operating sections.

a. Three Platoon Headquarters. Each platoon headquarters includes a platoon leader and platoon sergeant who exercise command control over the four operating sections of the platoon. Two powermen are included in each headquarters to provide organizational power-generator maintenance for the platoon.

b. Three Radio Relay Terminal and Carrier Sections. Each radio relay terminal and carrier section is organized and equipped to install and operate radio terminals and associated carrier equipment at a forward signal center to provide entry into the division multi-channel radio relay system. Each section has two teams of three men. Each team is equipped with one AN/MRC–68, which is utilized as a dual terminal.

c. Three Communication Center Sections. Each communication center section includes a communication center supervisor (NCO) and eight other personnel. It is organized to provide the following at a forward area signal center:

(1) A three-man message center team equipped with appropriate tentage and equipment.

(2) A three-man teletypewriter team equipped with Teletypewriter Sets AN/TGC–14 and AN/TGC–15, appropriate cryptographic devices, and a ¾ ton truck.

(3) A two-man motor messenger team equipped with one truck, ¼-ton.

d. Three Switchboard and Wire Sections. Each switchboard and wire section includes eight personnel and is organized and equipped to provide the following:

(1) Three switchboard operators equipped with two Manual Switchboards SB–22.

(2) A five-man wire team equipped with one truck, ¾-ton, Wire WD–1, five-pair cable and appropriate wire laying and recovery equipment.

e. Three Radio Sections. Each radio section includes a section chief and eleven other personnel. It is organized to provide the following:

(1) Three SSB-RATT teams of three men. Each team is equipped with Radio Teletypewriter Set AN/VSC–2, mounted in truck, ¼-ton.

(2) A two-man RWI FM radio team equipped with Radio Set AN/VRC–49 and auxiliary equipment mounted in truck, ¼-ton.

48. General Purpose Platoon

The general purpose platoon is organized and equipped to provide the personnel and equipment required to install and operate division communication facilities at the division artillery headquarters and the aviation battalion. In addition, this platoon provides radio relay sets for extension of multi-channel communication links or to provide additional terminals for special purposes. The platoon consists of a platoon headquarters and two operating sections.

a. Platoon Headquarters. The platoon headquarters includes the platoon leader and platoon sergeant who exercise command control over the two operating sections of the platoon. Two powermen are also included in the headquarters to provide organizational power-generator maintenance for the platoon.

b. Radio Relay Terminal and Carrier Section. This section is organized and equipped to provide a section chief and seven teams of three men each. The section normally installs and operates a terminal at division artillery headquarters and at the aviation battalion headquarters and furnishes up to five relay teams to extend the range of the division multi-channel links. It may be utilized to provide a team for the division rear echelon, for attached units or other special purposes. Each team is equipped with one AN/MRC–68 which is utilized as either a relay or a dual terminal.

c. Radio Section. The radio section includes the personnel and equipment required to install and operate two RATT sets and one RWI FM radio set at both the division artillery headquarters, and at the division aviation battalion. The section is organized to provide—

(1) Four SSB-RATT teams of three men. Each team is equipped with Radio Teletypewriter Set AN/VSC–2 mounted in truck, ¼-ton.

(2) Two RWI FM radio teams of two men, each equipped with Radio Set AN/VRC–49 and auxiliary equipment mounted in truck, ¼-ton.

CHAPTER 6

AIRBORNE DIVISION COMMAND POSTS

49. General

Command posts are the nerve centers of the division. The manner in which they function determines to a large degree the effectiveness of command control exercised by the division commander. Command posts may be moved often for security reasons or to exploit the situation and terrain; however, command and control must be maintained continuously despite such moves.

50. Command Post Doctrine

An accepted concept or standard of operation for establishment of command posts is that major command headquarters will be fragmented in order to reduce the vulnerability of a headquarters to instantaneous elimination and consequent loss of control. In the airborne division, the requirement for fragmentation is normally satisfied by the echelonment of the division headquarters into a division main, alternate and rear command post. These echelons are not separate levels of command but are rather components of the same headquarters. The location, composition, and organization of each echelon is flexible and remains the prerogative of the division commander who tailors each echelon to meet the needs of the situation and the mission. A type organization for fragmentation of an airborne headquarters in shown in appendix IV.

51. Division Main

Division main is the principal command post (CP) of the division. It contains those staff agencies and personnel required by the commander to assist him in the command and control of tactical operations. Operational control is exercised through the primary division tactical operations center (DTOC) (para 55), which is organized for continuous 24-hour operation.

52. Division Alternate

a. In order to insure continuity of command and control, an alternate command post is normally established at sufficient distance from the main command post to minimize the possibility of both CP's being overrun by a concentrated ground penetration or being simultaneously destroyed by a single nuclear burst or conventional bombardment. This echelon contains an alternate DTOC manned in an austere manner by representation of most of the elements found in the primary DTOC (para 55).

b. The purpose of the division alternate command post is to facilitate movement of division headquarters without major impact upon command control of the division, and without interruption of communications. It also provides for continuity of command in the event division main is crippled or destroyed. To fulfill its purpose, the alternate CP must be kept abreast of the latest information and maintain the current situation. It contains all the necessary equipment to take over operational control and assume the role and functions of the division main with minimum modification; however, for sustained operation, personnel augmentation is required. The signal communications facilities provided are identical to those at the main CP and are capable of 24-hour continuous operation.

53. Command Group

When it is necessary for the division commander to operate from a location other than one of the established CP echelons, a small tactical command group is usually formed. This group normally consists of G2/G3 and fire sup-

port representation, communication and security personnel, and other personnel as required. The command group is usually temporary, and is not considered to be a separate echelon in the command system. Organic FM and/or SSB radio sets are utilized as the normal means of communication for this highly mobile command group. However, the group may often be satellited upon a subordinate headquarters for augmentation of communication facilities and physical security.

54. Division Rear

a. Division rear is comprised of the staff elements primarily concerned with administration and personnel service sand other personnel not specifically required at either division main or alternate. These staff elements normally include the bulk of the G1 and G4 sections, the Staff Judge Advocate section, the IG section, and the AG section minus those distribution center functions required at main and alternate.

b. In normal airborne operations, the division rear remains outside the airhead until consolidation or link-up has been accomplished. When the rear CP is brought into the division area it is normally satellited upon the support command headquarters.

55. Division Tactical Operations Center (DTOC)

The division tactical operations center (DTOC) is a grouping of representatives of the general and special staff sections concerned with current combat and combat support operations. These representatives assist the commander in the operations aspects of his exercise of command. When an operation is in progress, current combat and combat support activities are monitored and posted by the DTOC so that an accurate and up-to-date situation (friendly and enemy) is continuously available to the commander. Actions are coordinated and supervised, and implementing instructions are issued by the DTOC within established policies. All new requirements are analyzed and coordinated by the appropriate DTOC elements to isolate problem areas and determine courses of action prior to making recommendations for command decision.

a. The DTOC normally includes the following:

(1) G2-G3 operations.
(2) Fire support/coordination element (FSCE).
(3) Tactical air support element (TASE).
(4) Air defense element.
(5) Division aviation officer or representative.
(6) Division signal officer or representative (C-E element).
(7) Division engineer officer or representative.
(8) CBR element.
(9) G1, G4, and G5 representation as required.
(10) Division support command liaison elements as required.

b. When the division is committed in an internal defense role, the DTOC representation will probably be altered to provide added staff assistance to the commander for those functions which require greater emphasis in internal defense operations, such as military civic action, psychological warfare, population control, and civil affairs.

c. The DTOC is established under the general staff supervision of the G3 at the main command post. A skeletonized DTOC manned by staff assistants is located at the alternate command post. Monitoring and posting of information concerning current combat operations are accomplished at both locations to insure that the alternate DTOC is prepared to assume immediate control of operations in the event the primary DTOC becomes ineffective for any reason. The DTOC and alternate DTOC will not displace at the same time, but will pass control, as required, to insure continuity of operational supervision and coordination.

56. Displacement

The division headquarters must be capable of displacement without interruption of the functions of command and control. Displacement and installation time must be reduced to a minimum.

a. Division Main and Alternate. Fragmentation of the command and staff elements, the provision of a DTOC and location of identical

communications facilities at both main and alternate command post, permit control of operations to be passed between the two echelons with a minimum of disruption or delay. Two methods of displacement are normally employed in the airborne division.

(1) *Single move (leap-frog) method.* Normally this method is employed when it is necessary to change only one CP location. It can be employed for a move in any direction and, for the airborne division, is the most practical and efficient method from a communication viewpoint. For a movement forward, the alternate echelon is normally closed out at a predesignated time and it moves around the main CP to an advantageous position for location of the new division main. During the process of moving and setting up, the off-shift personnel that can be spared from the main command post move forward and assist in installing the new CP. After communications are established, this echelon then assumes the role and title of division main, while the other echelon, now reduced to a skeleton crew, remains in place and assumes the role of alternate CP.

(2) *Dual-move method.* When the situation dictates a change of location for both echelons, the main CP usually closes out at a designated time and the alternate CP assumes control. Off-shift personnel as required move to the alternate CP to augment that echelon. After the main CP is relocated and communications reestablished at its new location, control reverts and the alternate echelon is closed down and displaced to its new location.

b. Division Rear. Movement of division rear is usually independent of the movement of division main and alternate, and is not done by echelon. Movement at the division rear is normally under the tactical control of the support command commander; however, it is usually performed under the supervision of the division AG.

CHAPTER 7

AIRBORNE DIVISION SIGNAL COMMUNICATION SYSTEM

Section I. BASIC CONSIDERATIONS

57. General

For purposes of this text, unless otherwise stated, discussion of the division signal communication system is limited to that portion of the system installed and operated by signal battalion elements and does not include the organic communication networks of other divisional units.

a. Communication is one of the most vital ingredients of any successful combat operation. Without the ability to communicate effectively, the fighting power of an airborne division would be reduced to the uncoordinated piecemeal efforts of individual units or fragments thereof. Without adequate communications, the maneuverability of infantry, the responsive firepower of artillery, the information-gather- other surveillance means, and the rapid mobility provided by motorized air and ground lift cannot be fully exploited.

b. The airborne division must communicate in order to perform its mission. At the same time there are dangers in too much communication. Excessive communication can slow down decision and reaction, provide important information to the enemy, and burden troop units with unneeded equipment to be carried and maintained.

c. The signal communication system of the airborne division must be extremely responsive, versatile, and flexible to provide for any probable organizationable organization for combat which may develop from the commander's concept and plan. The inherent operational flexibility of the airborne division requires an equally flexible communication system. To insure its flexibility, the DSO must, wherever possible, insure provision of alternate means and paths of communication to afford speedy reaction to cope with changes in operational plans and task organizations. It is imperative that the DSO, as a member of the division special staff, be included in all advanced staff planning to insure that communications considerations are incorporrated into all aspects of the division's operations.

58. Role of the Division Signal Officer

The division signal officer (DSO) is both a commander and staff officer. As commander of the division signal battalion the DSO is directly responsible for all matters normally associated with the function of command as outlined in FM 100–5, Field Service Regulations, Operations. As a member of the division special staff the DSO has the added responsibilities of—

a. Acting as advisor to the division commander and general staff on all signal communication matters.

b. Providing signal estimates and plans to support the division mission.

c. Providing input for paragraph 5 of division operations plans and orders.

d. Providing technical direction and supervision over all segments of the division signal communication system.

e. Directing and supervising the training and operational performance of all assigned and attached signal units.

f. Providing technical assistance on signal communications matters to all organic and attached units of the division.

59. Signal Communication Concepts

a. Each commander is responsible not only for the internal communication system of his command but also for the establishment and

maintenance of communications between commands. Unless otherwise directed by competent authority, the superior command is responsible for communications to the subordinate command; the unit on the left is responsible for communications to the unit on the right; and the supporting unit is responsible for communications to the supported unit.

b. In the airborne division, signal communication concepts are based upon the broad concept of fragmentation of division and major subordinate command headquarters. The division communication system must support this concept of "headquarters fragmentation" by providing functional and flexible signal communication to interconnect each activated echelon of the division headquarters with all major subordinate combat support, and combat service support units.

c. The airborne division signal communication concept visualizes emphasis on a command-oriented signal communication system, i.e., it will parallel the lines of command and priority will be given, in employment of communication facilities, to the support of the combat and combat support functions of the division.

d. Signal communication facilities earmarked primarily for the support of combat service support functions are limited in the airborne division. Provision must be made for meeting a portion of the communication requirements generated by these functions within the framework of the command oriented signal communication system. An area type multi-channel radio relay network as an entity separate and distinct from the command network is not provided in the airborne division signal communication system.

e. Communications are oriented forward, i.e., when feasible, and superior headquarters will furnish the equipment and personnel needed to provide communications to a subordinate headquarters. The exceptions to this policy in the airborne division signal communication system are:

(1) The armored cavalry squadron headquarters and the engineer battalion headquarters utilize organic equipment and personnel to enter two of the division radio teletypewriter nets. It is not considered practical for the signal battalion to furnish radio teams for these headquarters in view of their normal mode of operation.

(2) Major subordinate commanders as well as certain division staff officers utilize organic equipment to enter division SSB and FM-voice radio nets. It is not considered practical, efficient, or economical for the signal battalion to furnish teams for this purpose because of the numbers and dispersion of the radio sets involved and the simplicity of operation which lends itself more readily to user operation.

f. The division telephone and teletypewriter network is comprised primarily of common-user circuits. Sole-user circuits are kept to the minimum essential requirements. Strict adherence to this concept is especially imperative in the airborne division where weight and size considerations have necessitated use of multi-channel equipments with very limited circuit capacity.

g. When possible, communication circuits/nets are earmarked for primary support of a particular function or functions. This does not preclude use of such circuits/nets for other purposes when available and when operational need dictates. Where close working relationship or interchangeability permits, functions are grouped and utilize shared communication facilities. In the airborne division the operations/intelligence (combat support) functions are normally grouped as are the administrative/logistics (combat service support) functions.

h. Utilization of messenger service, both ground and air, is stressed, The tendency to disregard the capabilities of ground and air messengers service and to place almost complete reliance upon electrical transmission systems should be guarded against.

Section II. SIGNAL COMMUNICATIONS PLANNING AND CONTROL

60. General

a. Signal communication planning and control is a continuous cycle. It involves not only the initial tailoring of signal resources in accordance with operational plans, but also the provision of means to rapidly alter or adjust the signal communication system to meet immediate or anticipated requirements in accordance with changes in the tactical situation.

b. In developing and organizing a plan for the airborne division signal communication system, the DSO must insure that all standard communication requirements discussed in paragraph 61 are adequately satisfied and that due consideration is given to each of the communication system objectives discussed in paragraph 62.

61. Standard Communication Requirements

For success in battle a number of functions must be performed by or for the commander which require signal communication support for fulfillment. These functions, enumerated in *a* through *g* below, represent standard communication requirements which must be met adequately in some manner by the division signal system.

a. Internal Command Control. All commanders must be provided signal communication means which are responsive to their needs and which enable them to personally exercise control and influence the action of their subordinate units.

b. Tactical Operations. All commanders must be provided signal communication means which permit appropriate staff elements of their headquarters to issue orders implementing the commander's operational decisions and to transmit and receive information concerning the progress and/or status of the friendly tactical situation.

c. Surveillance and Intelligence. All commanders must be provided signal communication means which permit information and battlefield intelligence to be effectively exchanged. This includes the capability to receive and coordinate data from all surveillance and information gathering agencies and to transmit pertinent intelligence to all appropriate units in an expeditious and timely manner.

d. Fire Support Control. All commanders must be provided signal communications through which they can obtain effective fire support. This includes the capability to initiate, integrate, and coordinate multiple fire requests and to direct and control delivered fires from all available fire support means to include army air defense units and USAF close air support units.

e. Administration and Logistics. All commanders must be provided signal communication facilities through which combat service support (administrative and logistic) requirements can be exchanged between appropriate units or installations to insure prompt service support of the combat operations of the division.

f. External Command Control/Coordination. All commanders must be provided the signal communication facilities required to permit command control and/or coordination, as required, from higher headquarters. In addition, lateral lines of communication to adjacent units may be required. The planning, installing, and operation of signal communications is, by doctrine, the initial concern and responsibility of the higher headquarters. However, communication is accepted to be a mutual responsibility and it is incumbent upon the DSO to insure that adequate communication to his division from higher headquarters is planned for and implemented in a timely manner. This responsibility of the DSO includes insuring that any unusual communication requirements are made known to higher headquarters; coordinating the location and provision of security for supporting signal units in the division area; and keeping supporting signal units informed of any modifications to the communication system which may be required because of changes in the tactical situation.

g. Special Communications. Attention must be given during the planning stage to any special communication requirements that may arise. Attachments to the division, such as army air defense units, are a common special case.

Such attachment will present varying requirements for communication support. Every attempt should be made to provide the support required within the framework of the existing division communication networks. therefore, location of attached units is a critical consideration from a communication viewpoint as well as a tactical one. The DSO in his capacity as advisor to the commander must be prepared to offer workable solutions.

62. Communication System Objectives

In planning for and developing a division signal system(s) to fulfill the requirements enumerated in paragraph 61, certain system objectives discussed in *a* thru *e* below must be considered. These system objectives, which affect the overall dependability of the division signal system, cannot be considered individually or be isolated one from the other. Rather, they must be considered as an entity in order to effectively evaluate the overall dependability of the signal system at any given time. In many instances these system objectives will complement or supplement each other, and at other times inherent conflicts will be apparent that make it necessary to de-emphasize or downgrade one or more in order to maximize another. Such trade-offs are frequently required and are permitted. The importance or weight to be given any one objective, or the degree to which any one is to take precedence over another, will depend upon the mission, the tactical situation, and the commander's policies.

a. Technical Reliability.

(1) Technical reliability is defined as the probability of a device performing its mission adequately for the period of time intended under any of the operating conditions expected to be encountered. The technical reliability of the division communication system can be measured by its ability to operate without outages caused by technical failure of personnel or equipment.

(2) Technical reliability is built into the division communication system by every measure taken to insure that all major portions of the system will function properly for a specified period of time or by providing back-up and/or alternate means in event of failure of a critical portion of the system. Technical reliability is maximized when personnel are well trained; when proper system engineering techniques are applied; when adequate supply and maintenance support is provided; and when multi-means, multi-axis communications are planned for and implemented.

b. Survivability.

(1) Survivability is defined as the ability to continue to exist and function in the environment to which subject. The survivability of the division communication system can be measured by the degree of ability of the system as a whole to operate satisfactorily when subject to any enemy capability.

(2) Survivability is built into the division communication system by attention to the need for dispersion, security, cover and concealment, and other available passive defensive techniques. Trade-offs between the optimum technical method and defensive requirements may be required. Prudence must be applied in selecting communication sites, grouping of equipments and heights of antennas. Survivability is maximized when proper defense techniques are incorporated into communication plans and orders, and when multi-axis, multi-means communications are provided.

c. Flexibility.

(1) Flexibility is defined as the ability to effectively react to changing requirements with actions appropriate and adaptable to the situation. The high degree of tactical flexibility attributed to an airborne division requires an equally flexible communication system. The flexibility of the division communication system can be measured by the degree in which it is able to support diversified operations and its ability to adjust to rapid changes in the tactical situation in a timely manner.

(2) Flexibility is built into the division communication system by providing a variety of communication means; by maintaining a high degree of mobility; by preplanning and engineering in anticipation of future requirements; by location and utilization of resources so as to facilitate rapid adjustment to meet contingencies; and by establishment of sound control practices and control communications to permit expeditious reorientation of all or part of the communication system.

d. Communication Security.

(1) Communication security is defined as the condition which results from the establishment and maintenance of protective measures aimed at preventing unauthorized persons from obtaining information of value from the communication system. Each segment of the airborne division communication system should possess that degree of security appropriate to its function and consistent with its frequency and degree of usage.

(2) Security is built into the division communication system by adherence to the principles of communication security (ch. 8).

e. Speed.

(1) The airborne division communication system must provide for appropriate speed in processing and transmitting messages in order to insure that orders and information can be delivered in a timely manner. Speed of handling is defined as the time it requires to complete a connection or to deliver a message from originator to addressee via signal communication means.

(2) Speed of handling can be enhanced by providing a variety of means of communication and selecting the one most appropriate for the communication to be made; by employing alternate means and routings effectively to minimize delays because of overload on any one network; and by development, through training, of a continuing sense of urgency on the part of all communication personnel.

(3) Special emphasis should be placed on urgent, recurring requirements in which time is a highly critical factor. In these cases, consideration should be given to use of direct voice radio, telephone or teletypewriter circuits to eliminate switching delays, and to provision of complementary on-line privacy or cryptographic equipment to minimize encryption and decryption time.

63. Responsibility of the Division Signal Officer

The division signal officer (DSO) is responsible to the division commander for all aspects of the division signal communication system. Although the division commander has ultimate responsibility for the communication system of his command, he normally delegates the functions of planning, installing, operating, and maintaining the system to his signal officer. It is incumbent upon the DSO to insure that the system not only is responsive to the immediate needs of the commander but is also capable of rapid reaction to cope with changes in operational plans and task organizations.

a. The DSO advises the commander and staff on all communications matters and prepares signal estimates and plans to support the mission of the division.

b. During an operation the DSO or his designated representative will provide the communications-electronics element in the division tactical operations center (DTOC). By means of this representation in DTOC, the DSO keeps pace with the tactical situation and determines the broad requirements to fit immediate needs. In addition, based upon the commander's concepts and possible courses of action, the DSO anticipates future requirements and formulates plans to meet such requirements.

c. Although determination of requirements and broad planning are performed by the DSO, authority for detailed planning, engineering, and routine control of the communication system is normally delegated to a subordinate agency. This agency, charged with responsi-

bility for technical engineering and planning, issuing of orders, and coordination of operating elements in accordance with the decisions of the DSO, is called the division systems control center.

64. Division Systems Control Center

Since the division signal communication facilities are widely dispersed and constantly subject to alteration, detailed planning and positive control is not a simple matter. To obtain a truly integrated, well coordinated and responsive system, a central control agency is required to plan, implement, and control the technical operation of the entire system as one cohesive yet flexible entity. The division systems control center (SYSCONCEN) performs this centralized function.

a. Although the SYSCONCEN is utilized by the DSO for detailed planning, engineering, and control of all portions of the division signal communication system, from a practical viewpoint its primary concern will be the telephone and teletypewriter network carried by the multi-channel radio relay and carrier system. The number of critical factors involved in radio relay and carrier operation, such as frequency assignment, distances, locations, and orientation of antennas—coupled with a comparatively high traffic potential—requires continuous centralized planning, direction, and control in order to obtain the maximum effectivness and efficiency from the multi-channel system. The SSB and FM radio nets, radio-wire integration stations, communication center facilities, messenger service, and internal wire and cable distribution systems, on the other hand, lend themselves more readily to decentralized planning and direction by SOP, SSI, and SOI. It is normally sufficient for the SYSCONCEN to receive periodic status reports concerning these facilities so as to monitor their use and availability.

b. The SYSCONCEN is established by the operations and intelligence section of headquarters and headquarters company under the direction of the battalion S3. It operates on a 24-hour basis at the division main command post. Duplicate records and a skeleton staff are maintained at division alternate command post to provide an alternate SYSCONCEN to facilitate rapid and uninterrupted transition of communication system control during displacement or in event of destruction of the main CP. Since there are not sufficient personnel or equipments in the operation and intelligence section to maintain two SYSCONCEN, the facilities control center at alternate CP is normally utilized as the nucleus of an alternate SYSCONCEN. Technical data and records concerning the status of the division communication system—to include status of the system and circuits; commitments of equipment and facilities; and condition, location and availability of all signal personnel and equipment—are kept current at both locations. When feasible, direct (sole user) channels of communication should be provided between the primary and alternate SYSCONCEN.

c. As a matter of SOP, the SYSCONCEN at main is primarily concerned with the supervision and emergency adjustment of the existing communication system, while the alternate SYSCONCEN is primarily involved in planning for future requirements.

d. Effective centralized control is dependent upon rapid responsive communications between the SYSCONCEN and the implementing elements of the signal battalion. The SYSCONCEN normally exercises immediate operational control of the division communication system through the facilities control centers (FACCONCEN) established at each signal center (para 69*c*). As a minimum, direct control circuits should be established between the SYSCONCEN and each FACCONCEN.

(1) The primary SYSCONCEN control network is usually established over the division radio relay multi-channel network. The order wire extension system (see TM 11–2142, para 40) is employed to use the engineering channels of the AN/TCC–3s as direct control circuits from SYSCONCEN to each FACCONCEN. Because of the importance of the SYSCONCEN control, however, it is imperative that alternates to this primary network be provided.

(2) Back-up control networks for SYSCONCEN should be provided over a variety of means of communication. Since control becomes most critical

when a portion of the communication system has been disrupted, reliance cannot be placed upon a single network, such as the multi-channel network, for this crucial control function. Consideration should be given to the use of the signal battalion FM radio net and the division general purpose RATT net to provide alternate SYSCONCEN control nets. To insure responsiveness of these back-up control systems, they should be tested and/or exercised periodically in this role.

e. Caution should be exercised to avoid labeling the SYSCONCEN as *a routine* signal information center. It should be limited to activities connected with and essential to the technical planning and direction of the division communication system. Routine signal matters, and signal information services, such as telephone directory information and unit locations are more properly handled by the division signal officer's section or a designated operating section.

65. Common-User and Sole-User Communications

In planning for the allocation of communication resources, an important consideration is the provision of either common-user or sole-user facilities.

a. Common-User Communications. Common-user communications are those which are available to all users on a first-come, first-served basis. In terms of telephone and teletypewriter communications, they are those circuits which are available to all subscribers from a common switchboard. Common-user communications are more effective, efficient, and economical in terms of full usage of means available, service to the largest number of subscribers, and economy of equpiment and facilities. In the airborne division it is especially important that emphasis be placed on common user facilities because of the limited resources available and the highly flexible nature of airborne operations. It must be recognized, however, that normally operational need will not permit sole reliance upon a free common user system. A priority system to accelerate service for a subscriber having an urgent but temporary need should be a matter of SOP. Such a system enables a subscriber with a priority requirement to preempt a common use facility from other subscribers when necessary.

b. Sole-User Communications. Sole-user communications are those which are available for the exclusive use of a particular user for direct contact with a specific user on the other end. In terms of telephone and teletypewriter communications, they are those circuits which connect a subscriber set to another subscriber set. A communication system containing an abnormal number of sole-user facilities is relatively uneconomical and inflexible; however, a requirement for a certain number of sole-user circuits does exist in the airborne division. Certain personnel performing the more critical functions of command-control, operations-intelligence and fire support have an urgent and continuing requirement based on traffic precedence and operational necessity to communicate via direct no-delay channels with their counterparts at subordinate or superior levels. In these cases, where it has been clearly established that such a requirement exists, sole-user communication become a matter of SOP and are planned for and implemented.

