

SIGNALS IN BATTLE

VOLUME 2

SIGNALS IN THE BRIGADE AND BRIGADE GROUP

(BILINGUAL)

(Supersedes B-GL-321-002/FT-001 Interim 2 dated Mar 87)

Issued on Authority of the Chief of the Defence Staff

LIST OF EFFECTIVE PAGES

Insert latest changed pages; dispose of superseded pages in accordance with applicable orders.

NOTE

The portion of the text affected by the latest change is indicated by a black vertical line in the margin of the page. Changes to illustrations are indicated by miniature pointing hands or black vertical lines.

Dates of issue for original and changed pages are:

Original	0	1987-11-26	Ch	6
Ch	1		Ch	7
Ch	2		Ch	8
Ch	3		Ch	9
Ch	4		Ch	10
Ch	5		Ch	11
			Ch	12

Zero in Change No. Column indicates an original page. The use of the letter E or F indicates the change is in English or French only, Total number of pages in this publication is 165 consisting of the following:

Page No.	Change No.	Page No.	Change No.
Title	0	D-1, D-2	0
A	0	E-1, E-2	0
1/11	0	F-1, F-2	0
iii to v/vi	0	G-1, G-2	0
vii to xiii/xiv	0	H-1, H-2	0
1-1 to 1-20	0	J-1, J-2	0
2-1 to 2-17/2-18	0	K-1, K-2	0
3-1 to 3-28	0	M-1, M-2	0
4-1 to 4-11/4-12	0	N-1, N-2	0
5-1 to 5-26	0	P-1, P-2	0
6-1 to 6-8	0	Q-1, Q-2	0
LA-E-11, LA-E-2	0	R-1, R-2	0
LA-F-1, LA-F-2	0	S-1, S-2	0
A-1, A-2	0	T-1, T-2	0
B-1, B-2	0	U-1, U-2	0
C-1, C-2	0	V-1, V-2	0

Contact Officer: SO Doc Prod

FOREWORD

APPLICATION

1. B-GL-321-002/FT-001, Signals in Battle, Volume 2, Signals in the Brigade and Brigade-Group, is issued on the authority of the Chief of the Defence Staff. It is effective on receipt and supersedes B-GL-321-002/FT-001, Interim 2 which shall be destroyed.
2. Suggestions for amendments should be forwarded through normal command channels to the Secretary of the Army Doctrine Tactics Board, c/o HQ Mobile Command.

PREFACE

AIM

1. The aim of B-GL-321-002/FT-001, is to state the doctrine for the employment of Signals at the brigade and brigade group level.

SCOPE

2. The manual details the signal support provided within the brigade and brigade group down to combat team level, or equivalent groupings, and describes the integration of all communication systems between all arms formations or units. Additionally, the administrative support provided by the headquarters and signal squadron for the formation headquarters and its elements is outlined.

3. Signal doctrine, appropriate to the brigade and brigade group, covering all types of operations, primarily in high intensity operations, as part of a corps, is explained. This manual complements the general signal doctrine found in B-GL-321-001/FT-001, Signals in Battle, Volume 1, Principles and Employment.

4. Where subjects are covered in full detail in other manuals, cross-references are made to avoid duplication.

REFERENCES

5. The following major references should be read in conjunction with this manual:

ATP 35(A)	- Land Force Tactical Doctrine;
B-GL-300-000/FP-000	- The Army;
B-GL-301-001/FP-001	- Land Formations in Battle; and
B-GL-311-001/FP-001	- Administration in Battle.

6. Related references referred to within B-GL-321-002/FT-001 include:

B-GL-303-001/AF-001	- Corps '86 Establishments;
B-GL-303-002/FP-001	- Operational Staff Procedures;
B-GL-304-001/FT-001	- Training for War;
B-GL-304-002/FP-001	- Unit Administration;
B-GL-312-001/FP-001	- The Brigade Group Services Battalion in Battle;
B-GL-312-002/FP-001	- The Division Service Group in Battle;
B-GL-314-002/FP-001	- Maintenance in Battle;
ACP 122	- Security of Communications; and
DNDP 35	- Frequency Management.