66. Composition of the Signal Communication System

The division signal communication system established and operated by the signal battalion, airborne division, will normally include signal centers at division main and alternate headquarters, at the support command CP, and at three forward sites in the brigade areas. The system is normally composed of the following means of communication:

a. Multi-channel radio relay and carrier links.

b. Tactical SSB and FM radio nets.

c. Ground and air messenger service.

d. FM radio wire integration system.

Section III. SIGNAL CENTERS

67. General

The focal points around which the airborne division signal communications system is built are the signal centers installed and operated by the signal battalion. Signal centers are normally established at two echelons of the division command post, at support command, and in each brigade area.

68. Type Division Signal Centers

Division signal centers are groupments of signal communication facilities installed, operated, and maintained by the division signal battalion. There are two types of signal centers.

a. Command Signal Centers. Command signal centers provide signal support to specific command headquarters and to units located in their immediate vicinity. In the airborne division those signal centers in support of the echelons of the division headquarters and of support command headquarters are considered to be command type signal centers.

b. Area Signal Centers. Area signal centers provide communications, within a specified area of responsibility, for all units that require signal center support to communicate effectively with higher, subordinate or adjacent units. The three forward area signal centers are normally classified as area type centers, however, the distinction is not as clear-cut as in the infantry, armored and mechanized division. In the airborne division, the primary responsibility of the forward signal centers is support of a brigade headquarters and a division Forward Service Support Element (FSSE). Within its capability, each center also provides support to supplement the organic communication means of other elements located within its area of responsibility.

69. Characteristics of Division Signal Centers

Each division signal center is normally composed of a communication center, a switching central, a facilities control center, and appropriate electronic means of communication.

a. Communication center. Each division signal center contains a communication center (COMMCEN) which is the agency charged with the responsibility for receipt, signal processing and subsequent transmission of outgoing messages, and for receipts and delivery of incoming messages received via signal communication means. Each COMMCEN normally includes a message center section, a cryptofacility, teletypewriter terminal equipment and motor messengers.

(1) The message center section of each division COMMCEN is charged with the responsibility for acceptance and preparation of messages to be sent via signal communication means, and for receipt and delivery of incoming messages. In addition, each message center section monitors, records, and delivers, as appropriate, messages received via the division warning broadcast net.

(2) A cryptofacility is included at each COMMCEN to provide for on-line or off-line encryption/decryption as required. This facility is also responsible for secure storage of all registered cryptomaterial on hand.

(3) Teletypewriter tape perforating and page copy terminal equipments are provided at each COMMCEN to permit entry into the division manual switched teletypewriter network or, where appropriate, into the teletypewriter network of higher headquarters.

(4) Motor messengers are assigned to each COMMCEN with the exception of division rear. Messengers are normally employed from higher to subordinate headquarters and messenger operation is on a bulk or pouch basis (para 94–99).

b. Switching Central. Each signal center contains a switching central which employs either SB–86 or SB–22 manual field switchboards to interconnect telephone or teletypewriter subscribers. Each switching central has sufficient capacity to provide for local subscriber requirements and appropriate trunk circuits.

c. Facilities Control Center. Each signal center has a facilities control center (FACCONCEN) which is responsible for implementing the orders or directives of the division SYSCONCEN or coordinating to insure proper implementation by the appropriate element(s) of the signal center. The FACCONCEN tests for and coordinates action to correct any faults located in that portion of the signal system under its jurisdiction and routes or reroutes circuits within or through the signal center.

(1) All FACCONCEN should be authorized to make changes in communication routing in response to user needs within established priorities. This authority should, however, be properly implemented through a tested and clearly understood SOP. In respect to arrangement or provision of internal circuits, FACCONCEN normally take their direction from the OIC of the signal center; however, they are under the operational direction and control of the division SYSCONCEN for system fault location and arrangement or provision of external trunk circuits.

(2) The signal centers at division main and alternate have a pre-wired communication patching panel (SB–611) and specialized personnel trained in circuit control, which permits the establishment of a FACCONCEN as a separate entity. At all other signal centers the functions of circuit control still exist but they are accomplished within the scope of other operating elements. In common practice, at other than main and alternate, the radio relay and carrier section will perform facilities control functions for the testing and routing of multi-channel circuitry, while the switchboard and wire section will perform the same functions for the metallic trunks and local circuits at the wirehead. In this case the OIC of the signal center is the FACCONCEN coordinator.

d. External Electronic Means of Communication

(1) Each signal center has a variety of external means of communication. These include carrier and radio relay terminals to permit entry into the division multi-channel radio relay network, radio teletypewriter (RATT) stations to provide entry into selected division RATT nets, and RWI stations. In addition, each signal center possesses a limited capability to install and maintain field wire or cable, trunks and long locals.

(2) Signal centers at division main and alternate also provide stations in the division command net (SSB voice), the division operations and intelligence net (FM voice), and transmitting stations for the division warning broadcast net.

70. Location and Configuration of Signal Centers

The situation and the terrain will always be governing factors in determining the specific location of each signal center and the dispersion of facilities and equipments at the center. In certain fluid situations, such as may be found in an internal defense environment, extreme consolidation may be required in order to provide for maximum security with minimum use of combat forces. In other situations extreme dispersion may be desirable to avoid presenting a lucrative target to enemy air or artillery. The information presented in the following paragraph is for general guidance only.

a. Command Signal Centers. At echelons of division headquarters and at support command headquarters, the bulk of the command signal center is normally located within the command post which it serves. The COMMCEN, switching central, and FACCONCEN are situated within the perimeter of the command post area, and radio relay, high frequency, and FM radios are deployed on favorable terrain as far as practical from the main CP, but close enough to permit installation of required cable and/or remoting equipment. A type configuration for division main and alternate command posts is illustrated by figure 5. Figure 6 illustrates a type configuration for division support command.

b. Forward Area Signal Centers. Location of forward area signal centers presents a spe-

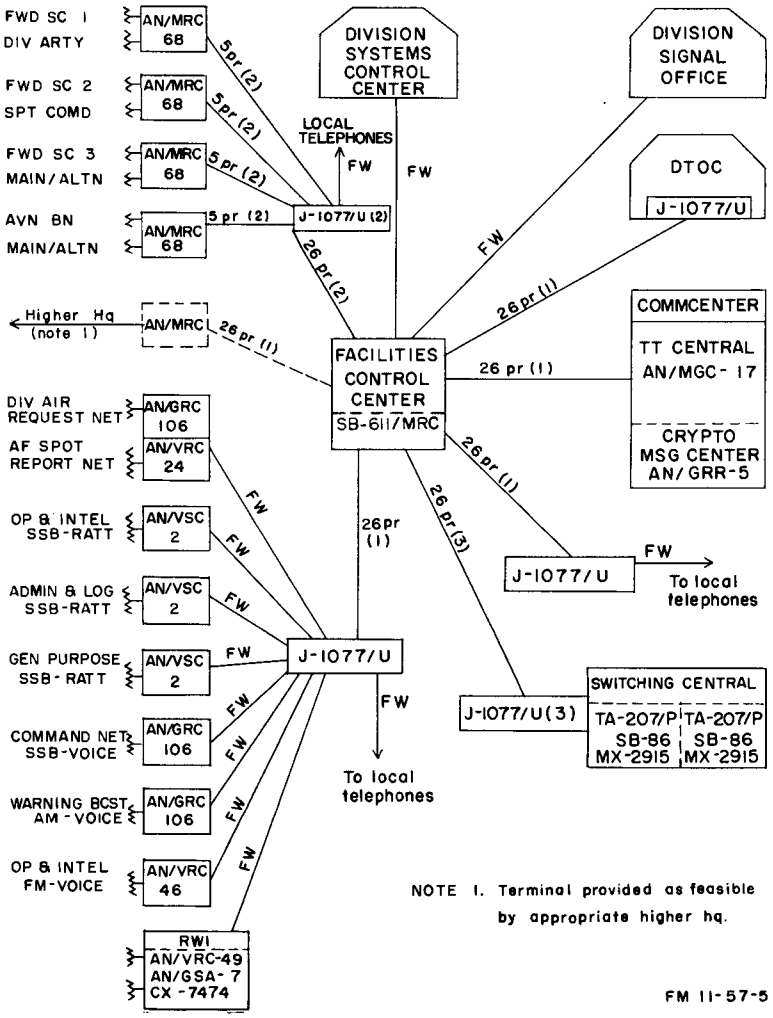


Figure 5. Type configuration, signal centers' main or alternate command post, airborne division.

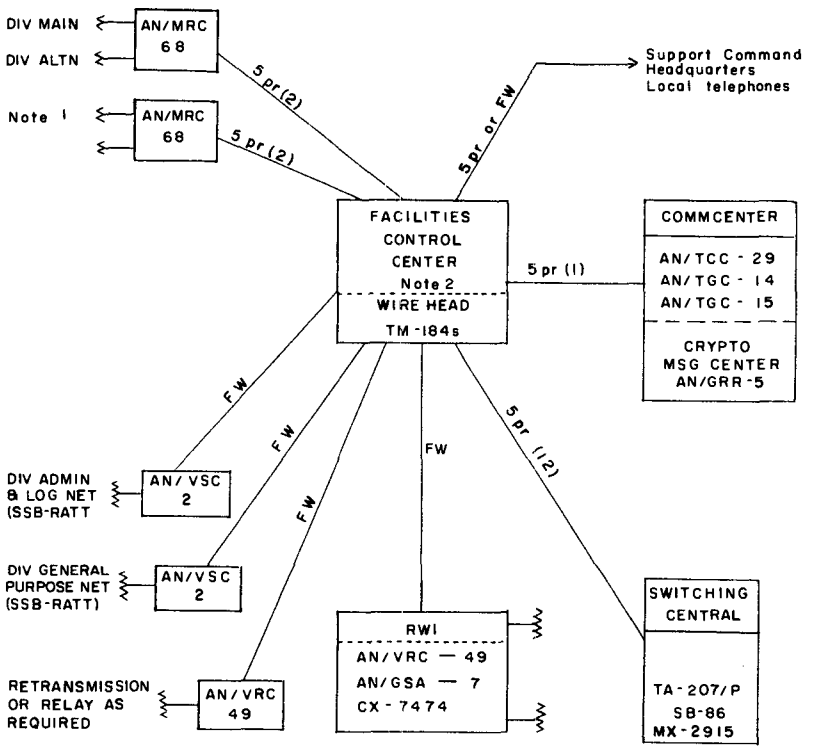
cial problem because of their dual mission of providing direct support to brigade headquarters and area support for a Division Forward Service Support Element (FSSE) and other units in the area.

(1) The primary requirement for area support is generated by the FSSE, one of which is normally formed in each brigade area. The FSSE is a support command activity consisting of the forward elements of service support units operating in support of a brigade area. The FSSE is normally located with, or in the close proximity to, the brigade trains. Although not a part of the FSSE, forward signal centers are often collocated with that activity to facilitate security and provision of logistical support for the signal center.

(2) Circuits of the multi-channel radio relay network allocated to brigade headquarters are normally extended to the brigade command post wire head by field wire or five-pair cable. When distance or other considerations make use of cable impractical, a VHF link may be established by augmenting the forward signal center with additional carrier and radio-relay terminals from the general-purpose platoon.

(3) The radio teletypewriter equipments of forward signal centers are usually deployed in a direct support role. One set is normally situated with brigade headquarters to provide a station in the division RATT operations and intelligence net. A second station is deployed in direct support of the FSSE and operates in the division RATT administrative and logistical net. The third station operates in the division RATT general purpose net and may be at the FSSE, brigade trains, or with the signal center as appropriate, depending upon the location of its heaviest users.

(4) A type configuration for forward area signal centers is illustrated by figure 7.



Note 1. Second AN/MRC-68 is for displacement but may be employed for secondary circuits.

Note 2. For an explanation of facilities control at this level see paragraph 69c.

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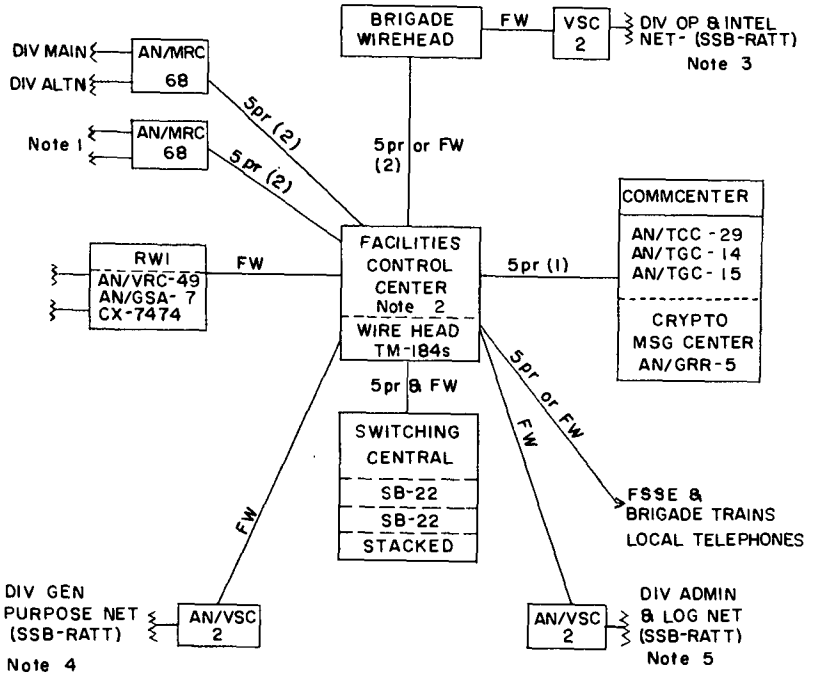
Figure 6. Type configuration, signal center, support command, airborne division.



NOTES:
1. Second AN/MRC-68 is for use during displacement but may be used to obtain additional secondary circuits.
2. For explanation of facilities control at this level consult text: par 69c.
3. Normally located vicinity brigade headquarters.
4. May be employed at brigade trains or at FSSE
5. Normally located with division FSSE

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Figure 7. Type configuration, forward area signal center, airborne division.

Section IV. RADIO RELAY MULTI-CHANNEL NETWORK

71. General

The radio relay multi-channel network carries the bulk of the electronic traffic handled by the division communication system. It is the primary means of providing telephone and teletypewriter circuits for the major headquarters of the division.

a. Sufficient resources are not available in the airborne division to permit establishment of a specific command-control multi-channel network in addition to and separate from the area network, as provided in the infantry, armored, and mechanized divisions. In practice, the multi-channel network of the airborne given to command-control requirements and division is command oriented, i.e., priority is area needs are met as feasible within this framework.

b. When dealing with the radio relay multi-channel network, the division signal officer (DSO) should be careful to avoid the pitfall of considering it from a radio-link viewpoint or as a carrier to carrier operation. The carrier and radio relay links are the heart of the network; however, these links are useless as separate entities, and appropriate attention

must be given to the cable or wire, switchboards, and subscriber teletypewriter and telephone instruments which permit utilization of the network. The only true test of the multichannel network is the ability to print or talk on a subscriber-to-subscriber basis.

72. Responsibility

A summation of responsibilities for specific functions relating to establishment and operation of the division multi-channel network as follows:

a. The division signal officer (DSO) is responsible for determining current and future requirements and matching technical capabilities to the tactical situation. This encompasses consideration of such matters as distance and terrain, status of frequencies and state of readiness of equipment and personnel. The DSO makes decisions regarding distribution and location of resources, priority of installation, type of circuits to be activated, and allocation of same, and the order of precedence of system objectives in accordance with the situation and the policies of the commander.

b. The division SYSCONCEN (para 64) is responsible for the detailed planning and engineering required in accordance with the decisions of the DSO. The SYSCONCEN issues necessary implementing orders and directives to appropriate operating elements, and coordinates and controls the establishment and operation of the network.

c. The FACCONCEN (para 69*c*) at each signal center is responsible for implementation of the orders and directives of the SYSCONCEN. The FACCONCEN insures the proper routing of circuits from carrier to carrier, and the timely interconnection of circuits from carrier to user. They keep the CYSCONCEN informed of all local developments which could affect the overall network.

d. The two command signal center platoons of the command operations company install and operate the radio relay and carrier terminals and other facilities required for access into the network at division main and alternate command post.

e. The support command operations platoon of the support operations company installs and operates the radio relay and carrier terminals and other facilities required for access into the network at the division support command headquarters.

f. The three forward signal center platoons of the support operations company install and operate the radio relay and carrier terminals and other facilities required for access into the network at signal centers in the brigade areas. Circuits allocated for the sole use of brigade headquarters, division FSSE, or another specified unit or activity are extended by the signal center platoon to the appropriate unit or activity.

g. The general purpose platoon of the support operations company installs and operates radio relay and carrier terminals in direct support of the division artillery and the division aviation battalion. Circuits are extended by the general purpose platoon to the supported unit. This platoon also installs and operates up to five relay stations or provides radio relay and carrier terminals for special tasks as required.

73. Characteristics of the Multi-Channel Network

The airborne division multi-channel network differs in a number of significant points from the network found in the standard division.

a. Sufficient equipment is not provided to permit establishment of a separate command control system in addition to an area type system.

b. The radio-relay multi-channel network of the airborne division has a relatively low circuit capacity when compared with that available to the infantry, armored, or mechanized divisions. A four-channel carrier system is utilized because of size and weight limitations which preclude use of higher capacity equipment.

c. Sufficient equipment is not provided for the sole purpose of establishing alternate routes of communication.

d. The airborne division radio-relay multichannel network is composed of relatively lightweight, reliable and simple-to-operate equipments which can be installed and/or displaced with a minimum of delay.

e. The standard radio-relay equipment currently authorized to the airborne division signal battalion is the AN/MRC–68. This equipment is used interchangeably as either a terminal or relay station. Use of the AN/MRC–68 as a dual terminal to furnish two separate links on differing azimuths is standard practice in the airborne division.

f. In the airborne division, carrier equipment is employed over radio-relay links only and no provision is made for the use of spiral-four cable.

74. Configuration

A type configuration for the radio-relay multi-channel network of the airborne division is illustrated by figure 8. Current equipment and personnel levels for the airborne signal battalion authorize sufficient resources to establish and maintain only the minimum essential radio-relay links and to provide for a limited rapid displacement capability. The minimum essential links normally installed for the basic standard multi-channel network are designated *primary links* and are shown by the solid lines in figure 8. Additional links, which

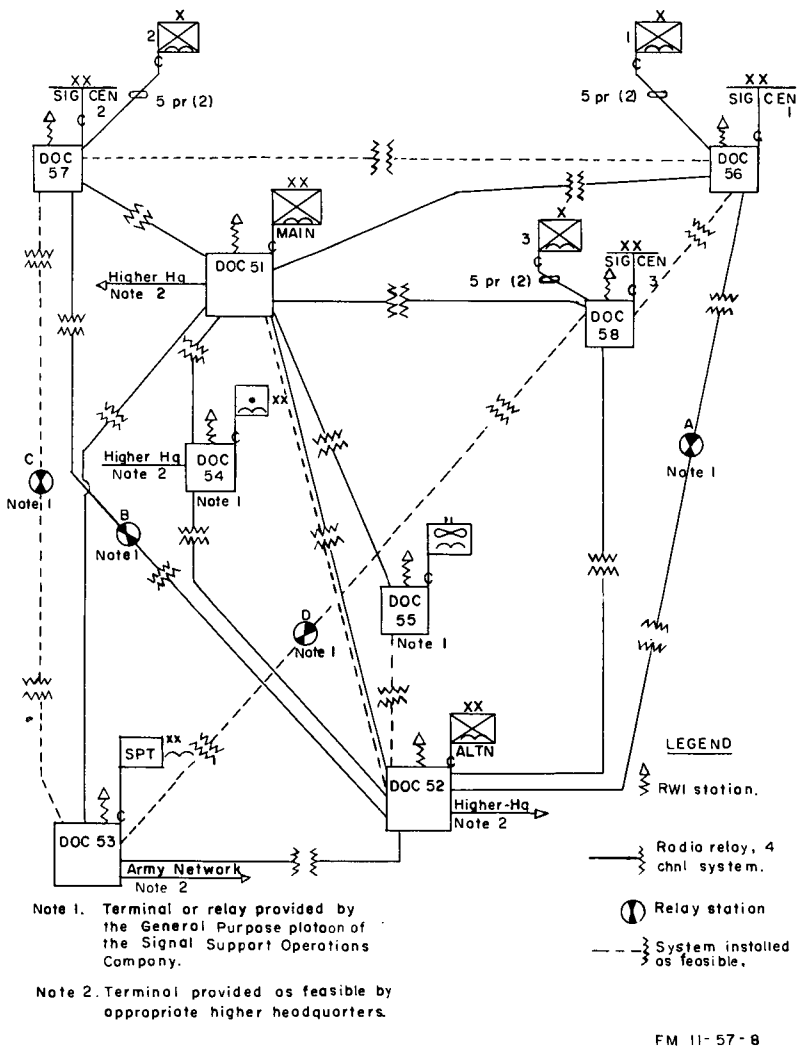

Figure 8. Type radio relay multi-channel network.

may be activated as feasible to augment the basic network, are called *secondary links.* These are shown by the broken lines in figure 8.

75. Primary Radio Relay Links

a. General. The primary radio-relay links carry the minimum essential circuits required for command control, combat and combat service support communications. All these links emanate from either division main or division alternate. Subordinate units should always attempt to pass traffic direct to the appropriate command post to avoid relay or retransmission delays; however, passing of traffic to either echelon by subordinate units is normally considered to constitute delivery to division headquarters. Current operational traffic received at either echelon should be passed to the other echelon, when appropriate, as a matter of SOP.

b. Installation and Restoration Priorities. It is the DSO's responsibility to establish installation and restoration priorities for each specific operation; however, an SOP should be developed for routine/standard type situations. A recommended order of priority for installation or restoration of primary links follows:

(1) From division main to—
   (*a*) Forward areas signal centers in committed brigade areas.
   (*b*) Division artillery.
   (*c*) Division aviation battalion/airfield.
   (*d*) Division support command.
   (*e*) Forward area signal center in reserve brigade area.
   (*f*) Division alternate.

(2) *From division alternate to*—
   (*a*) Forward area signal centers in committed brigade areas.
   (*b*) Division artillery.
   (*c*) Division support command.
   (*d*) Forward area signal center in reserve brigade area.

76. Secondary Radio-Relay Links

Due to the low circuit capacity and limited equipment, the primary radio-relay links of the multi-channel network provide only for the minimum essential circuit needs, and offer very limited alternate routing capability. The link between division main and alternate is the sole primary link which does not permit limited alternate routing; however, the primary purpose of this link is to connect the two CPs to insure that information held at both locations is up-to-date and to facilitate assumption of command. Additional secondary radio-relay links should be established when feasible, to build in greater suvivability by providing alternate routing, and also to make available additional circuits to increase speed of handling and permit greater flexibility. The experienced DSO will find many ways in which to employ his resources to maximum advantage to increase the inherent communication capability normally obtained from the multi-channel network.

a. One method of obtaining additional links is through the prudent use of "displacement" equipments. When movement is not imminent, equipment authorized for displacement should be put into use. It must be stressed that radio-relay equipments provided for displacement should not be committed in any manner which would seriously hinder or preclude their use as intended.

b. A second source of equipment to enlarge on the basic radio-relay network is the general purpose platoon of the signal support operations company. This platoon is equipped to provide up to five relays to extend the range of radio-relay systems. Judicious use of these sets, when not required as relays, should also be considered by the DSO.

77. Types of Circuits

Functional communication to support the functions of command control, combat support, and combat service support generate requirements for differing types of circuits. The multi-channel radio-relay network of the airborne division normally provides common-user or sole-user telephone circuits and common-user teletypewriter circuits.

a. Common-user Telephone Circuits. The bulk of the circuits provided via the multi-channel network are common-user telephone circuits. These circuits interconnect switchboards of the various signal centers and units,

and they are available to any subscriber for all types of functional communications. The DSO must insure that the common-user switched telephone network is comprehensive enough to enable any subscriber to reach any other subscriber within the division. A capability must also be provided to permit subscribers to place calls outside the division area via circuits installed by supporting signal units of higher headquarters.

b. Sole-User Telephone Circuits.

(1) A certain number of circuits are normally allocated on a full-time basis for sole use of specific personnel or activities. There are a number of guidelines provided for determining justification for sole-user circuits, based upon traffic studies and other engineering factors. From a practical viewpoint, however, the only valid justification that can be accepted for diverting a circuit to sole-user use in the airborne division is operational need of high tactical urgency.

(2) The normal sole-user circuits established as standard doctrine in the airborne division are:

(*a*) DTOC (G3/G2) to brigade operations (S3/S2)	Combat Support & Command-Control
(*b*) DTOC (FSCE) brigade operations (FSCC)	Combat Support
(*c*) DTOC (FSCE) division artillery (FDC)	Combat Support
(*d*) DTOC at division main to DTOC at division alternate	Command-Control

(3) Additional sole-user circuits may be installed as required for special operations or as SOP when additional circuits are available.

c. Teletypewriter Circuits.

(1) Teletypewriter operations in the airborne division are normally on a common-user basis. As standard doctrine, a manual switched teletypewriter net is established which includes all teletpyewriter subscribers within the division.

(2) Half-duplex circuits are normally provided for teletypewriter operation over the multi-channel network on a speech-plus basis. Subscribers are connected to the teletypewriter switching central at either division main or alternate command posts. At both division main and alternate, the AN/MGC–17 available is capable of terminating three full-duplex or half-duplex circuits, and communication security equipment can be utilized on one of the full-duplex or two of the half-duplex circuits.

(3) Teletypewriter service for brigade trains and the forward support areas is furnished on an over-the-counter basis from the appropriate forward signal center.

(4) Sole-user teletypewriter circuits are not normally employed within the airborne division.

78. Circuit Allocation

The number and types of circuits to be activated and the allocations to be made will vary with the situation. In the airborne division, because of the relatively low-channel capacity available, the provision and utilization of radio relay circuits are especially critical and the concept of shared communication circuits by interrelated functions (para 59*g*) should be adhered to closely in order to provide for even the minimum essential requirements.

a. When allocating circuits, first priority must be given to the needs for command/control and combat support (operation/intelligence and fire support) communications. As far as possible, these requirements should be met by primary circuits, which are circuits routed over the primary links of the multichannel network (para 75).

b. Consideration must also be given, however, to the requirements for combat service support communications to permit all units to conduct administrative and logistical functions in support of the division mission. Al-

though priority for these functions may of necessity be somewhat lower than those established for command/control and combat support functions, the sources allocated must be satisfactory to fulfill the minimum needs. After satisfying minimum command/control and combat support requirements, few primary circuits are available for combat support functions. Unsatisfied combat service support communications requirements can often be met by secondary circuits, which are circuits routed over secondary links of the multi-channel radio relay network (para 76).

c. Figure 9 illustrates a type circuit allocation chart for the multi-channel network of the airborne division. Both primary and secondary circuits are indicated. The primary circuits are those established as a norm, while the secondary circuits are examples of the type circuits which may be available when secondary circuits are examples of the type circuits which may be available when secondary links can be established. It must be stressed that figure 9 is a "type" allocation chart only. It is included as a guide and is not to be construed or utilized as doctrine.

79. Circuit Routing

a. The planning and engineering of circuit routing over the radio-relay multi-channel system is highly critical if all allocation requirements are to be met with the limited resources available.

b. Figure 10 illustrates a type circuit diagram which makes provision for all the primary and secondary circuits contained on the circuit allocation chart (fig. 9). Systems control center personnel should insure that all primary circuits are routed over primary links to avoid the necessity of rearranging additional circuits when secondary links must be deactivated. It must be stressed that figure 10 is a "type" diagram only. It is included as a guide and is not to be construed or utilized as doctrine.

80. Multi-Channel Communications to Higher and Adjacent Headquarters

a. Concepts of operations and normal missions of the airborne division include many instances when normal field army area communications support for the division will not be

Type of circuit	VOICE-COMMON USER							VOICE SOLE-USER							TELETYPE SPEECH-PLUS						
FROM ↓ / TO →	DIV MAIN CP	DIV ALTN CP	DIV ARTY HQ	AVN BN	EACH BDE (3)	DIV SPT COMD	EACH FWD SIG CEN(3)	DIV MAIN CP	DIV ALTN CP	DIV ARTY HQ	AVN BN	EACH BDE(3)	DIV MAIN CP	DIV ALTN CP	DIV ARTY HQ	AVN BN	EACH BDE(3)	DIV SPT COMD	EACH FWD SIG CEN(3)
DIV MAIN CP		2/1*	2	2	1/1*	2	1		1/1*	1	1	2		1	1	1	1	1	
DIV ALTN CP	2/1*		2	2*	2	2	1	1/1*		1	1*		1					1	1
DIV ARTY HQ	2	2				2		1	1				1						
AVN BN	2	2*				1/1*		1	1*				1						
EACH BDE (3)	1/1*	2			1*	1*		2					1						
DIV SPT COMD	2	2	2	1/1*	1*		1*						1	1					
EACH FWD SIG CEN (3)	1	1				1*	1*							1					

Note: * Secondary circuits installed when feasible.

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Figure 9. Type circuit allocation chart, radio relay multi-channel network, airborne division.

Figure 10. Type circuit diagram, radio relay multi-channel network, airborne division.

(Located in back of manual)

available. Communications to higher or adjacent units in an airborne operation will often be of a specialized nature provided in accordance with the joint plan for the operation.

b. When an airborne division is operating in an established field army or separate corps area, it can expect to receive communication support comparative to that provided to any other type division.

(1) When appropriate, a corps signal battalion will provide radio-relay terminals at division main, division alternate, and division artillery CP's. Allocated circuits will be extended by corps signal personnel to the appropriate division wire head to provide access into the Corps Command Communication System.

(2) The basic field army communication system includes area signal centers and connecting multi-channel radio-relay and cable links installed, operated and maintained under the direction of the Field Army Signal Officer. The system normally extends from the field army rear boundary down to and including division rear areas. Division support command headquarters is provided access into this army area communication system by means of circuits extended by the area signal battalion from the appropriate area signal center.

(3) When separately located, the division rear echelon will also be connected into the nearest army area signal center by a combat area signal battalion.

Section V. DIVISION TACTICAL RADIO NETS

81. General

The airborne division places heavy reliance on tactical radio nets of all types. Single sideband (SSB) radio teletypewriter (RATT) as well as SSB and FM voice are all employed extensively for division-level nets.

82. Internal Division Radio Nets

For purposes of this field manual, discussion of internal division radio nets is limited to those division level nets in which the signal battalion normally furnishes the net control station (NCS). The DSO normally exercises technical control over these nets in the name of the division commander.

a. In employing the division radio capability, the DSO must be guided by the tactical situation, the desires of the commander, and the availability of frequencies, equipment, and personnel. In accordance with these guidelines, it is the responsibility of the DSO to determine the number, type, and configuration of radio nets to be employed in support of the division mission.

b. Division tactical radio nets are designed to be utilized in support of specific functions, and as far as possible, should be restricted to a particular type of traffic. For economy of resources, the function of operations is usually combined with intelligence, and the function of administration is combined with logistics for joint use of radio facilities. Figure 11 illustrates the division level radio nets normally activated in the airborne division, however, the number, type, and configuration of these nets should be kept flexible in order to meet changing requirements of a specific tactical or technical situation. The DSO may activate, at his discretion within the policies of the commander, point-to-point facilities or additional nets in accordance with the situation and within the capabilities of available resources.

83. Division Command Net, SSB-Voice

The division commander requires an immediately responsive command-control means by which he can establish personal contact with his major subordinate commanders at all times. The division command net, SSB-Voice, is designed to meet this requirement and is normally restricted to high-priority traffic on a commander-to-commander basis.

a. The signal battalion provides only the Net Control Station (NCS) at division main and

DIVISION RADIO NETS, AIRBORNE DIVISION

UNIT \ NET	COMD NET SSB-VOICE	SSB RATT NETS 1 OP & INTEL	2 ADMIN & LOG	3 GENERAL PURPOSE	OP & INTEL NET FM-VOICE	WARNING BCST NET VOICE	AIR REQ NET SSB-VOICE	HIGHER HQ NETS
DIV MAIN	GRC-106 NCS (S)	VSC-2 NCS (S)	VSC-2 (S)	VSC-2 (S)	VRC-46 NCS (S)	GRC-106 NCS (S)	GRC-106 NCS (S)	
DIV CG	GRC-106				VRC-46			
each ADC (2)	GRC-106				VRC-46			Higher headquarters signal
DIV STAFF	GRC-106 (3) *				VRC-46 (4) **			unit provides required terminals for entry into higher headquarters RATT nets as appropriate.
DIV ALTN	GRC-106 (S)	VSC-2 (S)	VSC-2 (S)	VSC-2 (S)	VRC-46 (S)	GRC-106 (S)		
DIV ARTY	GRC-106 (2) CO & FDC	VSC-2 (S)	VSC-2 (S)		VRC-46 FDC	GRR-5 (13)		
each BDE (3)	GRC-106 (2) CO & CP	VSC-2 (S)		VSC-2 (S)	VRC-46 CP	GRR-5 (1)	GRC-106	
each INF BN (9)						GRR-5 (1)	GRC-106	
SPT COMD	GRC-106		VSC-2 NCS (S)	VSC-2 NCS (S)		GRR-5 (11)		
AVN BN	GRC-106 CP	VSC-2 (S)	VSC-2 (S)		VRC-49 CP	GRR-5 (3)		
CAV SQDN	GRC-106(2) CO & CP	VSC-2	VSC-2		VRC-46(2) S-3 & CP	GRR-5 (4)	GRC-106	
SIG BN	GRC-106 DSO				VRC-47 S3	GRR-5 (7) ***		
ENGR BN	GRC-106 CP	VSC-2	VSC-2		VRC-46/47 S-3 & CP	GRR-5 (4)		
MP Co	GRC-106 CP				VRC-47 monitor	GRR-5 (1)		
each Fwd Spt Area(3)			VSC-2 (S)					

NOTES: (S)-- Indicates equipment & personnel provided by signal battalion.
*-- One (1) AN/GRC-106 utilized by ACofS G-3. Two (2) AN/GRC-106's provided to Chief of Staff section to be utilized as required.
**-- One (1) each to Chief of Staff, ACofS G-3, Asst G-3 and ACofS G-2.
***-- One (1) AN/GRR-5 at each signal center operated by the signal battalion plus at division rear COMM CEN.

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Figure 11. Type division tactical radio nets, airborne division.

a station at division alternate. These stations are normally remoted into the DTOC's at each location for the use of the commander or his designated representative. The DSO operates a station in this net in his role as signal battalion commander.

b. Voice security equipment is not available for utilization on this net.

84. Operations-Intelligence Net, RATT No. 1

A requirement exists to provide a reliable, secure means of passing traffic of an operations-intelligence nature between the division G3/G2 and the S3/S2 elements of the combat and combat support units of the division. The operations-intelligence net, RATT No. 1, is designed to meet this requirement. The use of a combined net is based on the concept of close working relationship and interchangeability of the G3/G2 functions at all levels.

a. Units included in this net, with the exception of the engineer battalion and cavalry squadron, are provided direct support RATT teams from the division signal battalion. In addition, the signal battalion provides the NCS at division main and a station at division alternate.

b. This net is normally employed on a secure circuit basis, utilizing on-line cryptographic equipment organic to each RATT station.

85. Division Administration-Logistic Net, RATT No. 2

A requirement exists to provide a reliable, secure means of passing administrative and logistics traffic between the division support command and the service support elements of all organic and attached units of the division. The joint administration-logistic net, RATT No. 2, is designed to meet this requirement. The use of a combined net is based on the concept of centralized responsibility for those functions under a single commander.

a. All units included in this net, with the exception of the engineer battalion and the cavalry squadron, are provided direct support RATT teams from the division signal battalion.

b. The center of the combat service support complex and the principal user of the administration-logistics net is the division support command. For this reason, the NCS provided by the signal battalion is located at support command headquarters. In addition, a station is established by the signal battalion in each Forward Support Area. Although this station is primarily for the use of the forward area support coordinator, it also acts as the entry point into the admin-log net for the brigades, the infantry battalions, and other units located in the vicinity.

c. This net is normally employed on a secure circuit basis utilizing on-line cryptographic equipment organic to each RATT station.

86. Division General Purpose Net, RATT No. 3

The primary purpose of this net is to provide for overflow traffic from either RATT net number 1 or 2. It may be employed for other requirements when not needed for that purpose.

a. The signal battalion furnishes all stations in this net, to include the NCS, which is normally located at support command signal center. NCS responsibility may be transferred to one of the echelons of division headquarters by the SYSCONCEN when such an arrangement would be more appropriate to the function being performed by the net.

b. This net is normally employed on a secure circuit basis utilizing on-line cryptographic equipment organic to each RATT station.

87. Division Operations-Intelligence Net, FM-Voice

A requirement exists to provide a means of passing high priority traffic of an operational-intelligence nature on an immediate, personal basis. The division operations-intelligence net, FM voice, is designed to meet this requirement. The net parallels the division command net SSB voice and is for the primary use of the personnel at the DTOC and subordiate taetical command posts of the division.

a. The signal battalion provides only the NCS at division main and a station at division alternate. Those stations are normally remoted into the DTOC at each location for use of the G3/G2 operations officers. The S3 of the signal battalion operates a station in this net in his role as operations officer of the battalion.

b. Relays or retransmission stations may be required for efficient operation of this net. The DSO is responsible for the provision of ground facilities of this type and for the coordination of requirements for aerial relays with the aviation battalion.

c. A limited number of stations in this net have speech security equipment permitting selective operation on a secure circuit basis between these stations only.

88. Division Warning Broadcast Net, AM-Voice

The division warning broadcast net provides for non-selective warnings of CBR attacks, fallout patterns, radsafe data, nuclear strike warnings, and other urgent operational information of interest to all units of the division.

a. Transmitter stations are provided by the division signal battalion at division main and alternate command posts. In addition, by SOP, the cavalry squadron and division artillery are normally authorized to divert appropriate organic equipment and to broadcast on this net as required. A number of receivers are located as organic unit equipment throughout the division area to provide wide coverage.

b. This net is not secure and only broadcasts authorized to be sent in the clear may be transmitted. See AR 380–26. Other warning information is normally transmitted over a secure means such as the operations-intelligence net RATT No. 1.

89. Division Air Request Net, SSB-Voice

A requirement exists to provide a rapid, responsive method of passing immediate requests for tactical close air support from the requester to the division TOC. The division air request net is restricted to immediate requests. Preplanned missions are processed through normal command channels over other means of communication.

a. Immediate air requests normally reach maneuver/battalion squadron level through the

standard communication nets organic to the particular battalion/squadron. At this point they enter the division air request net. The cavalry squadron, each brigade headquarters, and each infantry maneuver battalion have an organic air control team (ACT) which provides a station in the division air request net. The signal battalion includes an air support signal team which provides the NCS for the net located normally at division main. The NCS is usually remoted into the DTOC for use of the tactical air support element (TASE). Requests are transmitted direct from battalion/squadron level to TASE. Brigade headquarters monitors and may disapprove the request if desired. From the TASE approved requests are forwarded to the direct air support center (DASC) via United States Air Fofirce (USAF)/air request net.

b. By AR 525–25 (AFR 55–9), 2 September 1965, service responsibility for tactical air control parties (TACP) has been given to USAF. As equipment and personnel become available, the USAF will provide TACPS to replace all the army ACT's at battalion and brigade levels and the air support signal team at division. The USAF air request net will then be extended to include these levels and the USAF will, except in some specialized cases, provide both the personnel and equipment required. For details concerning air support operations and communications after full implementation by the USAF, refer to FM 100–25, AFM ( ), Tactical Air Support of Land Forces (when published).

90. FM Radio Wire Integration

A requirement exists within the airborne division to provide a means of communication by which commanders and other key personnel traveling in vehicles or aircraft can contact or be contacted by selected personnel via the division switched telephone network. This requirement is met by the division FM radio wire integration (RWI) network.

a. The division signal battalion operates an RWI station at each signal center, at division artillery headquarters, and at the aviation battalion CP (airfield). At each location wire lines are extended by signal battalion personnel from the local switchboard to the Radio Set Control, AN/GSA–7, located with the RWI station, and the AN/GSA–7 is connected to the FM radio set by means of Special Purpose Cable CS–7474. When the switchboard employed is other than an SB–22( )/PT, it is necessary to utilize a line pack from the Switchboard Assembly Kit MX–2915/DT for interconnection of RWI calls at the switchboard. It is then possible for any subscriber of the switchboard to be connected to and operate the radio on a push-to-talk basis. When RWI calls are placed through more than one switchboard over circuits of the multi-channel radio-relay system, the subscribers lose the ability to operate on a push-to-talk basis and manual keying by the RWI station attendant is required.

b. Utilization of the RWI network, while simple in its application, requires division wide standardized operating procedures for efficient operation. SOP's must be established, published, and understood by all personnel involved to include the users, the switchboard operators, and the RWI station operators. The users, in this case, include any person who may have occasion to receive or make an RWI call utilizing a standard field telephone, or an FM radio. The high dividends that can be gained through the flexibility inherent in any RWI network warrant the training effort required to obtain an efficient RWI operation. RWI is especially useful when multi-channel radio-relay is not available and it is therefore of special value to the airborne division. When heavy reliance must be placed on the use of RWI, it may be prudent to establish restrictions on its use in order to avoid overloading the system and to give precedence to those personnel most in need of its facilities.

91. External Radio Nets

External radio nets are those nets over which a higher headquarters exercises control. The number and type of external radio nets to be provided to the airborne division are extremely flexible and are governed by the type of operation being conducted.

a. Normally, provision of external radio nets is the responsibility of a higher headquarters, and personnel and equipment to fulfill this requirement are not organic to the divi-

sion signal battalion, except to provide for monitoring of the Air Force spot receiver net.

b. For an airborne operation it is incumbent upon the DSO to insure that responsibilities in this regard are clearly and adequately spelled out in the joint operations order and that augmentation of personnel and equipment is provided when required.

c. For standard ground operations, communications to higher headquarters should, when feasible, be on a par with that normally provided to any other division to include the following:

(1) Corps Command Operations Net (RATT).

(2) Corps Command Operations Net (SSB-Voice).

(3) Logistics Net (RATT).

(4) Air Force Spot Report Net (UHF-Voice). (Equipment is organic to the airborne division to monitor this net.)

(5) Air Force Air Request Net.

92. Signal Battalion Radio Net

The signal battalion operates an internal FM voice radio net for command-control of the battalion elements. Figure 12 illustrates a type radio net for the signal battalion airborne division. This net is available for use by the division SYSCONCEN when required.

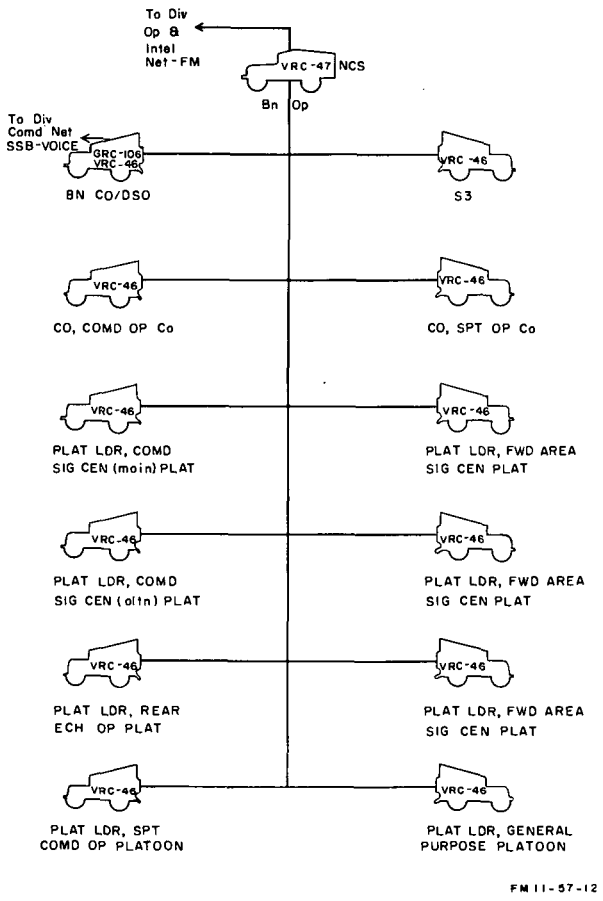

Figure 12. Type FM radio net, signal battalion, airborne division.

93. CW Radio Operators

Although all standard division AM radio nets operate on voice or RATT as normal mode, continuous unit training of radio operators in CW code and procedures is of utmost importance. Often CW will be the only method of communication because of quality of the circuit, enemy interference, or distance. It is the responsibility of the DSO to insure the continuing proficiency of CW operators so that an adequate capability will exist when required.

Section VI. MESSENGER COMMUNICATION

94. General

a. Messenger communication plays an increasingly vital role in the airborne division communication system. Current doctrine envisions employment of both air and ground messengers to the fullest degree possible consistent with the weather and terrain.

b. The tendency to overlook the full capabilities of air and ground messengers and to place almost complete reliance on electrical systems should be guarded against. Messenger service is often the most secure, accurate, and reliable means of communication available, and, in some instances, can accomplish actual delivery of a message faster than electrical means.

c. Messenger communication considerations peculiar to internal defense situations are discussed in chapter 11.

95. Utilization

a. Messengers are normally employed from higher to subordinate headquarters.

b. In the airborne division it is standard practice to employ messengers as the routine means of delivering bulk items which do not lend themselves to electronic means of communication. Service is primarily a "pouch" pick-up method. A typical list of items follows:

(1) Maps and overlays (facsimile is not available to the airborne division).
(2) Password.
(3) SSI and SOI items.
(4) Award and decoration papers.
(5) General and special orders.
(6) Routine correspondence, memoranda, bulletins, and circulars.
(7) Newspapers and PIO information sheets and bulletins.
(8) Spare parts and sundry small supply items.

b. In addition, messenger is often utilized as a means of delivery for all types of operations and intelligence traffic and command messages when such action is prudent from a security viewpoint, or when messenger will provide more expeditious delivery than any other means. Messenger should always be considered as alternate when the capability of electronic means has been significantly downgraded because of loss of equipment, overloading of circuit capacity, or other reason. Typical situations in which messenger may be used extensively for traffic normally handled by electronic means is during movement to contact or a withdrawal when it is imperative that electronic transmission be kept to a minimum or radio silence is imposed.

96. Type of Messenger Service

The two types of messenger service utilized within the airborne division are scheduled and special.

a. Scheduled Messenger. As the name implies, these are messengers who operate over pre-planned routes, arriving and departing specific locations at specified times. The division messenger schedule should be coordinated with the corps and field army area communication system messenger schedules and should be published and distributed to all appropriate agencies.

b. Special Messenger. Any messenger or courier not scheduled is considered to be a special messenger. Normally, special messengers are employed for urgent requirements when the use of scheduled messenger or other means will not insure delivery of a particular item within the required time, or when delivery is to be made to a unit for which a scheduled route has not been established. A special messenger capability should be retained at main and alternate whenever feasible. Personnel other than the organic messengers of the battalion can be employed as special messengers. Liaison officers from subordinate units of the division are often utilized as couriers or special messengers, and SOP's normally are established requiring them to check through the division COMMCEN prior to departure for their units. Other personnel visiting the division CP should be utilized as available and required.

97. Employment of Messenger

a. Division Main and Alternate CP's. There are four motor messengers at both main and alternate command posts. Scheduled messenger service is established from each CP to all major organic and attached units and to the three forward signal centers. Routes originating at either main or rear are coordinated and dispatched on an alternating complementary schedule to provide maximum coverage of the division area.

b. Support Command. There is one motor messenger at the support command signal center. This messenger is utilized as a scheduled messenger to subordinate units of support command in close vicinity of the support command CP and as a special messenger when required.

c. Forward Signal Centers. The one motor messenger at each forward signal center is normally not utilized on a scheduled messenger basis. Usually, the brigade headquarters, the forward support company, the medical company, and other supported units will pick up and deliver at the forward area signal centers. The signal center messenger is employed for delivery to higher headquarters or supported units as required on a special messenger basis.

98. Messenger Modes

a. Motor Messenger. The signal battalion contains an organic capability for motor messenger only. Motor messengers should be dispatched in two-man teams as driver and driver-guard respectively. For planning purposes motor messengers may be expected to travel at the rate of 25 to 40 miles per hour during daylight and from 15 to 30 miles per hour during hours of darkness. While these guidelines may be utilized to plan initial schedules for motor messenger routes, schedules should be revised as soon as possible in accordance with experience gained on the ground over the actual routes.

b. Air Messenger Service. The division aviation battalion has the mission of providing the air messenger service for the division. Close coordination is required between the division signal officer and the division aviation officer to insure establishment of a responsive air messenger delivery capability. Normally, aircraft and pilots are furnished by the aviation battalion and the messenger is provided by the division signal battalion. For planning purposes, air messengers may be expected to travel at the rate of 80 miles per hour. Air messenger may be significantly restricted during hours of darkness and adverse weather.

c. Foot Messenger. The signal battalion does not normally employ foot messengers except for internal command post delivery involving short distances. Consideration should be given, however, to the use of foot messengers or runners when warranted by the situation, such as in the initial airborne assault. When the enemy situation dictates, messengers should be employed in pairs keeping far enough apart to prevent simultaneous capture or destruction.

99. Advantages of Messenger Service

The advantages of messenger service are summarized below—

a Messenger service is often the most secure and reliable means of communication.

b. Bulky, items, such as maps and overlays, can only be transmitted by messenger.

c. Congestion of electrical means is relieved when messengers are used to carry low precedence traffic.

d. Classified traffic may be transmitted to units not having a cryptographic capability.

e. Delivery may be expedited when distance to addressee is short and when messenger delivery time is less than the encoding-decoding time required prior to transmission by electrical means.

CHAPTER 8

COMMUNICATION SECURITY

100. General

Communication security is of significant importance to all units; however, it must be given special emphasis by airborne units because of the critical requirement for the element of surprise in airborne operations.

101. Definition

Communication security (COMSEC) is defined as the protection resulting from all measures designed to deny to unauthorized persons information of value which might be derived from the possession and study of telecommunications, or to mislead unauthorized persons in their interpretations of the results of such a study. Communication security includes cryptosecurity, physical security, and transmission security.

a. Cryptosecurity is that component of communication security which results from the provision of technically sound cryptosystems and their proper use.

b. Physical Security is that part of security concerned with physical measures designed to safeguard personnel; prevent unauthorized access to equipment, facilities, material, and documents; and safeguard them against espionage, sabotage, damage, and theft. See AR 320–5.

c. Transmission Security is that component of communication security which results from all measures designed to protect transmissions from unauthorized interception, traffic analysis, and imitative deception.

102. Application of Communication Security

The basic objective of COMSEC is to prevent unauthorized personnel from gaining useful information from communications. This objective can only be realized if all personnel are security conscious and cognizant of their personal responsibilities in this regard. COMSEC should be a habit—a state of mind developed through training and application in daily routine. All personnel should be thoroughly familiar with, and follow, the security practices designed to minimize the value of communications as a source of intelligence to unauthorized personnel. A summary of the more basic practices for effective COMSEC follow (refer to FM 32–5 for more detailed discussion):

a. Cryptosecurity.

(1) Use only authorized cryptosystems.

(2) Insure strict compliance with the operating instructions for cryptosystems employed.

(3) Use cryptosystems designed to provide the degree and term of security required.

b. Physical Security.

(1) Maintain proper safeguards against capture, theft, or unauthorized observation of messages and COMSEC materials at all times.

(2) Maintain adequate emergency evacuation and destruction plans and practice them frequently.

(3) Guard against carelessness and laxity by frequent inspections and tests of security measures.

c. Transmission Security.

(1) Use radio transmission only when other means of communication are not adequate.

(2) Be aware that all means of transmission, not only radio, are subject to interception by unauthorized personnel. Restrict plain language transmission to a minimum.

(3) Maintain circuit discipline and avoid extraneous transmissions.

(4) Assign call-signs/words and frequencies in random manner and change them simultaneously at frequent intervals.

(5) Make transmissions brief.

(6) Use broadcast and intercept transmission methods when possible.

(7) Use only prescribed communications operation procedure.

(8) Use authentication properly.

(9) Use minimum power required.

CHAPTER 9

SPECIAL SIGNAL COMMUNICATION PLANNING AND APPLICATION—AIRBORNE OPERATIONS

103. General

a. Complete, detailed plans and tests and inspections are especially vital prior to an airborne operation to insure the availability and readiness of all required signal personnel and equipment. Errors of omission can be extremely costly. Once in the airhead, anything that has not been anticipated and provided for cannot be easily obtained.

b. Planning and preparation for an airborne operation begins as soon as the mission is established by the commander and continues throughout the operational phases. The operational phases of an airborne operation are discussed in the following paragraphs.

104. Mounting Phase

The mounting phase of an airborne operation extends from time of receipt of the warning order or planning directive to loading of the aircraft. It includes movement to the marshaling area and the marshaling process.

a. Planning Coordination. Much of the planning for an airborne operation is a joint endeavor. Signal plans must stipulate responsibility for communications during each phase of the operation, and must provide for the coordinated use and/or integration of the communication facilities of all forces involved. Such forces normally include Army units in support of the marshaling area, USAF assault airlift units, tactical Air Force, Navy or Army units providing supporting fires, nondivisional units participating in the operation and the next higher headquarters. It may also be necessary to coordinate the provision of signal communications with a joint commander designated to assume command in the objective area. In addition, communications may often be required to friendly forces in the area (guerrillas, other indigenous forces, or allied forces being relieved or reinforced) and to friendly units with whom link-up is expected. It is the responsibility of the DSO to insure that joint signal plans provide for the signal support required by the division commander. In addition, he must insure that provisions of the joint plans are understood by division personnel concerned, and that necessary amplifying and implementing instructions are contained in the division signal plan.

b. Division Signal Plan. Signal planning procedures for airborne operations are generally the same as for other combat operations; however, plans are usually based solely on map reconnaissance of the objective area. Certain details peculiar only to airborne operation must be considered. These include—

(1) Communication facilities to be provided to the division by supporting units in the marshaling area.

(2) Detailed allocation of signal personnel, equipment and supplies to be landed by parachute or aircraft and the sequence and place of delivery to include spares and follow-up items needed for replacement of losses expected in the assault.

(3) Additional personnel and equipment required for special communication requirements.

(4) Provision of special fire support request channels and method of operation.

(5) Establishment of special sound, visual and messenger communications, and assault radio nets for resumption of command-control early in the assault.

(6) Communication procedures and recognition signals to be employed with allied forces in the airhead or in the air.

(7) Special arrangement for links to higher headquarters and logistic support bases.

(8) Phased transition from limited assault communications to normal division signal communication operations as soon as feasible for subsequent operations.

c. Signal Battalion Activities.

(1) During the mounting phase, the signal battalion commander is primarily concerned with those actions necessary to bring the battalion to a high state of combat readiness. Training should be accelerated and where possible personnel, especially replacements, should be rehearsed in their duties. Normally, each airborne operation will generate its own specific requirements for cross attachment of personnel and utilization of equipment in nonconventional configurations. Training and testing to insure cohesive and effective results from these nonstandard formations is mandatory. Command inspections of personnel and equipment should be continuous, and appropriate corrective actions must be given high priority.

(2) Packaging and rigging of equipment to maximize survivability is of prime importance. All equipment should be completely tested prior to packing and, where possible, marginal items replaced. The packing, rigging, and loading of equipment should be carefully controlled to insure that all items are properly placed for sequential entry into the airhead in accordance with the signal plan.

(3) Normally, signal battalion equipment which is to be employed in the airborne operation is not utilized once the division has entered the marshaling area.

d. Communications.

(1) The marshaling area commander is responsible for providing all signal communications for the division during the marshaling period. Organic division equipment should be thoroughly tested, made combat ready, packaged, and rigged for the operation. The communications required by the division during this period will depend upon the size, number, and dispersion of the marshaling areas being utilized by the division. It is the responsibility of the DSO to coordinate, as required, for the provision of communications which will satisfactorily meet the needs of the commander during marshaling.

(2) When the airborne division has had an active communication system operating prior to participation in an airborne operation, care should be exercised to maintain the appearance of normalcy both in type and volume of traffic. It is of utmost importance that the use of communications does not reveal an impeding operation, either by a significant increase in traffic or an abrupt decline. During the planning stage, the DSO must coordinate with appropriate agencies for the provision of dummy stations to commence operations in consonance with the closing down of bonafide division stations. Equipment and personnel for dummy stations should be provided from a supporting unit. The DSO must insure that this unit is furnished with the traffic information necessary for an uninterrupted continuation of a realistic traffic pattern.

105. Air Movement Phase

The air movement phase commences upon takeoff and extends until personnel and equipment leave the aircraft. During this phase, the DSO has not direct responsibility for communications. Communication for the airborne units is provided by the troop carrier command. Normally, listening silence will be imposed and transmissions will be restricted to

those of an urgent emergency nature having a bearing on the operation. Messages that must be transmitted between aircraft, or between aircraft and bases, must be authorized by the senior troop carrier command officer present at the site of message origination.

106. Assault Phase

The assault phase commences upon departure of the airborne force from the aircraft and extends through seizure of initial objectives and consolidation of the initial airhead line.

a. Centralized control is usually not feasible during early stages of a division-size airborne assault and the operation is generally characterized by independent action of subordinate units. Every effort must be expended, however, to establish communications that will enable the commander to regain effective command-control as soon as possible. For coordinated effort, it is desirable that the division command group regain at least minimum control as units consolidate at DZ assembly areas. Some methods that may be employed early in the assault phase follow.

(1) Prearranged pyrotechnics, sound signals, and panels to report degree of assembly of units and progress by phase line.

(2) A division assault radio net, employing AN/PRC–25 radios to link the division command group with major subordinate units. Antennas RC–292 should be jumped in to increase the range of this net.

(3) Foot and motor messengers.

(4) Communication facilities of the USAF air control parties with each maneuver unit and by the ALO with the division command group can be utilized for urgent operational traffic. Use of these means must be carefully controlled to avoid degrading their primary mission of requesting and directing close air support.

(5) Field wire lines may be feasible for employment when distance and terrain permit.

b. Sufficient signal personnel and equipment should be delivered into the objective area during the assault to assure timely installation of vital command post communication and to permit rapid development of a reliable command-control communication system. When possible, key personnel and equipment should be distributed throughout the lift to minimize the effect of loss or abort of an aircraft.

(1) The DSO will normally be a part of and accompany the division command group in the assault.

(2) Signal elements should be attached or placed in direct support of infantry brigades or battalions as required to facilitate early establishment of command control communications in the airhead. Attachments revert to signal battalion control as soon as practicable to insure maximum flexibility and economy of effort.

(3) Vehicle mounted SSB and FM radios, messenger vehicles, and field wire teams should be included among the first heavy drop passes.

c. It is preferable to air-land much of the signal battalion equipment such as radio-relay and carrier. Therefore, whenever possible, delivery of this equipment should be deferred until air landing is possible. When operational necessity dictates, such equipment may be delivered by heavy drop; however, a high damage rate can be expected.

107. Subsequent Operations Phase

a. The subsequent operations phase commences upon establishment of the initial airhead. This phase consists of employing the division in standard ground maneuvers to accomplish the mission.

b. Employment of the signal battalion reverts to standard procedures as soon as possible and the normal division communication system is installed and operated. Employment of the signal battalion in support of a particular type ground situation, is covered in chapter 8, FM 11–50. Requirements and employment for the signal battalion airborne division are similar in these situations, differing only in scope or degree commensurate with differences in quantity of personnel and equipment.

108. Link-up Operations

a. Link-up operations are common following an airborne operation and may be on a varying scale ranging from link-up with small indigenous units to link-up with a large U.S. or allied force moving on the ground.

b. The communication plan for any link-up operation should be developed well in advance of the actual link-up and should include the following:

(1) Channels for radio communication between the major unit of the airborne force and the major command of the link-up force. This will normally include exchange of frequencies, call signs, time of activation, and authentication procedures. It may also involve, in some instances, exchange of radio equipments and/or radio teams. Fire support coordination is of prime importance during a link-up operation and should be given major consideration along with command-control communications.

(2) Visual or sound identification signals for both day and night must be prescribed and standard procedures established for their use. Flares, colored smoke, panels, flashing lights, and infrared equipment are among the devices that may be employed for this purpose.

(3) As link-up becomes imminent, Army aircraft of both the airborne force and the link-up force should be employed to extend radio communication ranges and to deliver messages between the two forces. Message pick-up and delivery can be used to great advantage in this operation.

CHAPTER 10

UNIT SECURITY

109. General

Every commander is ultimately responsible for the security of his command. Unit security embraces all defense measures taken to prevent enemy interference with the unit's activities.

a. A lax defense invites attack, and an ill-prepared, weakly defended signal communication installation is a prime target for hostile action. The best preventative to covert or surprise attack is an alert, effective defense posture.

b. The extent of fortification or other defense measures undertaken by the signal battalion, or elements thereof, will be governed by many factors to include the enemy capability to strike signal installations. Under environments wherein signal battalion installations are in relatively secure areas, defense requirements may be comparatively light and consist primarily of a minimum number of sentry posts and passive defense measures against aerial or artillery attack. In other environments, where signal sites are relatively remote and a hostile force has a capability of rendering serious damage to installations through ground action, unit security becomes critical and greater emphasis is required. In an internal defense situation, as an example, the possibility of infiltration, sabotage, raid, or concentrated attack can be expected to make extensive defense works and measures mandatory.

110. Defense Support

The effectiveness of the defense system that any particular signal element can provide from its own resources will vary greatly depending upon its size, its degree of commitment to communication activities, and its location. When feasible, signal elements should be collocated with other units to take advantage of already established defenses. When provision of security forces commensurate with the enemy threat is beyond the capability of the signal element or when provision of adequate security force would adversely affect the primary mission of providing communication, security support will be required from combat units of the division. In an internal defense environment, sources of this support may be either US units or host country armed forces, paramilitary units, or police forces.

111. Defense of the Site

A well prepared and organized defense will give advance warning of approach of intruders, reduce the number of possible approach routes into the installation, and greatly assist in delaying or denying penetration by attackers. Procedures which permit economy of security forces without serious deficiencies in the defense provided are of special interest to signal elements, where shortage of personnel for security duty is habitually a prime problem.

a. Selection of the Site. The selection of a signal site may be dictated by many factors beyond the control of the signal commander. Where possible, however, a site should be selected that is suitable from both a defense and communication viewpoint. The site selected should be an area with open ground, or ground that can be readily cleared, to permit good fields of observation and fire around the installation. Natural obstacles that preclude or delay access into the area are desirable. When the site is isolated, the area should be sufficiently large to accommodate a helicopter landing area within the perimeter for resupply or evacuation.

b. Assistance in Preparation of the Site. Signal units are normally required to become oper-

ational in a short period of time. Total effort cannot normally be diverted to preparation of a defense system prior to commencing communication operations. Advice and/or active assistance from other sources should be provided as required for preparation of defenses when they are considered critical to survivability of the communication site. Some of these sources are—

(1) *Engineer units,* for location and construction of obstacles such as barbed wire, concertina, or mine fields, and for clearing of heavy obstacles for fields of fire and observation.

(2) *Chemical,* for issue and instruction in the use of defoliants to clear fields of fire and observation, and for issue and advice on employment of chemical mines and riot control munitions.

(3) *Civil affairs personnel,* to intercede with civil authorities for relocation of civilian personnel away from the site perimeters, and provision of indigenous labor.

c. Barrier Plan. A barrier system is a coordinated series of natural or artificial obstacles designed to stop, delay, restrict, or canalize penetration attempts and to impose additional losses in personnel, time, and equipment on the attacking forces (FM 5–15 and FM 31–10). Barriers are of particular value to defense of signal installations since they permit economizing on the force needed to defend and they gain the time needed by defenders to deploy from their communication assignments to defense positions. Artificial obstacles such as barbed wire or concertina should include improvised booby traps (FM 5–30), trip flares or other simple sound devices such as tin cans to give warning of personnel attempting to breach the obstacle. A number of field expedient traps, such as camouflaged pits with sharpened stakes and simple impaling devices such as punji stakes, are effective devices to improve perimeter barriers. When available, standard anti-personnel mine fields and/or claymore mines are extremely efficient barriers. For maximum effectiveness, barriers should be organized in depth, extend 360° along the entire perimeter, and be covered by automatic fire.

d. Organization for Defense. Prior delineation of responsibilities is necessary to avoid confusion and to insure maximum coordinated effort on the part of all personnel in event of attack. The organization for defense and actions to be taken should be planned in advance, established as SOP, and periodically rehearsed. Appropriate actions and procedures to be considered include —

(1) Sentries act as observation and listening posts. Sentries are concealed and so positioned as to preclude being taken by surprise. The sentry force should be formidable enough to delay penetration until the defense positions can be manned by remaining personnel.

(2) All personnel are assigned defense positions and drills are conducted in the manning of these positions.

(3) Personnel are required to keep their individual weapons and ammunition close at hand at all times.

(4) Defense positions are prepared which can be mutually supported by interlocking fire. When possible, positions should be covered and be interconnected by communication trenches as well as a communication system. Secondary positions should be prepared if the perimeter is large enough.

(5) Audible and visual signals are established for manning of defense positions and for relocation or retirement to new positions.

(6) Specific personnel are assigned to crew served weapons but all personnel are cross-trained in their use.

(7) Ammunition, grenades, flare guns, illuminating rounds, and when available, night viewing devices (infrared) are cached at each defense position.

(8) Sufficient supplies of water, dry rations, and medical supplies are stocked to last through a limited siege or denial of resupply. These supplies should be dispersed throughout the defense positions in event movement within the perimeter is limited by enemy action.

(9) Procedures and communications to be used to call for and direct artillery and/or air support are established. A field expedient which has proven useful to direct aircraft to the target as a large arrow which can be revolved 360° to point out the direction of the enemy main effort. A system of illumination on this device such as candles or tin cans filled with sand and inflammable liquid makes it visable to aerial observers or strike aircraft at night.

(10) Consideration should be given to use of a mobile reserve; however, control is extremely difficult especially at night, and extensive training and coordination is required for effective use.

(11) All obstacles and warning devices utilized in the barrier plan are periodically checked to insure that they have not been neutralized.

(12) All personnel are given additional first aid training with emphasis on care of battle wounds.

(13) All personnel are given additional training in defense against CBR attack.

(14) Plans for resupply or evacuation while under attack are established which include security for landing or drop zones, appropriate air-ground communications, and drills in expediting unloading of aircraft.

112. Unit Air Defense

In any combat theater, all units must recognize the threat and be prepared to defend against enemy air attacks, aerial reconnaissance activities, and airmobile operations.

a. The effectiveness of enemy air activity can be curtailed considerably by passive measures, such as proper camouflage and dispersion. Normally, air defense by units of the signal battalion, airborne division, will be limited to such measures; however, use of organic weapons in active air defense against low flying enemy aircraft may be required.

b. To maximize effectiveness of organic weapons when employed in an air-defense role, the following actions should be taken:

(1) Commanders must insure that an air defense SOP is established which contains firm guidance on how identification of aircraft is to be accomplished, which personnel will engage aircraft, techniques of fire to be used, rules of engagement, and controls to be exercised.

(2) All personnel must be made aware of the effectiveness of a large volume of small arms fire against low flying aircraft. Emphasis must be placed on the aggressive engagement of hostile aircraft in accordance with the air defense SOP.

(3) All personnel involved must be well trained and kept current on aircraft identification, techniques of firing at aerial targets, fire discipline, and response to control methods. Extreme emphasis must be placed on the threat to friendly aircraft involved in failure to properly discriminate between hostile and friendly aircraft.

(4) Tactics of withholding fire to preclude disclosure of position must be kept in its proper perspective.

(5) When the signal battalion unit elements are located within a supported unit's area of responsibility, it will adhere to that unit's air defense SOP.

113. Withdrawal Plans

a. While emphasis is placed on effective defense of the signal installation, the contingency must be faced with withdrawal under enemy pressure may be necessary. Plans for orderly withdrawal must be prepared in advance and rehearsed periodically to insure minimum loss of personnel and equipment. Withdrawal plans must include specific instructions for execution of destruction plans for material which cannot be evacuated with emphasis on sensitive material.

b. Positive controls must be placed on activation of destruction plans to insure timely execution when required and also to guard against premature implementation. The purpose of an enemy strike at a signal installation is to put it

out of action. If they can cause the signal unit to destroy its equipment by merely feinting an attack, their mission will be accomplished.

114. Escape and Evasion

While emphasis is placed on effective defense of the installation or orderly withdrawal, the possibility of enemy action precluding either must be anticipated. Therefore, all personnel must be trained in the basics of escape, evasion, and survival. See FM 21–77, FM 21–77A, and FM 21–76. Failure of personnel to survive and return to military control, especially in remote areas, is often the result of lack of knowledge rather than the result of actions taken by the enemy force. Weather, terrain, and lack of confidence may be the greatest enemy of the evader or escapee, and the ability to overcome these may well mean the difference between life and death or capture.

CHAPTER 11

INTERNAL DEFENSE

Section I. INTRODUCTION

115. General

Internal defense (ID) operations constitute all military, paramilitary, political, psychological, and civic action activities taken to defeat subversive insurgency. Measures which may be employed by military forces include military assistance, tactical (combat) operations, intelligence and counterintelligence operations, military civic action, internal security (includes populace control), and psychological operations.

a. The airborne division, or any element thereof, may be committed to an internal defense role. The commitment may be limited to advising, training, or providing logistical support to host country (HC) armed forces, paramilitary units, or civilian agencies; or it may involve active participation in the full gamut of ID activities to include tactical (combat) operations.

b. In an ID environment, the standard mission, concept of operation, and organization for combat of the airborne division may undergo significant modification. In such an environment, it can be expected that a reevaluation of signal communication support requirements will be necessary. It is essential that commanders, staffs, and other key personnel of the signal battalion understand the unique character of ID operations so that requirements peculiar to an ID environment can be anticipated and identified early in the planning phase. This chapter provides minimum essential information and doctrinal guidance to assist signal personnel in effectively providing signal communication support in an ID environment. For detailed discussion of internal defense, refer to FM 31–16, FM 31–22, FM 31–22A, FM 31–73, FM 33–1, and FM 100–20.

116. The Internal Defense Environment

Many factors contribute to making conditions in the ID environment different than those normally found in other environments. Some of these factors which are likely to have a direct impact on the signal battalion or elements thereof are—

a. Mission. In the ID environment, the scope of the commander's mission will normally be enlarged to place emphasis on political, economic, sociological, and psychological considerations to a much greater degree than in other environments.

b. Reduced Ground Mobility. ID operations often must be conducted in areas inaccessible to ground transportation. Road and rail networks are likely to be poor or nonexistent and cross country movement may be limited to travel by foot. When insurgent tactical activity is prevalent, ground mobility may be further restricted by hostile action.

c. The Nature of the Insurgent. In an ID environment the hostile force may range from individuals or small bands of guerrillas, lightly armed, to sophisticated battalion or larger size regular units with heavy weapons support. The insurgent generally is elusive, hard to identify, well motivated, and highly trained in the techniques of infiltration, terrorism, sabotage, and guerrilla type tactical operations.

d. Increased Unit Security Requirements. In an ID environment there are no rear areas which can be considered free or safe from hit and run attacks, sabotage, and terrorism. Unit security requirements will be increased considerably, especially for combat support and combat service support units/elements which normally operate in the comparatively secure rear areas of other environments.

e. Winning the Support of the People. Winning the support of the people for the host government is a continuous requirement. The impact on the population must be considered and weighed prior to initiating any action. The signal battalion can expect to be involved in military civic action and psychological programs.

f. Need for Technical Signal Assistance by Host Country (HC). The HC often will lack a viable effective nationwide military or civil signal communication network to support their requirements. U.S. Army Signal Corps units of all types may be required to provide assistance to military, paramilitary, and/or civil agencies in the construction, rehabilitation, or maintenance of HC civil or military communication facilities. Such assistance may be advisory in nature, limited to rendering technical advice, or it may include supplying personnel and equipment, training of indigenous personnel, or active participation in the construction, rehabilitation, or maintenance of HC communication facilities. While the airborne division signal battalion can provide limited training of indigenous personnel in tactical communications and tactical signal equipment operation, it does not have any signal construction or rehabilitation capability and possesses only organizational maintenance personnel. Because of this, and considering the lack of personnel formally trained in advisory skills, the signal battalion airborne division is generally not well suited for performance of this function to any great degree. If the signal battalion must assume responsibilities of this nature which are over and above the tactical capabilities of the unit, the DSO should identify the requirements and consider recommending augmentation of the battalion with appropriate teams from the 11–500, 33–500, or 41–500 series TOE as applicable.

g. Need for Integration of Effort. Complete integration of all ID endeavors into the overall field ID operation being conducted in any particular area is extremely important. Close coordination will be required with other US, HC, or third country armed forces, and/or civil agencies as well as HC paramilitary units active in the area. Normally, an Area Coordination Center (ACC) will be established for designated political areas. The ACC acts as the contact point for coordination of all ID activities in the area, and includes representation from all US or HC forces. Requirements for continued close liaison between units of differing nationality may require the exchange of signal personnel and equipment to offset noncompatibility of equipment or procedures, as well as the use of interpreters to overcome language barriers.

h. Deployment of Tactical Units. The typical deployment of units and the normal offensive or defensive configurations associated with other environments often do not apply in the ID environment. Friendly forces are usually more widely dispersed over larger areas especially during tactical (combat) operations. While combat units will be extremely mobile and fast moving in tactical operations, division headquarters. combat support, and combat service support units usually will remain relatively static within the combat bases. Distances from higher to subordinate headquarters may be abnormally extended.

i. Decentralized Control. Tactical (combat) operations are characterized by widely dispersed fast moving tactical formations and a correspondingly wider use of decentralized control. Rather than depend on specific guidance and direction from headquarters, small unit commanders will be required to make more independent decisions.

Section II. SIGNAL BATTALION ORGANIZATION AND TACTICAL DEPLOYMENT

117. General

Deployment of the signal battalion by standard TOE organization may well be unrealistic in the ID environment. The standard company, platoon, and section structure of a TOE 11–215 signal battalion is designed to provide the optimum organization for signal support of an airborne division when deployed on a conventional or nuclear battlefield. In an ID environment the division and/or elements thereof will not necessarily assume the standard headquarters configurations or the normal deploy-

ment of subordinate units. When the organization for combat of the tactical unit being supported is altered significantly, the signal battalion must be prepared to alter its structure and deployment accordingly. The desire to maintain normal command relationships and tactical integrity within the signal battalion should not preclude realignment of organization, responsibilities, and functions when there is an operational requirement to do so. Some factors having a direct bearing on signal battalion employment are discussed below.

a. Command Posts. The tactical concept of fragmentation of division headquarters (para 50) into three echelons (command posts) characteristic of other environments does not fully apply in the ID situation. The threat of mass destruction weapons and the need for continuing displacement of the command post, which are the principal reasons for headquarters fragmentation, are not normally applicable in the ID environment. Consolidation of headquarters elements and support units with combat units to obtain added security and economy of force against insurgent activity is more appropriate. A reduction in the number of division command posts activated and consolidation of units into combat bases may permit a reduction in the number of signal centers normally required in other environments.

b. Command Group. Wide dispersion of tactical units during tactical (combat) operations may entail greater use of command groups (para 53), and extended distances involved may require provision of signal support to command groups over and above that experienced in other environments. Airborne command groups equipped with a variety of radios (SSB/AM, VHF/FM, VHF/AM, and UHF) will be valuable for control widely dispersed units in difficult terrain. The DSO should identify and establish communication requirements based on the division commander's guidance and should coordinate with the aviation officer and appropriate support command personnel for the provision of appropriate communication packages for this function.

c. Combat Bases. In the ID environment the division normally establishes a combat base or bases from which ID operations are directed or launched. The number of bases established and the size and strength of each varies depending upon the extent of the division mission, area of responsibility, the enemy capability, and the purpose of the bases. Normally, headquarters elements, combat support, and combat service support units do not establish separate bases, but rather are located within the perimeter of a combat unit base for security. Interconnection of all combat bases by appropriate signal communication will be a primary requirement for the signal battalion.

118. Allocation of Resources

Ingenuity and flexibility will be required to reorient the signal battalion organization and effectively redistribute resources to provide signal communication elements appropriate to the differing or additional tasks peculiar to the ID environment.

a. As far as possible, equipment and personnel which become available from reduction in the number of division echelons activated or from consolidation of headquarters should be reallocated to balance any additional requirements generated by the ID environment. Just as a tactical commander tailors his combat force to the specific tasks to be accomplished, so must the signal battalion tailor and allocate its signal support resources to meet the priority of requirements established by the commander. Tailored elements can be attained by cross attachment of operational elements or teams; redistribution of personnel and equipment on an individual basis; and re-training or cross training of personnel to meet increased needs for specific skills. Limitations placed on the use of wire communications (para 127) and motor messengers (para 129) may make a number of wire and messenger personnel available for re-training and utilization in other positions for which there is an increased need.

b. The concept of normally limiting signal support below division level to the deployment of forward signal centers which provide direct support to a brigade headquarters and a FSSE can be expected to be modified considerably in an ID environment. Widely dispersed operations and limitations experienced on use of FM radio and physical wire lines may downgrade the organic communication capability of

tactical units significantly. In this event, when resources are available, consideration should be given to the use of signal battalion RADREL or RATT teams either attached or in direct support to supplement organic brigade, or appropriate unit, communication means. In addition, a requirement may exist for signal elements of the battalion to be placed in direct support or attached to nondivisional US units, or to HC or third country armed forces.

c. When division-wide requirements exceed the capabilities of the signal battalion, the DSO, as advisor to the commander, must identify them and be prepared to recommend measures for obtaining appropriate personnel and/or equipment from other sources. The DSO should coordinate with higher headquarters signal officers for provision of any additional signal support that may be available from Corps or Army signal units. Because of special characteristics of the multi-channel radio relay equipment organic to the airborne signal battalion, attention must be given to insuring that any additional equipment of this type received from outside sources is compatible or will interface with appropriate division equipment.

119. Convoy Movement

Although it can be expected that motor vehicle movement will be limited, the signal battalion or elements thereof must be prepared to deploy units by motor convoy when required. All motor movement in an ID environment should be considered to be subject to ambush. Ground movement outside of the security of a combat base will therefore, habitually be a tactical one made as a movement to contact. The signal battalion is not organized or appropriately armed for such a maneuver, and will therefore normally make motor marches only in the company of a suitable tactical combat force.

a. When executing a motor movement accompanied by security elements, close coordination must be accomplished between the signal element commander and the escort commander. Clear understanding of the escort commander's plans and signals to be employed in event of ambush are essential. Minimum information required is the signal for vehicles to halt; or for troops to dismount, commence return fire, attack the ambushing force, and drive through ambush. Failure to understand or comply with the orders of the escort commander can be disastrous, therefore, all personnel should be well briefed and, if possible, rehearsed prior to initiation of the movement.

b. For detailed discussion of counterambush measures, see FM 31–16, FM 31–22, and FM–7 series manuals. Some basic principles which normally apply to all convoy movement in an ID environment are—

(1) Canvas covers on trucks are removed.
(2) Windshields, windows, and tailgates are left down.
(3) Personnel wear full field equipment including arms and ammunition, and protective vest if issued.
(4) Vehicles follow tracks of vehicle ahead.
(5) If required to halt because of enemy fire, vehicles are not driven off the road unless disabled.
(6) The senior man in each vehicle is charged with the responsibility for maintaining alertness and, in event of attack, fire discipline.
(7) Personnel, other than the driver, should be prepared to fire on order into ravines, defiles, forests, and heavy underbrush on the flanks of the convoy.

Section III. BASIC SIGNAL PLANNING CONSIDERATIONS

120. General

Providing a dependable signal system under ID conditions requires added emphasis on advanced signal planning. The time and distance factors involved and the restrictions on ground movement make heavy reliance on reactive signal planning undesirable. So far as possible, signal support requirements must be anticipated well in advance and allocation of signal resources planned to insure their availability when and where they are required. The im-

portance of coordination and dissemination of signal plans and orders in an ID environment cannot be over-emphasized. Practically all ID operations will have direct or indirect impact on a number of other US or third country armed forces and civilian agencies as well as HC armed forces, paramilitary units, and civilian agencies operating in the area. Coordination should normally be effected through the AAC. Failure to properly coordinate signal plans may have serious political as well as military implications.

121. Standard Communication Requirements

While the standard communication requirements discussed in paragraph 61 remain basically valid, a number of them will require modification or be broadened in scope by the contingencies of the ID environment. Limitations imposed upon utilization of certain means of communication and need for increased use of others to meet the requirements will necessitate reevaluation and reallocation of signal assets (para 118). It must be emphasized that when requirements are established which exceed the signal battalion's capabilities, they must be identified and recommendations made to the commander for obtaining appropriate signal support from other sources. Possible modifications to standard communication requirements follow:

a. Internal Command Control. The speed of reaction required in an ID environment, especially during tactical operations, may necessitate widening of the scope of command and operational communication channels. It may be necessary to provide communications which enable commanders and operation centers to exercise control, coordinate, or influence actions below the normal next subordinate level.

b. Tactical Operations. The enlargement of the scope of the commander's mission to include heavy emphasis on numerous programs in support of national development and internal security operations, to include populace and and resources control, will probably require heavy augmentation of the operational staff to support these activities. The necessity for increased coordination and direction of all type ID endeavors can be expected to require additional staffing and commensurate build-up of communications for the operational staff.

c. Surveillance and Intelligence. In the ID environment, because of the difficulty of "fixing" the insurgent, the need to convey information of hostile activity to a level at which it can be acted upon becomes most critical. The current concept of meeting communication requirements for surveillance and intelligence functions via circuits or nets shared with the operations function (para 59*g*) may require reevaluation. Increased traffic, coupled with increased need for minimum delay, may warrant provision of separate communication facilities when resources are available.

d. External Command Control Coordination. When considering this requirement, in addition to the need for communications with other US, HC, or third country armed forces, cognizance must be taken of requirements for communication with appropriate civilian agencies and HC paramilitary units in the area. Differences in language, signal procedures, equipment, and state of training are apt to generate special problems in establishing compatible communications.

122. Communication Systems Objectives

As pointed out in paragraph 62, the importance attributed to any one communication system objective will depend upon the mission, the tactical situation, and the policy of the commander. The ID environment requires emphasis on all objectives to a greater degree than in other environments, and resolving conflicts between objectives may be more difficult.

a. Technical Reliability. The wide dispersion of units, the increased need for use of attachment or direct support signal elements, and the restriction on ground movement will all have a bearing on the ability of the signal battalion to maintain a high state of technical reliability in its signal equipment. Conventional maintenance and supply procedures may require extensive revision (para 123).

b. Survivability. Application of active defense techniques takes on added importance in the ID environment. Communication sites are prime targets and are especially vulnerable to guerrilla-type hit and run, terrorist, and sabotage tactics, as well as to coordinated attacks

of the insurgent. For a discussion of unit security and defense measures, see chapter 10.

c. Flexibility. The complexity of missions and the fluidity of operations characteristic of the ID environment, especially in tactical (combat) operations, coupled with reduced ground mobility present unique problems in obtaining and maintaining a sufficiently flexible communication system. On the spot ingenuity and resourcefulness will be required on the part of all individuals and elements of the signal battalion to meet rapidly changing requirements. The DSO must attempt to enhance the flexibility of his unit by advanced planning for all contingencies which can be anticipated. Some measures that may be feasible are—

(1) Maximum decentralization of signal resources to optimize probability of having signal facilities already on-site to meet foreseeable contingencies.

(2) Advanced assignment of alternate missions and tasks to be automatically executed as required.

(3) Establishment of control communications which permit expeditious transmission of fragmentary orders and directives to all operating elements of the battalion.

d. Communication Security. In an internal defense environment, intelligence is of paramount importance to both friendly and hostile forces. Preventing the enemy from obtaining information of value from our communication system may become more difficult because of increased use of radios, especially during tactical ID operations. For discussion of communication security, see chapter 8.

e. Speed. Increased volume of traffic and reduction in means of communication available (wire and messenger) may have a serious impact on speed of service throughout the signal system. In view of this, added emphasis on cross training of personnel and contingency planning by the DSO, his staff, and operating personnel will be essential if a communication flow is to be maintained commensurate with the speed required to support the "quick reaction" concept. Measures to temporarily adjust available communication support to match the state of activity of division zones or units may be required; however, such measures must be closely coordinated and be approved by the division commander prior to implementation. Some measures to be considered in critical or emergency situations are—

(1) Imposition of restrictions on portions of the signal system to eliminate all but selected type traffic for a specific period.

(2) Temporary reduction of signal support to relatively quiet areas.

(3) Temporary change of certain circuits into the active area from common user to sole user basis.

123. Logistic Support of Signal Elements

The maintenance and resupply of signal sites may present unique problems in an ID environment. The battalion S4 must insure that the battalion maintenance and supply system is responsive and that the procedures employed make adequate provision for the contingencies apt to be encountered in an ID environment. Restrictions encountered in ground travel may make use of central maintenance points and supply point pick-up infeasible. Aerial supply distribution direct to signal sites and decentralized maintenance, either by attachment of maintenance personnel or by use of air transported contact teams, should be considered. When heavy reliance upon air transportation is required for resupply and maintenance, maximum pre-stocking of supplies, back-up equipment, and repair parts at signal sites is warranted to guard against the eventuality of non-flying weather. Coordination with the division general staff and the aviation officer for provision of required aircraft is essential. Close liaison should be maintained with support command and appropriate direct support units to facilitate effective higher echelon logistics support; such support should include a responsive replacement or evacuation and repair procedure.

Section IV. IMPACT ON DIVISION SIGNAL SYSTEM

124. General

Numerous characteristics of the ID environment and variable factors which may be expected to affect the overall operations of the signal battalion or have an impact on the entire division signal communication system (were outlined in paragraphs 115 through 123). The degree of impact of the ID environment upon any one specific means of communication cannot be fully assessed out of context with the situation and terrain that may exist at any particular time and place; however, the following paragraphs provide guidance to some specific problems that may be experienced and suggest possible solutions relative to each major portion of the division signal communication system.

125. Radio Relay Multi-Channel Network

The primary high traffic handling capability of the signal battalion is derived from employment of its radio relay (RADREL) and carrier equipment. Single channel radio (SSB or FM) cannot provide sufficient channels to handle the total requirements normally associated with a division or separate brigade operation. Therefore, in an ID environment, where communication requirements are extensive, every effort must be made to overcome obstacles and to continue maximum use of the RADREL and carrier equipment capability of the signal battalion.

a. In the ID environment, the deployment configuration of a division or brigade may vary over a wide spectrum. At one end, all major units may be located relatively close together in a single combat base. On the other end, characteristic of extremely active tactical (combat) operations, many units may be dispersed over a wide area in a number of combat and patrol bases (FM 31–16). The number and degree of obstacles presented to employment of RADREL communication will, therefore, vary widely depending upon the current status of deployment of the supported unit in relation to this spectrum. The primary obstacles likely to be encountered are—

(1) Distances or terrain between headquarters which preclude a direct link without relays.

(2) Lack of accessible or secure high ground suitable for a RADREL terminal in vicinity of the supported headquirters.

(3) Difficulty in installing and maintaining down-the-hill cable from the RADREL terminal to the supported headquarters.

(4) Provision of aircraft support for access to sites for installation and resupply.

b. Every effort must be made to continue use of a multi-channel radio delay network in order to provide the relatively high traffic handling capacity which it offers. The establishment of the standard multi-axis or grid type configuration (para 74 and fig. 8) may not be feasible in the ID environment. Reverting to a single axis may, however, prove to be satisfactory and, when necessary, should be considered. By taking advantage of the location of secure combat and patrol bases, it may be possible to overcome security, terrain, and distance obstacles and to extend radio relay communications to units otherwise inaccessible. When practical, and when resources are available, employment of RADREL should be considered at levels of command lower than normal; for example, from brigade to certain battalion combat bases in order to provide a substitute for the physical wire lines normally used at this level.

126. Tactical Ground Radio Nets

In the ID environment, reliance on tactical radio nets of all types can be expected to increase.

a. Division Level Nets. While normal division level internal radio nets (fig. 11) may require modification in station structure or deployment of stations to meet changes in standard communication requirements, the methods of operation and the basic use of these nets will probably not deviate significantly from any other environment.

b. Organic Unit Radio Nets. For organic unit communications, radio plays an even more important role in an ID environment than in other environments because often it will be in-

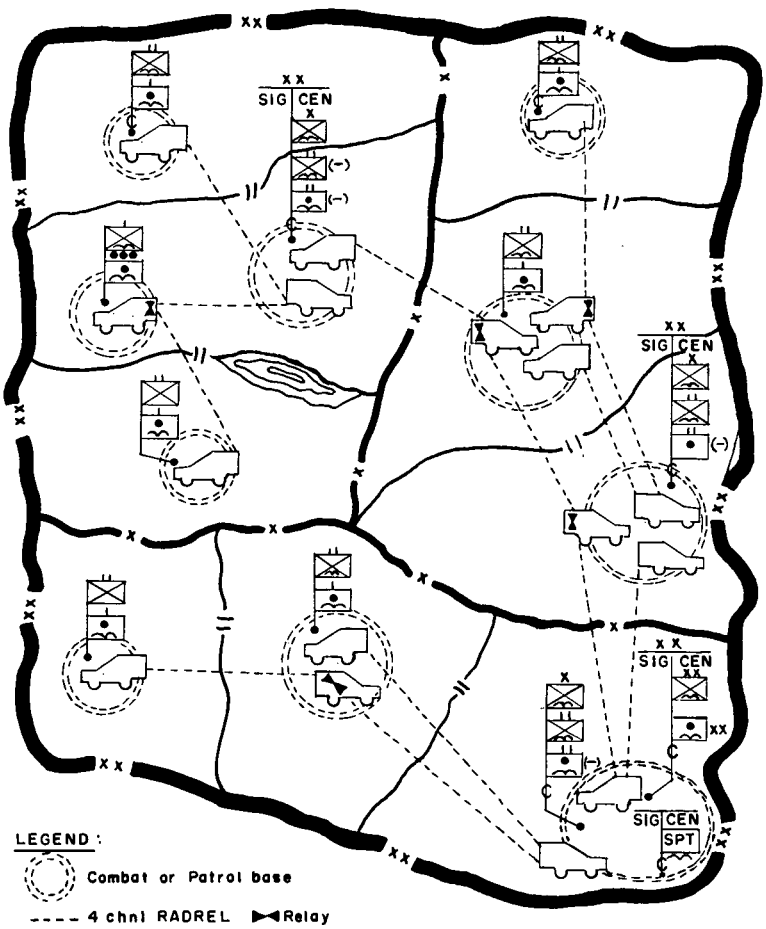

Figure 13. Type radio relay multi-channel employment in an internal defense environment.

feasible to install or maintain physical wire lines or employ messengers which would otherwise handle a large portion of the communication traffic at this level. Radio nets of brigade-size units and lower are principally FM. Any impact which tends to downgrade FM radio utilization is therefore critical and warrants the serious attention of the DSO. Although the signal battalion has no significant radio resources that can be used to directly alleviate difficulties encountered in use of FM radio equipment, the DSO, in his role as signal advisor to the commander, is expected to identify and recommend ways of eliminating or minimizing problem areas. Guidance on possible problem areas and solutions that may be considered follow:

(1) A need may exist for additional man-pack FM radio sets as substitutes for vehicular radios when use of vehicles is precluded for a particular operation. A temporary measure to alleviate this situation would be to withdraw a number of man-pack FM radio sets from comparatively inactive units to augment units actively en-

gaged in operations. The risk involved in reducing the losing unit's capability must be considered. The ultimate solution that may be required is the issue, through proper supply channels, of the required number of sets over and above TOE.

(2) Limitations may be placed on use of ground relays and retransmission stations needed to extend the range of FM radio sets. Use of airborne relays or retransmission stations should be recommended when practicable. When use of aircraft is precluded because of weather or other limitations, and relays are essential to success of an operation, an appropriate combat unit should be assigned to secure and defend a suitable ground relay site.

(3) Effective transmission range of FM radio sets may be reduced because of terrain configuration, vegetation, dense jungle growth, extremely wet terrain, or heavy overhead (jungle) canopy. Special antenna configurations will assist in overcoming transmission problems for FM as well as AM radios. The DSO should identify and advise on the use of appropriate antennas and recommend that those available for issue be procured and distributed. In addition, he should advise on the construction and use of field expedient antennas and coordinate with the G4 for the issue of suitable material when appropriate. Detailed description of antennas which may prove useful are contained in FM 31–73. An ultimate solution that may be warranted is replacement of certain FM radio sets with SSB high frequency radios for specific functions. The signal battalion has very limited resources for support in this area; therefore, the DSO should identify requirements for such sets and advise the G4 and support command as to equipment suitable to the function. Any specialized training that may be required is the responsibility of the DSO.

c. Cross Communication. There probably will be a number of requirements for cross communication with US, HC, or third country armed forces or civilian agencies as well as paramilitary units of the host country. Close coordination of frequencies, call words, and authentication will be required. For economy of equipment and frequencies, consideration should be given, where feasible, to having other units enter the appropriate division net, or placing a division station in the other unit's net. When language barriers, lack of compatibility of equipment and procedures, or security considerations preclude this, a special point-to-point radio link manned on both ends by the same unit should be considered. Interpreters or translators may be required in this case.

d. Communication Security. The increased use of tactical radio will place added importance upon the requirement for adherence to all communication security practices, especially transmission security (para 102).

127. Wire Communications

In the ID environment, extensive employment of cable or wire for trunking purposes will be significantly curtailed. In addition to the normal difficulties encountered in establishing and maintaining wire lines in mountainous, swampy, or jungle terrain, the problem of enemy activity takes on added significance. Wire lines are always vulnerable to enemy sabotage and/or tapping for intelligence purposes. In the ID environment, this vulnerability is intensified. Even in comparatively well secured areas, the insurgent or sympathizer may often be present in the seemingly friendly population, and this ability to interfere with wire lines must be presumed. From a practical viewpoint, wire lines which are not within well secured friendly defense perimeters will exist only so long as they are advantageous to the enemy.

a. The cable normally installed by the signal battalion from RADREL sites to patching centrals or switchboards and the short trunks to units in the vicinity of signal centers may become highly vulnerable to enemy activity in the ID environment. Efforts should be made to reduce the number and length of these lines. Lines which must be installed where sabotage

is possible should be routed to facilitate observation and inspection by wire patrols. Where the danger of enemy action is acute, consideration should be given to utilization of additional RADREL as a substitute for cable.

b. The principal impact of reduction or loss of wire capability can be expected to be felt at brigade and battalion levels where heavy reliance on wire lines is normal. Consideration should be given to the selective use of RADREL teams from the division signal battalion or other sources to substitute for brigade or battalion wire lines when it is feasible and warranted by operational need.

c. When, because of unavailability or inadequacy of other means extensive wire or cable trunks must be utilized regardless of the risks, consideration must be given to procurement of reserve stocks to compensate for the heavy loss of wire which can be anticipated.

128. Air Request Communications

When committed in an ID environment, it can be expected that the doctrine relative to USAF responsibility for provision of communications for immediate request close air support will be fully implemented. U.S. air request and strike control communications will be relatively standard in accordance with the latest doctrine (para 89*b*). However, it will probably be necessary to provide for integration of HC and/or third country ground and air forces. In addition, dispersion of units and increased independent operations may require employment of USAF Forward Air Controllers (FAC) in greater numbers and at lower levels of command than is normal in other environments. Terrain limitations on ground movement and observation may dictate wider use of aerial FAC.

129. Army Air-Ground Communications

Air-ground communications between Army ground elements and Army air elements will require greater emphasis. In the ID environment, it is not unusual for units of platoon or squad to have a requirement to communicate with army aircraft. Effective ground to air communication capability is required at all levels of tactical command for a wide variety of missions to include medical evacuation, surveillance (observation aircraft), artillery fire support (aerial OP to FDC), aerial fire support (armed army aircraft), resupply, and troop transportation. Radio is the primary means of communication. The DSO must insure that adequate frequencies, call signs, authentication and recognition signals are established and that this information is disseminated and coordinated with all who have a need to know. In addition, provision of alternate visual means of signaling for air-ground communications is essential (para 131).

130. Messenger Communications

Motor, foot, and air messenger are considered to be a most reliable and secure means of delivery in other environments; however, their use in an active ID operation will require reevaluation.

a. Motor Messenger. The usefulness of motor messengers is significantly downgraded by the ID environment. Messengers are highly vulnerable to ambush, sniper fire, emplaced mines, and other road blocking tactics such as bridge and culvert destruction. For this reason, their employment should normally be limited to well secured areas. When motor messengers must be employed in areas where insurgent action is prevalent, the following measures should be taken:

(1) Preplanned, scheduled routes and time of dispatch are avoided. Routes and times are selected at random, shortly before dispatch.
(2) All distinctive messenger markings are removed from vehicles.
(3) Sand bags or other protective devices are placed on floor or undercarriage of vehicles to minimize effects of mines.
(4) A cable cutter is mounted on front bumper of vehicle.
(5) Drivers and guards wear protective armored vests and, if possible, vehicle should be modified with protective armor for protection against sniper fire and mines.
(6) A minimum of two vehicles are employed for each run, and armed guards are increased. When possible, guards should be armed with automatic weapons and grenade launchers.

(7) Messengers should be carefully briefed prior to departure over unfamiliar routes. Reliance cannot be placed or road signs, which may be altered to lure messengers or convoys into ambush sites.

(8) Messenger should be cautioned that "convenient" by-passes around blown bridges, felled trees, rock slides, or other road block should be suspect as they are likely spots for mines and booby traps.

(9) Added emphasis is placed on cautioning drivers to use reasonable speeds. The common tendency to try to present a difficult target to snipers by employing maximum speeds is questionable. The "safety" attained by this method may be more than offset by the increased possibility of fatality or serious injury to personnel should control of the vehicle be lost if the driver is wounded or a tire is hit by sniper fire.

b. Foot Messenger. The use of foot messenger by the signal battalion is extremely limited in any type environment. When required to use foot messenger for internal delivery in an ID environment, because of the limitations an ID environment, it is advisable to employ them in pairs, especially at night.

c. Air Messenger. Use of air messengers takes on added importance in the ID environment because of the limitations placed on ground messengers. The bulk of the messenger traffic will be handled by air messengers. In the internal defense environment, aircraft are commonly employed in comparatively large numbers for resupply, medical evacuation, and transportation of commanders, liaison personnel, and troops. For economy of resources, aircraft on any or all of these missions should be required to carry messenger traffic whenever feasible. During an operation in which communication is extremely critical, provision of special air-mobile messengers on a standby basis should be considered.

131. Visual and Sound Communications

a. General. Visual and sound communications take on added importance in the ID environment because of the numerous restrictions which are placed upon the full utilization of other means normally available to tactical units. The primary concern of the DSO is to advise on the use of sound and visual signals; to prepare, publish, and distribute SSIs and SOIs containing the necessary prearranged meanings or codes; and to coordinate their use with all friendly armed forces, paramilitary units, and appropriate civilian agencies in the area. When prescribing pyrotechnic signals, care must be taken to insure that they include only those pyrotechnic types and colors currently available in supply channels.

(1) *Visual communications.* An effective station-to-station system of visual signals is an excellent alternate means for transmitting brief orders and information as well as emergency requests for air or support. It is insurance against the risk of total loss of communication between units in close proximity, or between ground units and aircraft, because of failure or destruction of electronic equipment. FM 21–60 covers the general employment of hand signals, flags, pyrotechnics, and panels. Their use can easily be enlarged upon. For example, flag communications prescribed for armored units in FM 21–60 can be modified for infantry and artillery units by substitution of appropriate prearranged meanings. In addition, maneuver of aircraft can be used as a visual communication means to indicate target location and/or initiating fire requests.

(2) *Sound communications.* Sound communications are more limited in use than visual communications. However, whistles, horns, and other sound devices can be utilized to good advantage to maintain control and to pass directives and requests between small units in close proximity.

b. Advantages. The principal advantages of visual and sound communications are that they can be used to circumvent language problems and that they require only simple, lightweight devices for execution.

c. Disadvantages. Visual signals are easily misunderstood and their use is restricted during periods of poor visibility or when line of sight locations are not available. In addition, security of both visual and sound signals is extremely difficult to maintain, and the enemy can employ either with relative ease to mislead or confuse friendly troops.

Section V. INTELLIGENCE

132. General

In an internal defense environment, intelligence is of paramount importance to both friendly and enemy forces. In view of this, both the collecting and reporting of enemy information and the safeguarding of friendly information becomes extremely vital.

133. Intelligence Collecting

Reporting of information for intelligence purposes is a standard function for all military personnel in all environments; however, in the ID environment this particular function becomes more important and also more feasible. The population, in a country involved with insurgency, is usually a good source of information. Signal battalion personnel often have close contact with the civil population in both an official and unofficial capacity, and the possibility of hearing or seeing things of value is always present. Unusual movement or other activity on the part of the civilian population or change in their attitude are in themselves useful information. Signal unit commanders must impress upon their personnel the importance of promptly reporting observations, and simple and convenient reporting procedures should be established.

134. Safeguarding Military Information

The ID environment is often characterized by close contact with the indigenous population. Such a situation, coupled with the fact that elements of the population may be in sympathy with the insurgent cause, makes safeguarding of military information more critical as well as more difficult. All personnel must be kept aware of the extreme value of information, and of the fact that the insurgent will exert great effort through the use of agents and sympathizers to obtain information.

Section VI. MILITARY CIVIC ACTION

135. General

The purpose of the military civic action program is to improve the social, economic, and psychological environment of the populace and thus gain the support, loyalty, and respect of the people for their government. Military participation in this program is termed military civic action. Military civic action in an ID environment is the use of military manpower and skills in cooperation with civil agencies, authorities, or groups for the purpose of improving social, cultural, and economic conditions (environmental improvement) and to enhance the stature and relationship of military forces with the civilian population of the host country. United States forces may be called upon either to advise and assist HC military forces in performing military civic action and/or to actively participate in the program. Military civic action projects which impart knowledge and teach the people to help themselves are the most effective since they can be continued by the people after military forces depart the area. For detailed discussion of military civic action, consult FM 41–10 and appropriate sections of FM 31–73.

136. Signal Battalion Participation

a. The signal battalion may expect to be involved in military civic action programs in varying degrees depending upon the extent of the battalion's commitment to other ID endeavors. The degree to which the signal battalion elements are committed to military civic action is a command decision and should be based upon immediate and anticipated employment of the division and requirements for signal support of the division effort.

b. Care should be exercised to insure that the assigned civic action roles or tanks are

suitable and consistent with the capabilities of the unit and the resources available. Guidance and material assistance for projects usually can be obtained from local civic and military authorities and from US civil representatives in the area, such as the United States Agency for International Development (USAID) and the United States Information Service (USIS).

c. Military civic action projects are sponsored by a unit. Participation may be limited to one or more members of the unit on a person-to-person basis or it may involve the entire unit. In all cases, however, activities should be coordinated with the proper authorities through the ACC.

d. Military civic action by the signal battalion need not be limited to assistance or participation in programs which utilize the specialized military skills and equipment characteristic of the signal corps unit. All US Army uits normally possess a wide variety of individual skills which can be utilized to good advantage. Activities to which the signal battalion may be able to contribute either with assistance or active participation include—

(1) Designing, constructing, rehabilitating, or maintaining simple tactical type communication facilities.

(2) Providing instruction in basic signal communication and maintenance skills.

(3) Providing instruction in nonsignal trade skills such as automotive repair, carpentry, electrical work, masonry, etc., depending upon the skills available among the personnel of the battalion.

(4) Providing transportation for community activities or for evacuation of disaster areas.

(5) Assistance in construction of public facilities such as schools, dispensaries, community centers, sports fields, etc.

(6) Health and sanitation matters to insect and rodent control, purification of water, food decontamination, waste disposal, immunization procedures, and first aid.

(7) Providing instructors for English language courses.

(8) Sponsoring worthy causes such as orphanages, medical centers, and 4-H type activities.

Section VII. ADVISORY ASSISTANCE

137. General

Advisory assistance to HS personnel and organizations, as differentiated from military civic action, is usually performed to support Military Assistance Programs (MAP). For general policy and doctrine governing advisory assistance activities, see FM 31–22, FM 31–22A, FM 100–5, FM 100–20, and FM 31–73.

138. Signal Battalion Participation

In certain situations, the airborne division signal battalion may be called upon to perform advisory tasks or to provide selected personnel or training teams for that mission. As a part of the ID mission, the signal battalion may be called upon to perform such tasks as organizing, training, or advising on the operational employment of HC signal/communication personnel and units, or to provide instruction or advice on the use or maintenance of tactical signal communication equipment. When U. S. military assistance organizations are in the area, advisors or mobile training teams normally will be provided from this source.

Section VIII. PSYCHOLOGICAL OPERATIONS

139. General

The purpose of psychological operations (PSYOP) is to influence the opinions, emotions, attitudes, and behavior of hostile, neutral, or friendly groups in such a way as to gain support for the achievement of national

objectives. Psychological considerations play an important part in all ID operations, but they are of particular concern to units engaged in military civic action or other activities having a direct impact upon the civil population. For a detailed discussion of PSYOP, see FM 33–1 and FM 33–5.

140. Signal Battalion Participation

a. One of the most important aspects of psychological operations is the conduct of the individual soldier. It is the responsibility of every member of the signal battalion to conduct himself at all times in such a manner as to reflect credit upon himself, the US Armed Forces, and the United States of America.

(1) All personnel must demonstrate in their official and unofficial roles respect for local laws, customs, and property of the local inhabitants. Official policies and directives regarding legal status and treatment of the civilian population must be scrupuously observed. This is to preclude or counter adverse insurgent propaganda concerning the character of the U. S. soldier and the purpose of U. S. presence in the HC.

(2) In addition, U. S. personnel must show respect in their demeanor and attitude toward the officials and military leaders of the HC in order to enhance the prestige and effectiveness of the legally constituted government.

b. Normally, the signal battalion will not be involved in formal PSYOP programs, which are better conducted by personnel or teams with specalized training. The signal battalion can, however, expect to be called upon to provide signal support for PSYOP teams operating in the area. Should the PSYOP responsibilities of the signal battalion be enlarged, augmentation by PSYOP personnel from the 33–500 series TOE will be required.

Section IX. INTERNAL SECURITY OPERATIONS

141. General

a. Internal security operations comprise the prevention of action against U. S. and HC resources, industries, and institutions, and the protection of life and property in the event of a domestic emergency.

b. To the maximum extent possible, control of the population and economic resources should be performed by HC agencies; however, it may become necessary for the division signal battalion, or elements thereof, to participate when signal installations are located in populated areas. For guidance on policy and doctrine on internal security operations, consult FM 31–22, FM 31–22A, FM 31–73, FM 100–5, and FM 100–20.

c. Normally, signal battalion participation in internal security operations will be restricted to control of indigenous personnel employed at an installation or site by the battalion or elements thereof.

142. Control of Civilian Employees

a. To reduce the possibility of infiltration and sabotage, employment of indigenous personnel should be avoided when possible. When it is necessary to utilize indigenous employees, measures should be taken to minimize the risks involved.

(1) All employees should be screened and approved by appropriate authority prior to hiring.

(2) A strict system of inspection of individual identification documents and search of employees prior to admission to the installation should be enforced.

(3) Transportation used by employees (bicycles, motor bikes, autos) should not be allowed in or near the installation perimeter. A suitable parking area should be established at least 100 yards from the installation.

(4) Employees should not be allowed to carry parcels or packages of any type into the perimeter. When possible, eating facilities for indigenous employees who supply their own food should be constructed outside of the

installation at a safe distance from the perimeter.

(5) Specific entrances and exit routes should be prescribed for indigenous employees and they should be warned not to approach or attempt to leave the installation from any other direction.

(6) Under no condition should civilian employees be made aware of the extent or specific locations of minefields or other protective barriers.

(7) Curfew for departure of all indigenous employees from the area should be instituted to insure that all personnel have departed the installation by a certain hour.

(8) A system for control of indigenous employees present in the unit area during an attack, to include a predesignated place of collection, should be established.

b. In dealing with indigenous employees, every effort must be made to avoid conduct which results in alienation of the people. Employees should be informed of the reasons for restrictions placed upon them and particularly for search of their person. Searches and imposition of controls should be conducted in an efficient but courteous manner.

APPENDIX I

REFERENCES

1. General

This appendix contains a selected list of publications pertinent to the administration and operation of the signal battalion, airborne division. For availability of documents listed and additional publications on other subjects, refer to 310 series of DA pamphlets.

2. Allied Communications Procedures (ACP)

JANAP 201	Status of Non-Cryptographic JANAP and ACP.
ACP 121	Communications Instructions—General (U).
ACP 122B	Communications Instructions—Security (U).
ACP 124	Communications Instructions—Radio Telegraph Procedure (U).
ACP 125	Communications Instructions—Radio—Telephone Procedure (U).
ACP 125, U.S. Supp–1	High Frequency Air-Ground Radio—Telephone Procedure (U).
ACP 126	Communications Instructions—Teletypewriter (Teleprinter) Procedures (U).
ACP 127	Communications Instructions—Tape Relay Procedures (U).
ACP 129	Communications Instructions—Visual Signal Procedure.
ACP 136	Communication Instructions—Panel Signaling.
ACP 167	Glossary of Communications-Electronics Terms.
ACP 168(B)	Pyrotechnic Signals.
ACP 190	Guide to Frequency Planning.

3. Army Regulations (AR)

AR 105–15–5	Field Signal Communications; Provision of Press Communication Facilities.
AR 105–31	Message Preparation.
AR 105–34	Reduction and Control of Message and Telephone Traffic in an Emergency (Minimize).
AR 105–68	Radio Interference Reduction.
AR 230–5	Nonappropriated Funds and Related Activities; General Policies.
AR 320–5	Dictionary of United States Army Terms (Short Title AD).
AR 320–50	Authorized Abbreviations and Brevity Codes.
AR 340–15	Correspondence.
AR 350–1	Army Training.
AR 350–15	Military Training Aids.
AR 380–5	Safeguarding Defense Information.
AR 380–26	Encryption for Transmsision Only (EFTO) Procedures.
AR 380–40	Safeguarding Crypto Information.
AR 380–40–1	Safeguarding Crypto Information (Supplement).
AR 380–41	Control of Cryptomaterial.
AR 380–51	Transmission of Classified Messages.

AR 525–25	Delineation of Service Responsibility for Tactical Air Control Parties.
AR 604–5	Clearance of Personnel for Access to Classified Defense Information Material.
AR 735–5	Property Accountability: General Principles and Policies and Procedures.
AR 735–10	Principles and Policies, Accounting for Lost, Damaged and Destroyed Property.
AR 735–11	Accounting for Lost, Damaged and Destroyed Property
AR 735–16	Property Accountability—Report of Survey.
AR 735–35	Supply Procedures for TOE Units, Organizations and Non-TOE Units.
AR 750–1	Maintenance Concepts.
AR 750–5	Organization, Policies and Responsibilities for Maintenance Operations.
AR 750–8	Command Maintenance Management Inspections.
AR 750–10	Material Readiness (Serviceability of Unit Equipment).
AR 750–38(C)	Maintenance of Supplies and Equipment—Army Equipment Records Procedure-Communication Security (U).
AR 750–610	Maintenance of Supplies and Equipment, Communication Security Equipment Maintenance.

4. Department of the Army Pamphlets (DA Pam)

DA Pam 108–1	Index of Army Motion Pictures, Filmstrips, Slides, Tapes and Phone Recordings.
DA Pam 310–1	Index of Administrative Publications.
DA Pam 310–2	Index of Blank Forms.
DA Pam 310–3	Index of Doctrinal Training and Organizational Publications.
DA Pam 310–4	Index of Technical Manuals, Technical Bulletins and Supply Manuals.
DA Pam 310–6	Index of Supply Catalogs and Supply Manuals.
DA Pam 310–9(C)	Index of Communication Security (COMMSEC) Publications (U).
DA Pam 350–10	U. S. Army Formal Schools Catalog.
DA Pam 750–1	Preventive Maintenance Guide for Commanders.

5. Field Manuals (FM)

FM 3–12	Operational Aspects of Radiological Defense.
FM 5–15	Field Fortifications.
FM 5–20	Camouflage, Basic Principles and Field Camouflage.
FM 5–31	Use and Installation of Booby Traps.
FM 7–24	Communication in Infantry and Airborne Divisions.
FM 11–8	Field Radio Relay Techniques.
FM 11–21	Tactical Signal Communciation Systems, Army, Corps, and Division.
FM 11–50	Signal Battalion Armored, Infantry and Infantry (Mechanized) Divisions.
FM 11–86	Combat Area Signal Battalion.
FM 11–92	Corps Signal Battalion.
FM 21–5	Military Training Management.
FM 21–6	Techniques of Military Instruction.
FM 21–10	Military Sanitation.
FM 21–20	Physical Training.
FM 21–26	Map Reading.
FM 21–30	Military Symbols.
FM 21–31	Topographic Symbols.
FM 21–40	Small Unit Procedures in Chemical, Biological and Radiological (CBR) Operations.

FM 21–41	Soldiers Handbook for Chemical and Biological Operations and Nuclear Warfare.
FM 21–48	Chemical, Biological, and Nuclear Training.
FM 21–60	Visual Signals.
FM 21–76	Survival.
FM 21–77	Evasion and Escape.
FM 21–77A(C)	Evasion and Escape, Change 1
FM 22–5	Drill and Ceremonies.
FM 22–100	Military Leadership.
FM 23–8	US Rifle 7.62mm, M-14.
FM 23–32	3.5 inch Rocket Launcher.
FM 23–35	Pistols and Revolvers.
FM 23–71	Rifle Marksmanship.
FM 24–1	Tactical Communications Doctrine.
FM 24–16	Signal Orders, Records and Reports.
FM 24–17	Tactical Communication Center Operations.
FM 24–18	Field Radio Techniques.
FM 24–19	Communication-Electronics Reference Data.
FM 24–20	Field Wire and Field Cable Techniques.
FM 30–18(S)	Intelligence Collection Operations, Intelligence Corps, US Army (U).
FM 31–10	Barriers and Denial Operations.
FM 31–16	Counterguerrilla Operations.
FM 31–22	U. S. Army Counterinsurgency Forces.
FM 31–22A(S)	U. S. Army Counterinsurgency Forces (U).
FM 31–73	Advisor Handbook for Counterinsurgency.
FM 32–5	Signal Security.
FM 32–20	Electronic Warfare.
FM 33–1	Psychological Operations, U. S. Army Doctrine.
FM 33–5	Psychological Operations.
FM 41–5	Joint Manual of Civil Affairs/Military Government.
FM 41–10	Civil Affairs Operations.
FM 57–35	Airmobile Operations.
FM 57–100	The Airborne Division.
FM 61–100	The Division.
FM 100–1	Field Service Regulations—Doctrinal Guidance.
FM 100–5	Field Service Regulations—Operations.
FM 100–10	Field Service Regulations—Administration.
FM 100–20(C)	Field Service Regulations, Counterinsurgency (U).
FM 101–5	Staff Officer's Field Manual; Staff Organization and Procedure.
FM 101–10–1	Organizational, Technical, and Logistical Data, Unclassified Data.
FM 101–10–2	Staff Officer's Field Manual; Organizational, Technical and Logistical Data, Extracts of Tables of Organization and Equipment.

6. Technical Manuals (TM)

Technical manuals pertinent to specific signal equipment authorized to the Airborne Division Signal Battalion are listed in appendix II.

TM 11–486–6	Electrical Communications Systems Engineering Radio.
TM 11–666	Antennas and Radio Propagation.
TM 57–210	Air Movement of Troops and Equipment.
TM 57–220	Technical Training of Parachutists.

7. Table of Organization and Equipment (TOE)

TOE 11–215F	Signal Battalion, Airborne Division.
TOE 11–216G	Headquarters and Headquarters Company Signal Battalion, Airborne Division.
TOE 11–217G	Signal Command Operations Company, Signal Battalion, Airborne Division.
TOE 11–218G	Signal Support Operations Company, Signal Battalion, Airborne Division.

8. Army Subject Schedules (ASubjScd)

ASubjScd 11–9	Power Sections.
ASubjScd 11–18	Radio Teletypewriter Communications.
ASubjScd 11–19	Radio Communications.
ASubjScd 11–20	Radio Relay and Carrier Communication.
ASubjScd 11–23	Teletypewriter Communication.
ASubjScd 11–28	Command Post and Field Exercises.
ASubjScd 11–30	Communication Center Operation and Messenger Service.
ASubjScd 11–34	Electronic Warfare.
ASubjScd 11–35	Defense of Signal Installations.
ASubjScd 11–36	Radiotelephone Operations.
ASubjScd 11–05B20	MOS Technical Training for MOS 051.1.
ASubjScd 11–05C20	MOS Technical Training for MOS 053.1.
ASubjScd 11–321	MOS Technical Training for MOS 321.1 and 321.9.
ASubjScd 11–72B10	MOS Technical Training for MOS 723.0.
ASubjScd 11–724	MOS Technical Training for MOS 724.1 and 724.6.

9. Army Training Program (ATP)

ATP 11–215	Army Training Program, Signal Battalion Airborne Division

10. Army Training Test (ATT)

ATT 11–215	Army Training Test, Signal Battalion Airborne Division

11. Trajectory Chart (TC)

TC 101–2	Tactical Operations Centers.

12. Miscellaneous

USAF TACM 2–4	Tactical Air Control Party.

APPENDIX II

CHARACTERISTICS OF SIGNAL EQUIPMENT

This appendix lists, by category, the major unclassified items of signal equipment organic to an airborne division signal battalion organized under TOE 11–215F and contains the nomenclature and a brief description of each item of equipment to include its normal employment. More detailed technical information may be obtained from appropriate equipment technical manuals listed under the "Nomenclature" column of this appendix. Note that multipart technical manuals are listed without reference as to echelon of maintenance; for example, a "TM 11–5820–222–" listing actually represents five (5) technical manuals, namely TM 11–5820–*10, –20, –20P, –35,* and *–35P* (refer to DA Pam 310–4).

An index to this appendix is included which provides a complete listing of major signal equipments in alpha-numeric sequence without regard to type. The TOE allocation of each item is listed therein.

Index by Type Number

Type No.	*TOE Allocation*	*App II Para & Line No.*
AN/GRA–39	2—Sig Comd Op Co 7—Sig Spt Comd Co 3—Hq & Hq Co	3–4
AN/GRA–50	11—Sig Comd Op Co 15—Sig Spt Op Co	2–3
AN/GRA–74	11—Sig Comd Op Co 15—Sig Spt Op Co 1—Hq & Hq Co	2–4
AN/GRC–106	5—Sig Comd Op Co 1—Hq & Hq Co	2–1
AN/GRR–5	3—Sig Comd Op Co 4—Sig Spt Op Co	2–5
AN/GSA–7	2—Sig Comd Op Co 6—Sig Spt Op Co	3–6
AN/MGC–17	2—Sig Comd Op Co	9–1
AN/MRC–68	8—Sig Comd Op Co 15—Sig Spt Op Co	5–1
AN/TCC–29	4—Sig Comd Op Co 8—Sig Spt Op Co 1—Hq & Hq Co	9–4

Index by Type Number

Type No.	*TOE Allocation*	*App II Para & Line No.*
AN/TGC–14	4—Sig Comd Op Co 8—Sig Spt Op Co 1—Hq & Hq Co	9–2
AN/TGC–15	4—Sig Comd Op Co 8—Sig Spt Op Co 1—Hq & Hq Co	9–3
AN/VRC–24	1—Sig Comd Op Co	4–1
AN/VRC–46	6—Sig Comd Op Co 6—Sig Spt Op Co 2—Hq & Hq Co	3–1
AN/VRC–47	1—Hq & Hq Co	3–2
ANVRC–49	2—Sig Comd Op Co 7—Sig Spt Op Co	3–3
AN/VSC–2	6—Sig Comd Op Co 15—Sig Spt Op Co	2–2
CX–162/G (100')	4—Sig Comd Op Co 24—Sig Spt Op Co	8–1
CX–162 (500')	20—Sig Comd Op Co 54—Sig Spt Op Co	8–1
CX–162/G (1,000')	10—Sig Comd Op Co 23—Sig Spt Op Co	8–1
CX 163/G	34—Sig Comd Op Co 118—Sig Spt Op Co	8–2
CX 4566/G (250')	60—Sig Comd Op Co	8–3
CX 4760/G	40—Sig Comd Op Co	8–4
CX 7474/U	2—Sig Comd Op Co 6—Sig Spt Op Co	3–7
Generator Set Gasoline Engine 3 kw, 28 VDC, skid mount (Engr Item)	16—Sig Comd Op Co 27—Sig Spt Op Co 1—Hq & Hq Co	1–1
J–1077/U	16—Sig Comd Op Co	7–1
MX–2915/PT	2—Sig Comd Op Co 6—Sig Spt Op Co	7–6
PU–322/G	3—Sig Comd Op Co +8 P/O AN/MRC–68 2 P/O AN/MGC–17 4—Sig Spt Op Co +15 P/O AN/MRC–68 2—Hq & Hq Co	1–2

Index by Type Number

Type No.	*TOE Allocation*	*Para & Line No.*
RC–292	12—Sig Comd Op Co 20—Sig Spt Op Co 2—Hq & Hq Co	3–5
RL–27	5—Sig Comd Op Co 2—Sig Spt Op Co	8–7
RL–31	10—Sig Comd Op Co 8—Sig Spt Op Co	8–8
RL–172	4—Sig Comd Op Co	8–9
SB–22/PT	2—Sig Comd Op Co 6—Sig Spt Op Co	7–3
SB–86/P	5—Sig Comd Op Co 1—Sig Spt Op Co	7–4

Index by Type Number

Type No.	*TOE Allocation*	*Para & Line No.*
SB–611/MRC	2—Sig Comd Op Co	7–2
TA–207/P	5—Sig Comd Op Co 1—Sig Spt Op Co	7–5
TA–312/PT	181—Sig Comd Op Co 60—Sig Spt Op Co	6–1
WD–1/TT on RL–159	104—Sig Comd Op Co 36—Sig Spt Op Co	8–5
WD–1/TT in MX–306/G	180—Sig Comd Op Co 42—Sig Spt Op Co	8–6
WD–1/TT on DR–8	30—Sig Comd Op Co 44—Sig Spt Op Co 6—Hq & Hq Co	8–5

1. Power Equipment

Line	Nomenclature	Description	Remarks
1.	Generator Set Gasoline Engine 3 kw, 28 VDC Skid Mount (Engr Item) W = 332 lbs. Cu = 9.97 cu. ft.	A skid mount, gasoline engine, DC generator.	Used as a power source for vehicular FM and AM radios during stationary operations. Not suitable for continuous use.
2.	Generator Set, Gasoline Engine PU–322/G TM 11–6115–225 Wt = 2,350 lbs.	Consists of two gasoline engine generator sets PE–75 mount in ¾ ton trailer, plus ancillary equipment. Supplies 2.5 kw for components requiring 120 volts, ac, 1 phase, 60 cycle—per second (cps) power.	Only one generator used at a time; the other is on standby. Serves as a mobile power source to operate communications electronic equipment.

2. Radio Equipment—HF AM

Line	Nomenclature	Description	Remarks
1.	Radio Set AN/GRC–106 TM 11–5820–520 Wt = 122 lbs.	A high power, mobile, tactical single-sideband radio. (Upper sideband only.) Transmits and receives AM Voice and CW signals with a frequency range of 2–30 mc. Consists of RT 662/GRC plus ancillary equipment, mounted in truck, ¼ ton, or ¾ ton.	Capable of being air dropped. Input voltage 24 volts, dc, output 400 watts PEP, SSB. Employed throughout the combat zone.
2.	Radio Teletypewriter Set AN/VSC–2	A highly mobile medium power radio teletypewriter set. Transmits and receives AM voice CW plus FSK teletype within a frequency range of 2–30 mc. Consists of an AN/GRC–106 plus ancillary teletypewriter equipment mounted in a truck, ¼ ton.	Replaces AN/VSC–1. Capable of being air-dropped. Power output 200 watts AM Voice, CW and FSK; 400 watts PEP for SSB voice. Primary set for division AM nets. Input voltage 24 volts, dc.
3.	Antenna Group AN/GRA–50 TM 11–5820–467 Wt = 11.75 lbs.	A lightweight doublet antenna kit for transmitting and receiving, with a frequency range of 1.5 to 20 mc.	For tactical use during stationary operation of high frequency radio sets having proper frequency range and a transmitter power output of less than 100 watts. Provides increased distance and more reliable communication.

Line	Nomenclature	Description	Remarks
4.	Radio Control Group AN/GRA–74	Small, lightweight remote control equipment providing a four (4) wire communication link with transmit and receive facilities of SSB, CW and AM from a remote site of one mile.	Used with radio sets AN/GRC–106, AN/VSC–2.
5.	Radio Set AN/GRR–5 TM 11–5820–284 TM 11–295 Wt = 76 lbs. Cu = 2.89 cu ft.	A portable or vehicular mounted AM radio receiver providing for the reception of AM Voice, CW or MCW signals within a frequency range of 1.5 to 18 mc.	Requires 6, 12, or 24 volts dc or 115 valts ac for operation. Employed on the division warning broadcast net.

3. Radio Equipment FM

Line	Nomenclature	Description	Remarks
1.	Radio Set AN/VRC–46 TM 11–5820–401 Wt = 115 lbs. Cu = 1.10 cu. ft.	A short-range, two way, transistorized, vehicular FM radio set providing radio telephone communication within a frequency range of 30–75.95 mc. Can monitor or transmit on one channel. Set is manually tuned and does not permit remote selection of frequencies. Includes Receiver-Transmitter RT–524/VRC plus ancillary equipment. Range: 20 mi (32 km) stationary; 15 mi (24 km) moving.	Replaces AN/VRC–8–9–10. Requires 24 volts dc for operation. Power output is 25–35 watts. Employed within and between armored, artillery, and infantry units in the combat zone.
2.	Radio Set AN/VRC–47 TM 11–5820–401 Wt = 132 lbs. Cu. = 1.52 cu. ft.	A short range, two way, transistorized, vehicular FM radio set providing radio telephone communication within a frequency range of 30–75.95 mc. Set permits monitoring of two channels simultaneously, or for monitoring on one channel while transmitting on the other. Set is manually tuned, does not have intercom facilities, and is not capable of remote selection of frequency. Includes Receiver-Transmitter RT–524/VRC and Auxiliary Receiver R–442/VRC. Range: 20 miles (32 km) stationary; 15 miles (24 km) moving.	Replaces AN/VRC–16, –17, –18. Requires 24 volts dc for operation. Power output is 25–35 watts. Employed within and between armored, artillery, and infantry units in the combat zone.
3.	Radio Set AN/VRC–49 TM 11–5820–401 Wt = 223 lbs. Cu = 2.3 cu. ft.	A short range, two-way, transistorized, vehicular FM radio set providing radio telephone communication within a frequency range of 30–75.95 mc. Set is manually tuned and is capable of transmitting on two channels simultaneously, or of monitoring on one channel while transmitting on the other. Set does not permit remote selection of frequencies. Includes two Receiver-Transmitters RT–524/VRC. Range: 20 mi (32 km) stationary; 15 mi (24 km) moving.	Replaces AN/VRQ–1, –2, –3. Requires 24 volts dc for operation. Power output is 25–35 watts. Employed within and between armored, artillery, and infantry units in the combat zone. Has automatic retransmission capability.

Line	Nomenclature	Description	Remarks
4.	Control Group AN/GRA–39 TM 11–5820–477 Radio Control Set C–2328/GRA–39 Wt = 11 lbs. Cu = 0.183 cu ft. *Set C2329/GRA–39* Wt = 10.25 lbs. Cu = 0.183 cu ft.	A transistorized, battery-operated, remote control system providing duplex telephone operation and two-way signaling for the operation of FM radio sets from a remote location. Built-in loudspeaker and audio power amplifier. Range: 2 mi (3.2 km) with field wire WD–1/TT.	Used with AN/VRC–46, –47, and –49 radio sets of the battalion. Employed throughout the combat zone.
5.	Antenna RC–292 TM 11–5020–348 Wt = 48 lbs.	An elevated, wide band, modified ground plane antenna designed to operate with and increase the distance range of combat area FM radio sets. Consists of one vertical element and three ground plane elements mounted on a sectional mast that can be raised to 30 feet in 3-foot increments.	Utilized with AN/VRC–46, –47, and –49 radio sets of the battalion. Element lengths must be adjusted for frequency range used.
6.	Radio Set Control AN/GSA–7 TM 11–5135 Wt = 50.3 lbs. Cu = 1.85 cu ft.	A small lightweight remote control unit used to interconnect radio circuits with local battery telephone on a push-to-talk basis. Range: 10 mi (16 km) with field wire WD–1/TT.	Used with tactical radio sets to provide RWI facilities.
7.	Cable CX–7474/U	Special Purpose Cable.	Used to interconnect AN/GSA–7 with AN/VRC–49 radio set for RWI operation.

4. Radio Equipment—Ground to Cir—VHF-UHF

Line	Nomenclature	Description	Remarks
1.	Radio Set AN/VRC–24 TM 11–5820–222 Wt = 88 lbs.	A compact, VHF–UHF, vehicular AM radio set providing ground-to-air radio telephone voice communication within a frequency of 225–399.9 mc. Range: 30 miles (48 km) for aircraft at 1000 feet elevation; 100 miles (161 km) at 10,000 feet.	Requires 24 volts dc for operation. Power output is 16 watts. Employed by Air Support Signal Team.

5. Radio Relay Equipment

Line	Nomenclature	Description	Remarks
1.	Radio Terminal AN/MRC–68 TM 11–5820–505 Wt = 1,750 lbs. (Shelter with all components mounted)	A mobile radio relay set installed in S–89/G shelter mounted on a ¾ ton truck. Consists of 3 each T–235/GRC–10, 3 each R–125/GRC–10, 2 each AN/TCC–3, 9 each TA 182/U, 3 each TA 125/U, 1 each TA 312/PT, and 1 each PU–322/G plus ancillary equipment. Operates within frequency range of 54 to 70.9 mc.	May be used as dual terminal or as a repeater set, when long distance transmissions are required. Utilized to provide the airborne division multi-channel communications network. Requires 120 volts ac.

6. Telephone Sets

Line	Nomenclature	Description	Remarks
1.	Telephone Set TA–312/PT TM 11–2155 Wt = 9.5 lbs. Cu = 0.177 cu ft.	A rugged, lightweight, water-proof battery operated telephone set designed for local battery, common battery, or common battery signaling operation. Range: 14–22 mi (22.5—35.4 km) using non-loaded WD–1/TT with 36 db loss.	Uses two BA–30 Batteries. Employed throughout the combat zone.

7. Telephone Switching Equipment

Line	Nomenclature	Description	Remarks
1.	Distribution Box J–1077/U TM 11–5805–204 TM 11–5895–225 Wt = 14 lbs. Cu = 0.31 cu ft.	A weatherproof binding post panel for providing access to the pairs in one 26-pair cable (CX–4566/G) at a junction in the cable.	Used for distribution of pairs in 26-pair cables at division main and alternate CP.
2.	Panel, Patching Communication SB 611/MRC TM 11–5805–204 Wt = 1831 lbs. (Shelter complete w/ equipment)	A flexible, mobile, circuit control facility capable of connecting forty-six 26-pair cables (CX–4566/G) and 18 field wire pairs (WD–1/TT). Testing and monitoring facilities for voice and teletypewriter circuits are integral. Includes one manual Telephone Switchboard SB–22A/PT, one Teletypewriter TT–4A/TG, and other equipment.	Installed in Shelter S–171/MRC. Mounted on ¾-ton truck. Employed at division main and alternate CP.
3.	Switchboard, Telephone Manual, SB–22/PT TM 11–5805–26 Wt = 36.5 lbs. Cu = 0.679 cu ft.	A portable, local battery monocord switchboard capable of connecting 12 local battery telephone circuits, remote controlled radio circuits, or voice frequency teletypewriter circuits.	Uses four BA–30 Batteries. Two or three additional SB–22/PTs can be used to increase line capacity from 12 to 29 or 46 lines, respectively. Employed as primary switchboard at forward signal centers.
4.	Switchboard, Telephone Manual SB–86/P TM 11–2134 TM 11–4134 Wt = 172 lbs. Cu = 12.67 cu ft.	A complete, transportable, single-position non-multiple, local battery tactical switching central capable of terminating 30 magneto or common battery signaling lines or trunks, two of which may be automatic-one-way ringdown trunks to civilian exchanges. Can be used for voice frequency teletypewriter circuits. Includes a switchboard section, Jack Field Switchboard Signal Assembly TA–207/P, and Power Supply PP–990/G.	Expansible to 60 lines with the addition of Switchboard Signal Assembly TA–207/P. Employed as primary switchboard at division main, alternate, rear, and support command CP.
5.	Signal Assembly Field Switchboard TA 207/P TM 11–2134 TM 11–4134 Wt = 31 lbs. Cu = 0.800 cu ft.	A switchboard section capable of terminating an additional 30 lines when used in conjunction with SB–86/P.	One per SB–86.
6.	MX–2915/PT	Accessory kit for SB–22/PT. Contains two line packs and one trunk pack.	Used to by-pass cord circuits in SB–86/P switchboard when RWI operation is desired.

8. Wire and Cable Equipment

Line	Nomenclature	Description	Remarks
1.	Cable Assembly Telephone CX–162/G SB 11–523 Wt = 700 lbs per mile Cu = 13.257—100′ 39.772—300′ 66.287—500′ 132.575—1000′	A five-pair, voice frequency, field telephone cable assembly furnished in 100, 300, 500, and 1000 ft lengths (30.4, 91.4, 152.4, and 304.8 meters) with universal type connectors on each end. Has 1.5 db loss per mile.	Assemblies are connected together to form desired length. Employed throughout the combat zone.
2.	Cable Assembly Telephone CX–163/G SB 11–523 Wt = 3.50 lbs. Cu = 0.210 cu ft.	A 12-ft (3.6 meter) cable stub with universal connector on one end for mating with CX–162/G and with exposed conductors available at the other end for connection to equipment not provided with cable connectors.	Employed throughout the combat zone.
3.	Telephone Cable Assembly CX–4566/G TM 11–5895–225 Wt = 68 lbs. Cu = 2.197 cu ft.	250 ft (76.2 meters) of general purpose 26-pair cable with universal connectors on both ends.	For truck-mounted shelter assemblages. Employed throughout the combat zone.
4.	Telephone Cable Assembly CX–4760/G TM 11–5895–225 Wt = 5 lbs.	A 15-ft stub (4.5 meters) of 26-pair cable with universal connector on one end for mating with CX–4566/G and with exposed conductors available at the other end for connection to equipment not provided with cable connectors.	Employed throughout the combat zone.
5. 4.	Wire WD–1/TT SB 11–100–154 Wt = 48 lbs. per mile less spool	General Purpose, twisted pair, polyethylene jacketed field telephone wire. 1 mile (1.6 km) on Wire Reel RL–159( )/U. ¼ mile on DR–8. Range: 12–24 miles (19.3—38.6 km).	Employed throughout the combat zone.
6.	Wire Dispenser MX–306 A/G TM 11–2240 Wt = 27 lbs. loaded with ½ mile of WD–1/TT. Cu = 0.669 cu. ft.	Contains ½ mile of field wire WD 1/TT in torus shaped coil. Wire payed out from center without any accessory equipment.	Wire may be payed out from man pack, ground vehicle, or aircraft. Wire may be projected by bazooka rocket or rifle grenade.
7.	Reeling Machine Cable Hand RL–27 TM 11–3895–201 Wt = 7 lbs. Cu = 0.037 cu. ft.	Single axle with two handles—one removable. Capacity one RL–159, 29″ long.	Man pack manual operation.
8.	Reeling Machine Cable Hand RL–31 TM 11–362 Wt = 30 lbs incl frame. Cu = 13.035 cu. ft.	A frame with devised (split) axle. Capacity 2 RL–159, one DR–5, one DR–15B or one DR–7.	Has attachments for mounting on vehicle.
9.	Reel Unit RL–172 TM 11–3895–207 Wt = 110 lbs.	Motor driven unit. Designed to be mounted on truck or any vehicle with 24 volt storage battery. Capacity one RL–159.	

9. Teletypewriter Transmission Equipment

Line	Nomenclature	Description	Remarks
1.	Central Officer Teletypewriter AN/MGC–17 TM 11–2225 TM 11–5805–262 TM 11–5815–205 TM 11–5815–206 Wt = 1400 lbs.	A mobile central office containing facilities for three full-duplex or half-duplex teletypewriter circuits including one secure circuit, and switching facilities for 12 subscriber lines. Includes one Teletypewriter TT–4A/TG, two Teletypewriter Reperforator-Transmitters TT–76B/GGC, one Manual Telephone Switchboard SB–22A/PT, and other equipment.	Installed in Shelter S–169/MGC–17 and includes Trailer-Mounted Generator Set PU–322/G. Mounted on ¾-ton truck. Employed at division main and alternate CP.
2.	Teletypewriter Set AN/TGC–14 (Dev)	A lightweight, portable sending-receiving teletypewriter set. Manual keyboard transmitter and page printer. 60–100 wpm.	Replaces AN/PGC–1.
3.	Teletypewriter Set AN/TGC–15 (Dev).	A lightweight, portable sending-receiving teletypewriter set. Includes typing reperforator and page printed.	Replaces AN/GGC–3.
4.	Terminal Telegraph-Telephone AN/TCC–29.	A transistorized telegraph terminal that provides speech plus half-duplex telegraph over any voice frequency facility. Consists of Terminal TH–22/TG; Electrical Filter F–316/U, and Conventer CV–425/U.	Replaces AN/TCC–14. Operates on 115–220 volts, ac, 50–60 cy 1 phase.

APPENDIX III

TYPE VEHICLE LOADING PLAN
SIGNAL BATTALION, AIRBORNE DIVISION

1. This appendix contains a type vehicle loading plan for each of three companies of the signal battalion, airborne division, organized under TOE 11-215F.

2. In preparing this plan the following criteria were utilized: *a.* The weight of an individual is considered to be 240 lbs and includes weapon, bayonet and individual portion of the basic load of ammunition. It also includes, where appropriate, binoculars, compass, flashlight, goggles, wrist watch, grenade launcher 40 mm, and tool kit TE-33.

b. No personnel will occupy vehicular mounted shelters or trailers during movement.

c. Allowable maximum vehicle pay-loads for off-road operation as stipulated in FM 24-19 were utilized.

3. Utilizing the criteria above, organic transportation is available for 100 percent of TOE equipment and for 375 personnel or approximately 71 percent of authorized strength.

4. It is emphasized that the loading plan provided in this appendix is intended to be utilized as a guide and/or starting point. The criteria contained in paragraph 2 above should be modified as required to develop SOP loading plans which will meet the varying requirements of routing or contingency operations. In these SOP loading plans, provision must be made for the weight and cube at the basic and/or prescribed load appropriate to the mission.

5. Requirements for movement of personnel and equipment which cannot be met by the organic capability of the battalion must be anticipated and commitment of appropriate support transportation should be arranged and included in the loading plans.

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle			Remarks
				Personnel	Cargo		
Co Hq	1	¾t trk	Co Hq transport	—3— Armorer(d) Co Cmdr 1st Sgt	Decon app Case, BC–5 Cook Set, field Stove, cooking gas Detector kit, cml Barber kit Desk, field plywood Co guidon Launcher rocket, 3.5 Safe Table folding Tool kit, armorer Typewriter (ptbl) Panel set AP–30–C Panel set AP–30–D Panels VS–17	1 2 1 1 1 1 1 1 1 1 2 1 1 2 2 6	No. space for 2 personnel 1 Sup Sgt 1 Co Clk
	1a	trl ¾t	Company supply		Bag, water Heater, 45k BTU Burner assy, heater Generator 1.5kw 120V Light set, illum Tent, GP, small Liner, tent Vestibule, tent Screen, latrine	1 2 2 1 1 1 1 1 1	
Admin & Log Section	2	¾t trk	Bn S–1 & S–4	—4— Mail clerk(d) Bn S–1* Bn Sgt Maj* Unit Sup Tech	Decon app Case, BC–5 Cook set, field Stove, cooking, gas Flag, national, U.S Flag, organizational Launcher, rocket 3.5 Case, field Cabinet, filing Typewriter Safe	1 2 1 1 1 1 1 1 9 1 1	No. space for 6 personnel: 1 per NCO 1 clk typ 1 sup sgt 1 sig sup sp 1 sup clk 1 sup sp *Bn hq uses 2 spaces.
	2a	trl ¾t			Heater, 45k BTU Burner assy, heater Mine detector Charger, PP–1578 Paulin, 40 x 20 Tent, GP, medium Liner, tent Repair kit, tentage Desk, field, plywood Table, folding	2 2 1 2 2 1 1 1 2 2	**From OP & Intel Section
	3	¼t trk	BN S–1	—3— Lt trk drv(d) BnExecOff& BN S–4*	Decon app Cook set, field Stove, cooking, gas	1 1 1	*Bn Hq uses 2 spaces
	3a	trl ¼t			Paulin, 17 by 12 Table, folding Duplicating Mach** Mine detector	2 3 1 1	**From Op & Intel Section

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle			Remarks
				Personnel	Cargo		
Op & Intel section	4	¾t trk	Bn op	—4—	Decon app	1	No space for 2 personnel: 1 Cml NCO 1 clk typ
				Gen dftm(d)	Radio, AN/VRC-47	1	
				Asst S-3	Antenna, RC-292	1	
				Op sgt	TSEC/KY-8	1	
				Intel sgt	Desk, field, plywood	1	
					Lettering set	1	
					Safe	1	
					Table, folding	1	
					Typewriter (ptbl)	1	
	4a	trl ¾t			Heater, 45BTU	3	
					Burner assy, heater	3	
					Generator 3kw 28VDC	1	
					Drafting equip set	1	
					Tent GP medium	1	
					Liner, tent	1	
					Control AN/GRA-39	1	
					RL-39	1	
					Wire, WD1 on DR-8	2	
					Table, folding	1	
	5	¼t trk	Bn S-3	—3—	Decon app	1	*Bn Hq uses 1 space
				Lt trk drv(d)	Radio, AN/VRC-46	1	
				Bn S-3*			
				Asst op sgt			
	5a	trl ¼t			Cook set, field	1	
					Stove, cooking, gas	1	
					Desk, field plywood	1	
					AN/GRA-39	1	
					Typewriter (ptbl)	1	
					Liner, tent	1	
					Case, BC-5	2	
					Heater, 45k BTU	1	
					Burner assy, heater	1	
Div Sig Office section	6	¾t trk	Division signal operation	—4—	Decon app	1	No. space for 4 personnel: 1 op sgt 1 clk typ 1 crypto sp 1 sig op clk
				Sig op clk(d)	Clock, M-2	1	
				ADSO	Safe	1	
				Crypto tech	Typewriter (ptbl)	2	
				Ch sig NCO	Case, BC-5	1	
					Case, field, 22"	1	
					Duplicating machine	1	
					Heater, 45k BTU	1	
					Burner assy, heater	1	
	6a	trl ¾t			Heater, 45k BTU	1	
					Burner assy, heater	1	
					Desk, field	2	
					Table, folding	3	
					Tent, GP medium**	2	**1 from O&I Sec
					Liner, tent	1	
					RL-39	2	
					Wire WD1 or DR-8	4	
	7	¼t trk	DSO	—2—	Decon app	1	*Bn hq uses 1 space
				Lt trk drv(d)	Radio, AN/GRC-106	1	
				DSO/Bn Comdr	Radio, AN/VRC-46	1	
	7a	trl ¼t			Antenna, RC-292	1	
					Case, BC-5	1	
					Control, AN/GRA-39	1	
					Control, AN/GRA-74	1	
					Table, folding	1	

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
					Tent, GP Small** 1	
					Liner tent** 1	**From Co Hq Sec
					Vestibule, tent** 1	
Motor maint section	8	2½t trk 5,000	Hq & shop	—3—	Decon app 1	No. space for 7 personnel— 1 powerman 1 Eq rpt clk 2 Mechanics 2 Powerman hlp 1 Mech hlp
				Mech hlp(d)	Tool kit #2 1	
				Mtr maint tech	Cook set, field 1	
				Rep parts sp	Stove, cooking, gas 1	
					Cabinet, filing 3	
					Tool kit, mechanics 5	
					Typewriter 1	
					Multimeter, TS-352 4	
	8	trl 1½t			Tent, frame type 1	
					Tent liner 1	
					Heater, 250k, BTU 1	
					Paulin, 17X12 1	
					" 40X20 1	
					Table, folding 2	
					Case, field 22" 1	
	9	2½t trh	POL DIST	—3—	Decon app 1	
				Petrol disp(d)	Liquid dispensing unit 1	
				Powerman	Tool kit mechanics 2	
				Sr mechanic		
	9a	trl 1½t			Liquid dispensing unit 1	
	10	trk wrecker		—3—	Decon app 1	
				Mech hlp(d)	Tool kit mechanic 4	**From Admin & Log Sec
				Motor sgt	Tool kit, carpenter** 1	
Signal maint section	11	¾t trk	Sec Hq & radio repair	—4—	Decon app 1,492 1	No. space for 4 personnel— 1 RADREL rpm 1 sr rad rpm
				Fld Rad Rpm (d)	Cook set field 1	
				Sec chief	Stove, cooking gas 1	
				Sr rad rpm (2)	AN/URM-103 1	
					AN/URM-120 1	
					AN/USM-50 2	
					AB/USM-140 1	
					AN/VRM-1 1	
					ME-26 2	
					MX-1258 1	
					MX-2106 1	
					SG-71/FCC 1	
					TS-382 1	
					TV-7/U 1	
	11a	trl ¾t P/O PU-322	Power		Generator, PE-76 2	
					BC-5 2	
					AN/URM-70 1	
					AN/TSM-16 1	
					PP-2953 1	
					PP-3773 1	
					TS-352 5	
					Table, folding 2	
					TV-7/U 1	
					Heater, 45k, BTU 1	
					Burner assy 1	
					AN/USM-159 1	
	12	¾t trk	Radio repair	—4—	Decon app 1	
				Fld rad rpm (d)	Cook set field 1	
				RADREL rp ch	Case BC-5 2	
				RADREL rpm (2)	Stove cooking gas 1	
					AN/URM-25 1	

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
					AN/URM-70 1 AN/URM-103 1 AN/URM-120 1 AN/USM-50 1 AN/USM-159 1 AN/VRM-1 1 ME-26 2 ME-30 1 TS-382 1 TV-7/U 1 SG-71/FCC 1	
	12a	trl ¾t	Radio repair		Tent, medium 1 Tent liner 1 CASE, BC-5 2 PP 2953 1 PP 3773 1 Paulin 17 by 12 2 AN/URM-70 1 Table, folding 2 TS-382 1	
	13	¾t trk	TT & Crypto repair	—5— TT rpm hlp(d) Sr TT rpm Gen Cry rpm (3)	Decon app 1 Cook set field 1 Stove cooking gas 1 Case BC-5 1 Safe 1 Table folding 1	
	13a	trl ¾t	TT repair		Case BC-5 1 TF-171 1 TS-352 6 TS-799 2 TS-1060 1 TS-1194 1 TV-7/U 1 TE-508 5 PPL-927 6 PPL-863 4 AN/TCC-29 1 AN/TGC-14 1 AN/TGC-15 1	
	14	¾t trk	TT, Crypto & telephone repair	—5— TT rpm(d) Sr CrpOff rpm GenCrp rpm Cen off rpm (2)	Decon app 1 Cook set field 1 Stove cooking gas 1 Case BC-5 1 PPL-927 5 TE-111 1 TS-190 1 TS-352 5 Table, folding 2	
	14a	trl ¾t P/O PU-322	Power		Generator, PE-75 2 Case BC-5 1 Tool equip, elect 3 TE-123 4 TS-140 2 Heater 45L BTU 1 Burner assy 1	

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
Bn Field Mess Section	15+16	¾t trk	Mess truck	—2—	Decon app 1	
				Cook(d)	Range, field 3	
				Mess steward		
	17+18	¾t trk	Mess	—5—	Decon app 1	
			supply	Cooks hlp(d)	Acc outfit 1	
				First cook(3)	Table folding 2	
				Cook		
	15a+16a	trl ¾t	Mess		Tent, kitchen fly 1	
					Heater immersion 2	
					Container food 3	
					Paulin 17X12 1	
	17a+18a	trl ¾t	Mess		Heater immersion 2	
					Container food 3	
					Paulin 17X12 1	

Note. The organic transportation of Headquarters and Headquarters Company will transport 64 personnel or approximately 72% of authorized strength. Additional transportation is required for 25 personnel.

SIGNAL COMMAND OPERATIONS COMPANY
TOE 11-217F

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
Co Hq	1	¼t trk	Command	—2—	Decon app 1	
			& Control	Lt truck dr(d)	Radio, AN/VRC-46 1	
				Co Comdr		
	1a	trl ¼t			Antenna, RC-292 1	
					Panel marker VS-17 4	
					Table folding 1	
					Safe 1	
	2	¾t trk	Co CP	—4—	Decon app 1	
				Mech hlp (d)	Det kit cml 1	
				Co clk	Cook set field 1	
				Sr Mechanic	Guidon 1	
					Stove, cooking gas 1	
					Tool kit automotive 1	
					Panel marker VS-17 10	
					Table folding 1	
					Typewriter (ptbl) 1	
	2a	trl ¾t			Tent, GP small 1	
					Liner, tent 1	
					Vestibule, tent 1	
					Heater 45k BTU 1	
					Burner assy, heater 1	
					Deck field plywood 1	
	3	¾t trk	Co Supply	—5—	Decon app 1	
				Armorer(d)	Machine gun, light 1	
				Supply Sgt	Mount, machine gun 1	
				Supply clk	Tool kit, automotive 2	
				Mechanic(2)		
	3a	trl ¾t			Pauling 17 by 12 1	
					Tool kit armorer 1	
					Screen, latrine 1	
					Bag, water 2	
					Barber kit 1	
					Case, BC-5 2	

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
	4	¾t trk	CoMaint	—2— Mech hlp(d) Motor Sgt	Charger PP–1578 2 Radiacmeter IM–174 1 Repair kit tentage 1 Heater, 250k BTU 1 Decon app 1 Tool kit #1 1	
	4a	trl ¾t			Tool kit, auto 2 Tent frame 1 Liner, tent 1 Paulin, 40 by 20 2	
TWO (2) COMMAND SIGNAL CENTER PLATOONS—(Div Main and Div Alternate)						
Plat Hq	5 & 6	¼t trk (2)	Command & Control	—3— Powerman hlp (d) Plat ldr Plat Sgt	Decon app 1 Radio AN/VRC–46 1 Launcher 3.5 1	No. space for 4 personnel—1 swbd opr 1 Powerman (ea plat hq)
	5a & 6a	trl ¼t (2)			Gen. 3kw 28VDC 1 Antenna, RC–292 1 Cook set, field 1 Stove cooking gas 1 Tool kit, automotive 2 TS–352 2	
Radio Relay Term & Carrier Section (2)	7 & 8	¾t trk (2)	Mount AN/MRC–68	—3— RADREL Atnd (d) Section ch Team chief	Decon app 1 Radio, AN/MRC–68 1 Meter, AN/URM–105 1	No. space for 2 personnel—1 SR RADERL opr (ea section)
	9 thru 14	¾t trk (6)	Mount AN/MRC–68	—3— RADREL opr (d) Team chief Sr RADREL opr	Decon app 1 Radio, AN/MRC–68 1 Meter, AN/URM–105 1	
	7a thru 14a	trl ¾t (8) P/O PU322	Power PU322 P/O AN/MRC–68		Generator PE–75 1 Case BC–5 1 Cook set field 1 Stove cooking gas 1 CX–162/500: 2 CX–162/1000: 1 CX–163 2	
Comm-center section(2)	15 & 16	¾t trk (2)	Mount AN/MGC–17	—3— Comm clk(d) Commcen Supv TT opr	Decon app 1 TTY central AN/MGC–17 1 TSEC/KW–7 1	No. space for 10 personnel: 3 commcen clk
	15a & 16a	trl ¾t (2) P/O PU–322	Power PU322 P/O AN/MGC–17		Generator PE–75 2 Cook set field 1 Stove, cooking gas 4	2 TT Opr (ea section)
	17 & 18	¼t trk (2)	Msgr service	—3— Mtr msgr(d) Asst msgr Crypto Tech	Decon app 1 Cook set field 1 Stove cooking gas 1	

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
TWO (2) COMMAND SIGNAL CENTER PLATOONS—(Div Main and Div Alternate)—Continued						
	17a & 18a	trl ¼t (2)	Msgcen & crypto		Safe 2 TSEC/KL-7 2 TSEC/KW-7 2 KLX-7/TSEC 1 TSEC/HL-1B 1	
	19 thru 22	¼t trk (4)	Msgr service	—3— Mtr msgr(d) Asst msgr Commcen sp	Decon app 1	
	19a & 20a	trl ¼t (2)	Msg center		Typewriter 1 Tent, GP small 1 Liner, tent 1 Vestibule, tent 1 Heater 45k BTU 1 Burner assy, heater 1 Table folding 1 Radio, AN/GRR-5 1	
	21a & 22a	trl ¼t (2)	Msg center		Tent, GP small 1 Liner, tent 1 Vestibule, tent 1 Heater 45k BTU 1 Burner assy heater 1 Table folding 1 Case field 18" 1	
	23 & 24	¼t trk (2)	Msgr service	—3— Mtr msgr(d) Asst msgr TT opr	Decon app 1	
	23a & 24a	trl ¼t (2)	Msgcen		AN/TGC-14 1 AN/TGC-15 1 AN/TCC-29 1 Case BC-5 1 Clock, M2 1	
Swbd & wire section(2)	25 & 26	¾t trk (2)	Mount SB-611	—3— Control sp(d) Section ch Cir contr sgt	Decon app 1 SB-611 1 TS-26 1	No. space for 36 personnel— 1 cir con sp 5 swb opr 3 sr wireman 6 wireman 3 wireman hlp (each section)
	25a & 26a	trl ¾t (2) P/O PU322	Power		Generator PE-75 2 Cook set field 1 Stove, cooking gas 1 CX-4566/250' 3 CX-4760 2	
	27 & 28	¾t trk (2)	Swbd equip	—3— Swbd opr(d) St swbd opr(2)	Swbd SB-86 2 TA-207 2 Decon app 1 Swbd SB-22* 1	*From platoon Headquarters
	27a & 28a	trl ¾t (2)			Tent, GP small 1 Liner, tent 1 Vestibule, tent 1 Heater 45k, BTU 1 Burner assy heater 1 Case BC-5 2 Cook set field 1 Stove cooking gas 1 Telephone TA-312* 34	

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
TWO (2) COMMAND SIGNAL CENTER PLATOONS—(Div Main and Div Alternate)—Continued						
					RL-31 1	
					MX-306 8	
					WD-1 on RL-159 2	*From platoon
					TS-26 2	Headquarters
	29 thru	¾t trk	Wire instal	—4—	Decon app 1	
	32	(4)	team	Tp instal(d)	TE-21 1	
				Team ch	RL-27 1	
				Sr wireman	RL-31 1	
				Wireman	RL-172 1	
					Telephone TA-312 3	
					TM-184 2	
					MK-356 1	
					Wire WD-1 on RL-159 4	
	29a thru	trl ¾t	Wire instal		Case BC-5 1	
	32a	(4)	team		Cook set field 1	
					Stove cooking gas 1	
					Dist box, J-1077 2	
					CX-4566/250' 9	
					CX-4760 6	
					MX-306 8	
					WD-1 on RL-159 6	
					Telephone TA-312 8	
					TM 184 3	
	33 & 34	¾t trk	Wire instal	—4—	Decon app 1	
		(2)	team	Tp instal(d)	TE-21 1	
				Team ch	RL-31 1	
				Sr wireman	Telephone TA-312 3	
				Wireman	TM 184 2	
					MK-356 1	
					Wire WD-1 on RL-159 6	
	33a &	trl ¾t	Wire instal		Case BC-5 1	
	34a	(2)	team		Cook set field 1	
					Stove cooking gas 1	
					Dist box, J-1077 2	
					CX-4566/250' 9	
					CX-4760 6	
					MX-306 12	
					WD-1 on RL-159 5	
					Telephone TA-312 10	
	35 thru	½t Plat-	Wire instal	—1—	Decon app 1	
	40	form(6)		Wireman(d)	MX-306 16	
					WD-1 on RL-159 5	
Radio platoon	41	¼t trk	RWI	—2—	Decon app 1	No. space for
			station	Radio opr(d)	Radio, AN/VRC-49 1	12 personnel
			MAIN	Platoon ldr	Control, AN/GSA-7 1	1 radio opr
					CX-7474 1	3 sr rad opr
					MX-2915 1	6 RATT opr
					TS-352 1	1 Powerman
						1 Powerman
	42	¼t trk	RWI	—2—	Decon app 1	hlp
			station	Radio opr(d)	Radio, AN/VRC-49 1	1 Powerman
			ALTN	Platoon sgt	Control, AN/GSA-7 1	hlp
					CX-7474 1	
					MX-2915 1	
					TS-352 1	

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
	41a & 42a	trl ¼t (2)	Radio equip		Gen, 3kw 28VDC 1 Antenna RC-292 2 Cook set field 1 Stove gas cooking 1 RL-39 2 WD-1 on DR-8 4	
	43 & 44	¼t trk (2)	Division radio net	—2— Radio opr(d) Sr radio opr	Decon app 1 Radio, AN/GRC-106 1 Radio, AN/VRC-46 1 TSEC/KY-8 1	
	43a & 44a	trl ¼t (2)	Radio equip		Gen, 3kw 28VDC 1 Antenna, RC-292 2 Control, AN/GRA-39 1 AN/GRA-50 1 AN/GRA-74 1 RL-39 1 WD-1 on DR-8 2 Cook set field 1 Stove cooking gas 1	
	45 & 46	¼t trk (2)	Division Radio net	—2— Radio opr Sr radio opr	Decon app 1 Radio, AN/GRC-106 1 Tool kit Automotive 1	
	47 thru 52	¼t trk (6)	Division RATT net	—2— RATT opr(d) Team chief	Decon app 1 Radio, AN/VSC-2 1 TSEC/KW-7 1	
	45a thru 52a	trl ¼t (8)	Radio equip		Gen 3kw 28VDC 1 AN/GRA-50 1 AN/GRA-74 1 RL-39 1 WD-1 on DR-8 2 Cook set field 1 Stove cooking gas 1	
REAR ECHELON OPERATIONS PLATOON						
Platoon Hq	53	¼t trk	Command & Control	—2— Plat sgt(d) Plat ldr	Decon app 1 Radio AN/VRC-46 1 Launcher 3.5 1	
	53a	trl ¼t			Gen 3kw 28VDC 1 Antenna RC-292 1 Cook set field 1 Stove cooking gas 1 AN/TGC-15* 1	*From Comm center Sec
Comm-center section	54	¾t trk	Msg Cen & TT	—3— Comm clk(d) Commcen supv TT opr	Decon app 1 AN/TGC-14 1 AN/TGC-15 1 AN/TCC-29 1 TSEC-KL-7 2 TSEC/KW-7 2 KLX-7/TSEC 1 TSEC/HL-1B 1 Radio AN/GRR-5 1 Safe 1 Typewriter 1 Case BC-5 1 Cook set field 1 Stove cooking gas 1	No. space for 6 personnel— 3 TT opr 2 Commcen clk 1 Commcen sp

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
REAR ECHELON OPERATIONS PLATOON—Continued						
					Table folding 1	
					Case field 22" 1	
					Clock M2 1	
	54a	trl ¾t P/O PU322	Power		Generator PE–75 2	
					Heater, 45K BTU 1	
					Burner assy heater 1	
					Tent, GP small 1	
					Liner, tent 1	
					Vestibule tent 1	
					AN/TGC–14 1	
					AN/TCC–29 1	
Swb & wire section	55	¾t trk	Wire team	—3—	Decon app 1	No. space for 6 personnel— 3 swbd opr 2 wireman 1 Sr wireman
				Wireman(d)	Cook set field 1	
				Team ch	Stove cooking gas 1	
				SrSwbdOpr	CX–162/100' 4	
					CX–162/500' 4	
					CX–162/1000' 2	
					CS–163 18	
					MX–306 8	
					WD–1 on RL–159 6	
					MX–356 1	
					RL–27 1	
					RL–31 2	
					TM–184 2	
					Telephone TA–312 4	
	55a	trl ¾t	Mount swbd		Case BC–5 2	
					Heater 45k BTU 1	
					Burner assy 1	
					Switchboard SB–86 1	
					TA–207 1	
					WD–1 on RL–159 2	
					TM–184 8	
					MX–306 4	
					Tent, GP small 1	
					Liner, tent 1	
					Vestibule tent 1	
					Telephone TA–312 38	
					Paulin 40 x 20 1	
Air Support Signal Team	56	¾t trk	Air Request System	—3—	Decon app 1	
				Radio opr(d)	Radio AN/GRC–106 1	
				Team ch	Radio AN/VRC–24 1	
				Radio opr	Telephone TA–312 1	
					Cook set field 1	
					Stove cooking gas 1	
	56a	trl ¾t			Gen. 3kw 28VDC 1	
					AN/GRA–50 1	
					AN/GRA–74 1	
					RL–39 1	
					WD–1 on DR–8 2	

Note. Organic transportation of Signal Command Operations Company will transport 150 personnel or approximately 66% of authorized strength. Additional transportation is required for 76 personnel.

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
Co Hq	1	¼t trk	Command and Control	—2—	Decon app 1	
				Lt trk dr(d)	Radio, AN/VRC-46 1	
				Co Comdr		
	1a	Trl ¼t			Antenna RC-292 1	
					Panel Marker VS-17 4	
					Table folding 1	
					Safe 1	
	2	¾t trk	Co CP	—5—	Decon app 1	
				Mech hlp(d)	Det kit cml 1	
				1st Sgt	Cook set field 1	
				Co clk	Guidon 1	
				Sr Veh Mech	Stove, cooking gas 1	
				Veh mech	Tool kit, auto 1	
					Panel Marker VS-17 4	
					Table folding 1	
					Typewriter (Ptbl) 1	
	2a	trl ¾t			Tent, GP, small 1	
					Liner, tent 1	
					Vestibule 1	
					Heater 45 BTU 1	
					Burner assy 1	
					Desk field plywood 1	
	3	¾t trk	Co Supply	—5—	Decon app 1	
				Armorer(d)	Machine gun light 1	
				Supply Sgt	Mount machine gun 1	
				Supply Clk	Tool kit auto 3	
				Veh Mech(2)	Launcher rocket 3.5 1	
	3a	trl ¾t			Paulin 17-12 1	
					Tool kit, armorer 1	
					Screen latrine 1	
					Bag water 2	
					Barber kit 1	
					Case BC-5 1	
					Charger PP1578 3	
					Radiacmeter IM-174 1	
					Heater, 250 BTU 1	
	4	¾t trk	Co Maint	—2—	Decon app 1	
				Mech Hlp(d)	Tool kit No. 1 1	
				Motor Sgt	Tool kit auto 2	
	4a	trl ¾t			Tool kit auto 2	
					Tent Frame 1	
					Liner tent 1	
					Paulin 40x20 2	
SUPPORT COMMAND SIGNAL OPERATIONS PLATOON						
Plat Hq	5	¼t trk	Command and Control	—3—	Decon app 1	No. space for 1 Powerman
				Pwrman hlp(d)	Radio, AN/VRC-46 1	
				Plt ldr	Launcher 3.5 1	
				Plat sgt		
	5a	trl ¼t	Plat Hq Cargo		Generator 3kw 28VDC 1	
					Antenna RC-292 1	
					Cook set field 1	
					Stove cooking gas 1	
					Tool kit auto 2	
					Meter TS-352 2	

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
SUPPORT COMMAND SIGNAL OPERATIONS PLATOON—Continued						
Radio Relay Term & Carrier	6 & 7	¾t trk (2)	Mount AN/ MRC-68	—3— RADREL Atnd(d) Team Chief Sr RADREL Atnd	Decon app 1 Radio AN/MRC-68 1 Meter AN/URM-105 1	
	6a & 7a	trl ¾t (2) P/O PU-322	Power PU-322 P/O AN/ MRC-68		Generator PE-75 2 Case BC-5 2 Cook set field 1 Stove cooking gas 1 CX-162/G 500' 2 CX-162/G 1000' 1 CX-163/G 4	
Comm-center section	8	¾t trk	Msg Cen & TT	—3— Comm clk(d) Commcen Supv TT opr	Decon app 1 AN/TGC-14 1 AN/TGC-15 1 AN/TCC-29 1 TSEC/KL-7 2 TSEC/KW-7 2 KLX-7/TSEC 1 TSEC/HL-1B 1 Radio AN/GRR-5 1 Safe 1 Typewriter 1	No. space for 4 personnel— 2 TT opr 2 Comm clk
	8a	trl ¾t P/O PU-322	Power		Generator PE-75 2 Case BC-5 1 Cook set 1 Stove cooking gas 1 Table folding 1 AN/TGC-14 1 AN/TCC-29 1	
	9	¼t trk	Mtr Msgr	—4— Mtr Msgr (d) Asst Msgr COMM Cen sp TT opr	Decon app 1	
	9a	trl ¼t	Msg Cen		Heater 45k BTU 1 Burner assy 1 Case field office 1 Clock M-2 1 Tent GP small 1 Liner tent 1 Vestibule tent 1 AN/TGC-15 1	
Swbd & Wire Section	10	¾t trk	Wire tm	—3— Wireman(d) Tm chief Sr swbd opr	Decon app 1 Cook set field 1 Stove cooking gas 1 CX-162 100' 6 CX-162 500' 6 CX-162 1000' 2 CX-163/G 18 MX-306 14 WD-1 on RL-159 6	No. space for 6 personnel— 3 swbd op 2 wireman 1 sr wireman

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
SUPPORT COMMAND SIGNAL OPERATIONS PLATOON—Continued						
					MX-356 1	
					RL-27 2	
					RL-31 2	
					TE-21 2	
					TM 184 2	
					Telephone TA-312 4	
	10a	trl ¾t	Swbd Tm		Case BC-5 1	
					Heater 45K BTU 1	
					Burner assy 1	
					Swbd SB-86 1	
					TA-207 1	
					MX-306 4	
					Tent small GP 1	
					Liner, tent 1	
					Vestibule tent 1	
					Telephone TA-312 20	
					Paulin 40x20 1	
					TM 184 8	
Radio Section	11	¼t trk	Div Radio Nets (as required)	—2— Radio op(2) Sr Rad Op	Decon app 1	No. space for 2 personnel 2 RATT op
					Radio, AN/VRC-49 1	
					Control AN/GRA-39 2	
	12	¼t trk	RWI Station	—2— Radio op(d) Sr Rad op	Decon app 1	
					Radio, AN/VRC-49 1	
					Control AN/GSA-7 1	
					CX-7474 1	
					MX-2915 1	
	11a & 12a	trl ¼t (2)	Radio Equip		Gen 3kw, 28VDC 1	
					Antenna RC-292 2	
					Cook set field 1	
					Stove cooking gas 1	
					RL-39 1	
					WD-1 on DR-8 2	
	13 & 14	¼t trk (2)	Division RATT Net	—2— RATT opr(d) Team Chief	Decon app 1	
					Radio, AN/VSC-2 1	
					TSEC/KW-7 1	
					Cook set field 1	
					Stove gas burner 1	
	13a & 14a	trl ¼t (2)	Radio equip		Gen, 3kw, 28VDC 1	
					AN/GRA-50 1	
					Control AN/GRA-74 1	
					RL-39 1	
					WD-1 on DR-8 2	
THREE (3) FORWARD AREA SIGNAL CENTER PLATOONS						
Plat Hq (3)	15 thru 17 (3)	¼t trk	Command & Control	—3— Powerman hlpr(d) Plat ldr Plat sgt	Decon app 1	No. space for 3 personnel 1 powerman (ea Plat Hq)
					Radio, AN/VRC-46 1	
					Launcher 3.5 1	
	15a thru 17a	trl ¼t (3)	Plat Hq		Gen 3kw, 28VDC 1	
					Antenna, RC-292 1	
					Cook set Field 1	
					Stove cooking gas 1	
					Tool kit auto 2	
					TS-352 2	

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
THREE (3) FORWARD AREA SIGNAL CENTER PLATOONS—Continued						
Radio Relay Term & Carrier Section (3)	18 thru 23	¾t trk (6)	Mount AN/ MRC-68	—3— Radrel op(d) Team chief Sr RADREL Atnd	Decon app 1 Radio, AN/MRC-68 1 Meter, AN/URM-105 1	
	18a thru 23a	trl ¾t (6) PO PU322	Power PU-322 P/O AN/ MRC-68		Generator PE-75 2 Case BC-5 1 Cook set field 1 Stove gas burner 1 CX-162/G 500' 2 CX-162/G 1000' 1 CX-163/G 4	
Comm Center Section (3)	24 thru 26	¾t trk (3)	Msg Cen & TT	—3— Comm clk(d) Comm Cen Supvr TT Opr	Decon app 1 AN/TGC-14 2 AN/TGC-15 2 AN/TCC-29 2 TSEC/KL-7 1 TSEC/KW-7 2 KLX-7/TSEC 1 TSEC/HL-1B 1 Radio AN/GRR-5 1 Safe 1 Typewriter 1	No. space for 6 personnel— 1 TT op 1 Comm clk (ea section)
	24a thru 26a	trl ¾t (3) P/O PU322	Power		Generator PE-75 2 Case BC-5 1 Cook set field 1 Stove cooking gas 1 Table folding 1	
	27 thru 29	¼t trk (3)	Mtr Msgr	—4— Mtr Msgr(d) Asst Msgr CommCen Sp TT Opr	Decon app 1	
	27a thru 29a	trl ¼t (3)	Msg Cen		Heater 45k BTU 1 Burner assy 1 Case field office 1 Clock M2 1 Tent GP small 1 Liner tent 1 Vestibule tent 1	
Swbd & Wire Section (3)	30 thru 32	¾t trk (3)	Wire Tm	—4— Wireman(d) Tm chief Sr Wireman [2] Sr Swbd Opr	Decon app 1 Case BC-5 1 Cook set field 1 Stove cooking gas 1 CX-162/G 100' 4 CX-162/G 500' 4 CX-162/G 1000' 2 CX-163/G 18 MX-306 8 WD-1 on RL-159 6 MX-356 1 RL-31 2 TE-21 2 TM 184 6	No. space for 12 personnel— 2 wireman 2 swbd op (ea section)

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
THREE (3) FORWARD AREA SIGNAL CENTER PLATOONS—Continued						
					Telephone TA-312 12	
					TS-26 1	
	30a thru 32a	trl ¾t (3)	Swbd Tm		Paulin 40x20 1	
					Heater 45k BTU 1	
					Burner Assy 1	
					Switchboard SB-22 2	
					CX-162/G 100' 2	
					CX-162/G 500' 2	
					WD-1 on RL-159 4	
					Tent GP small 1	
					Liner tent 1	
					Vestibule 1	
Radio Section (3)	33 thru 35	¼t trk (3)	RWI Sta	—2— Radio Op(d) Section Chief	Decon app 1	No. space for 12 personnel— 3 RATT op 1 Sr Rad op (ea section)
					Radio, AN/VRC-49 1	
					Control, AN/GSA-7 1	
					CX 7474 1	
					MX 2915 1	
	33a thru 35a	trl ¼t (3)	Rad Equip		Gen 3kw, 28VDC 1	
					AN/GRA-39 1	
					Antenna RC-292 2	
					Cook set field 1	
					Stove gas burner 1	
					RL-39 1	
					DR-8 2	
	36 thru 44	¼t trk (9)	Div RATT nets	—2— RATT op(d) Tm Chief	Decon app 1	
					Radio, AN/VSC-2 1	
					TSEC/KW-7 1	
Radio Section (3)	36a thru 44a	trl ¼t (9)	Rad Equip		Generator 3kw 28VDC 1	
					Cook set field 1	
					Stove gas burner 1	
					AN/GRA-50 1	
					AN/GRA-74 1	
					RL-39 1	
					DR-8 2	
GENERAL PURPOSE PLATOON						
Plat Hq	45	¼t trk	Command & Control	—3— Powerman hlp(d) Plat ldr Plat Sgt	Decon app 1	No. space for 1 powerman
					Radio, AN/VRC-46 1	
					Antenna RC-292 1	
	45a	trl ¼t			Generator 3kw, 28VDC 1	
					Launcher rocket 3.5 1	
					Cook set field 1	
					Stove gas burner 1	
					Tool kit auto 2	
					Meter TS-352 2	

Section	Vehicle No.	Type vehicle	Function	Load for each vehicle		Remarks
				Personnel	Cargo	
GENERAL PURPOSE PLATOON—Continued						
Radio Relay & Term Section	46	¾t trk	Mount AN/MRC-68	—3— RADREL op(d) Sec Chief Tm Chief	Decon app 1 Radio AN/MRC-68 1	No. space for 1 Sr RADREL op
	47 thru 52	¾t trk (6)	Mount AN/MRC-68	—3— RADREL op(d) Tm Chief Sr RADREL op	Decon app 1 Radio AN/MRC-68 1	
	46a thru 52a	trl ¾t (7) P/O PU-322	Power PU-322 P/O AN/MRC-68		Generator PE-75 2 Case BC-5 1 Cook set field 1 Stove gas burner 1 CX-162/G 500' 2 CX-162/G 1000' 1 CX-163/G 2 Meter AN/URM-105 1	
Radio Section	53 & 54	¼t trk (2)	RWI Station	—2— Radio Op(d) Sr Rad Opr	Decon app 1 Radio AN/VRC-49 1 Control AN/GSA-7 1 CX-7474 1 MX-2915 1	No. space for 4 personnel—4 RATT op
	53a & 54a	trl ¼t (2)	Radio Equip		Generator 3kw 28VDC 1 Antenna RC-292 2 Control AN/GRA-39 1 Cook set field 1 Stove gas burner 1 RL-39 1 WD-1 on DR-8 2	
	54 thru 58	¼t trk (4)	Division RATT nets	—2— RATT opr(d) TM Chief	Decon app 1 Radio AN/VSC-2 1 TSEC/KW-7 1	
	54a thru 58a	trl ¼t (3)	Rad Equip		Generator 3kw 28VDC 1 Antenna AN/GRA-50 1 Control, AN/GRA-74 1 Cook set field 1 Stove gas burner 1 RL-39 1 DR-8 2	

Note. Organic transportation of the Signal Support Operations Company will transport 161 personnel or approximately 76% of authorized strength. Additional transportation is required by personnel.

APPENDIX IV

TYPE COMMAND POST FRAGMENTATION AIRBORNE DIVISION

Main	*Alternate*	*Rear*
Division Commander		
Asst Div Comdr	Asst Div Comdr	
CofS	CofS rep	
G1 rep	G1 rep	G1 Sec (–)
G2 Sec (–)	G2 rep	
G3 Sec (–)	G3 rep	
G4 rep	G4 rep	G4 Sec (–)
Div TOC	Altn Div TOC	
G5 rep	G5 rep	G5 Sec (–)
Div Arty Sec		
Army Avn Sec		
Div Engr Sec		
Div Sig Sec (–)	Sig Sec rep	
Div PM Sec		
Chemical Sec (–)	Chemical Sec rep	
Div Surgeon Sec		
Info Sec rep	Info Sec rep	Info Sec (–)
Hq Comdt Sec		
Div Hq Co (–)	Det Div Hq Co	Admin Co Hq
Det AG Sec (DistrCen)	Det AG Sec (DistrCen	AG Sec (–)
Div Chaplain	Chaplains Sec (–)	
MP Co (–)	Det MP Co	JA Sec
Hq & Hq Co Sig Bn	Det Hq & Hq Co Sig Bn	IG Sec
Comd Sig Cen Plat	Sig Comd Opns Co (–)	Finance Sec Rpl Det

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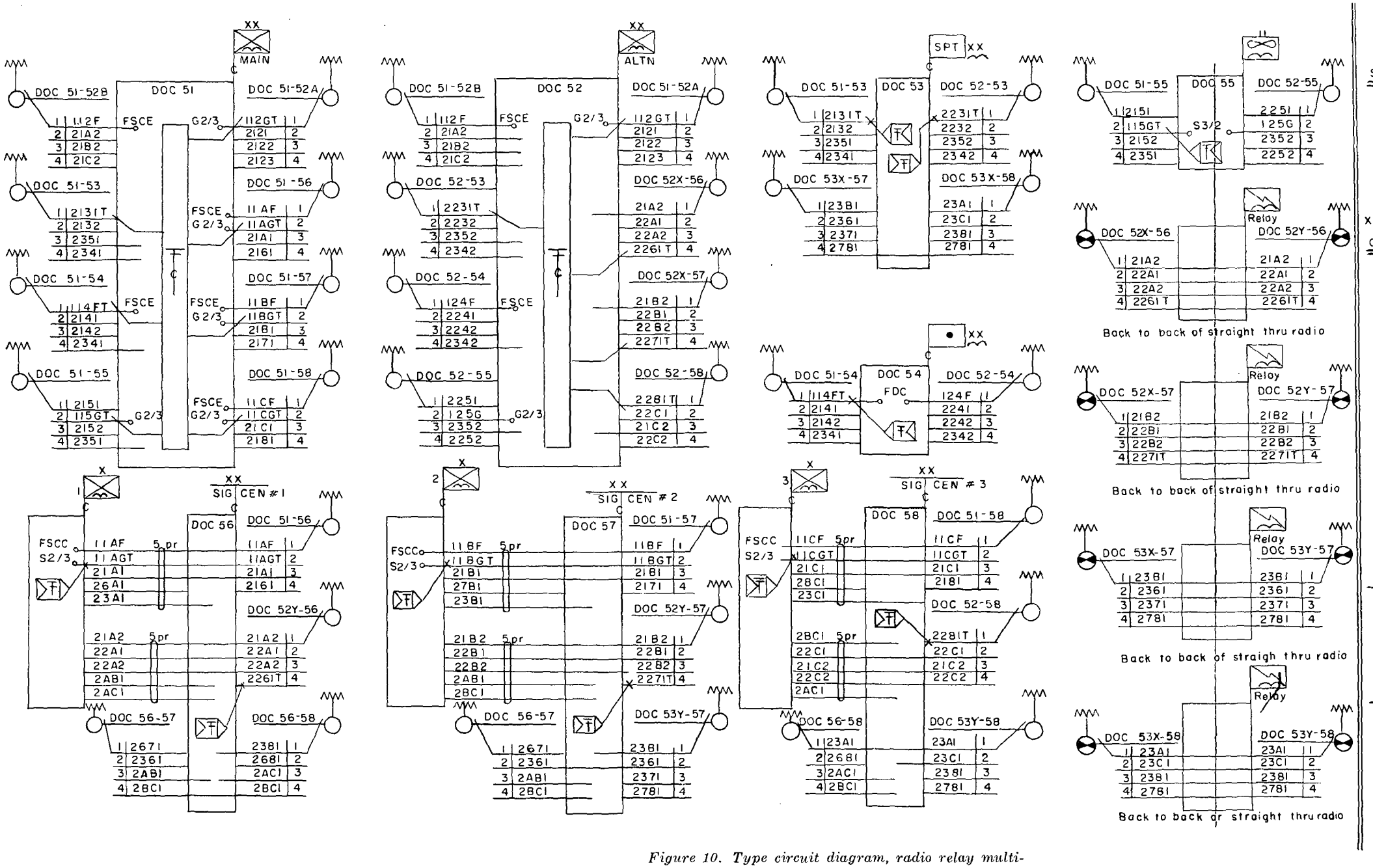

Figure 10. Type circuit diagram, radio relay multichannel network, airborne division.

KEY

SYSTEM IDENTIFYER

51 Division main
52 Division alternate
53 Division support command
54 Division artillery
55 Division aviation battalion
56 Forward signal center #1
57 Forward signal center #2
58 Forward signal center #3

X & Y designate legs of system.

CIRCUIT IDENTIFIER

First position: Type of circuit.
1 Sole-user voice

Second and third positions: Headquarters, unit or installation at which circuit terminates - higher and subordinate respectively.

1 Division main
2 Division alternate
3 Division support command
4 Division artillery
5 Division aviation battalion
6 Forward signal center #1
7 Forword signal center #2
8 Forward signal center #3
A First Brigade
B Second Brigade
C Third Brigade

Fourth position: Designates the user of a sole-user circuit or the sequence number of a common user circuit.

F. FSCE/FSCC/FDC
G. G3/2-S3/2

Fifth position:
T in this position indicates circuit has speech plus superimposed teletype.

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