7. Associated manuals in this series include:

- | | |
|---------------------|--|
| B-GL-321-001/FT-001 | - Signals in Battle, Volume 1, Principles and Employment; |
| B-GL-321-003/FT-001 | - Signals in Battle, Volume 3, Signals in the Corps and in the Division; |
| B-GL-321-004/FT-001 | - Signals in Battle, Volume 4, Tactical Electronic Warfare; and |
| B-GL-321-006/PT-001 | - Signals in Battle, Volume 6, Signal Field Handbook. |

TERMINOLOGY

8. The terminology used in this manual is consistent with that of B-GL-303-002/FP-Z03 Supplement 3, Army Glossary and AAP-6, NATO Glossary of Terms and Definitions. Technical terms derive from ACP 167, from the Canadian Forces Electronic and Telecommunication Vocabulary 1984 and those terms authorized by the Working Group on Signal Terminology.

CONTENTS

CHAPTER 1 - COMMAND AND CONTROL OF ALL ARMS FORMATIONS

Section 1 - Tactical Employment of Brigades/Brigade Groups

General Considerations
Characteristics
Tasks

Section 2 - Organization of Brigades/Brigade Groups

Organization
Single Arm/Service Brigades

Section 3 - Requirements

General
Commander
Staff
Formation Signal Officer
Unit Commanding Officers

Section 4 - Organization of the Headquarters

General
Components of the Headquarters

Section 5 - Headquarters Deployment Procedures

Deployment
Reconnaissance and Selection of Sites
Movement
Defence of Sites
Security Tasks

CHAPTER 2 - HEADQUARTERS AND SIGNAL SQUADRON ORGANIZATION

Section 1 - Roles and Tasks

Role of the Brigade Headquarters and Signal Squadron
Role of the Brigade Group Headquarters and Signal Squadron
Tasks of the Headquarters and Signal Squadron

Section 2 - Organization

General
Composition of HQ and Signal Squadrons
Typical HQ and Sig Sqn

Section 3 - Command and Control of Signals Within the Formation

Responsibilities
Exercise of Command
Signal Planning
Signal Command Post
Headquarters and Signal Squadron Internal Communications
Signal Training Standards and Self Discipline

CHAPTER 3 - SIGNAL SYSTEMS IN BRIGADES AND BRIGADE GROUPS

Section 1 - Introduction

General
The Means

Section 2 - Combat Net Radio

Background
Very High Frequency (VHF) Radio
High Frequency (HF) Radio
Ultra High Frequency (UHF) Radio
Combat Net Radio Communications at Brigade/Brigade Group Headquarters

Combat Net Radio Communications in the Brigade/Brigade Group

Section 3 - Trunk

General
Trunk Access at Brigade/Brigade Group Headquarters
Trunk Access at the Service Battalion Headquarters
Trunk Access at Units

Section 4 - Line

- General
- Network Planning
- Internal Headquarters Line
- Laying and Recovering of Line
- Maintenance of Line
- Civil Interface

Section 5 - Signal Despatch Services (SDS)

- General
- Responsibilities
- Planning
- Liaison Officers and Visitors

Section 6 - Electronic Warfare

- General
- Responsibilities
- Capabilities

Section 7 - Automated Combat Information System (ACIS)

- Capability
- Operations Function
- Intelligence Function
- Fire Support Function
- Air Defence and Airspace Management Function
- Administration Function

Section 8 - Technical Control of Systems

- Control of the Headquarters and Signal Squadron Systems
- Control of Brigade/Brigade Group Systems

- Control of Higher Formation Systems

CHAPTER 4 - SIGNAL SECURITY

Section 1 - General

- Scope
- Requirements
- The Threat
- Responsibilities
- SIGSEC Material

Section 2 - Communication Security Monitoring

Functions
Compromise Procedures

Section 3 - Field Mobile Distributing Authority

Responsibilities
Supply
Maintenance
Emergency Destruction

CHAPTER 5 - ADMINISTRATION

Section 1 - General Responsibilities

Introduction
Administration of the Headquarters
Administration of the Unit
Functions of Administration
Related Publications

Section 2 - Control of Administration

Planning and Co-ordination
Administration Command Post (Adm CP)

Section 3 - Transportation

Vehicle Fleet
Control of Transport
Control of Movement
Safety
Landing Zone Operation and Defence

Refuelling

Section 4 - Supply

Responsibility
Unit Holdings
The Replenishment System
Ammunition
Rations
Water
Laundry, Decontamination and Bath Services

Defensive Stores
Repair Parts
Signal Controlled Stores

Section 5 - Maintenance

The Army Maintenance System
Permissible Repair Schedule (PRS)
Establishing Maintenance Priorities
Unit Maintenance
Equipment Maintenance
Telecommunications Maintenance

Mobile Repair Teams
Field Lighting/Power Generators
Backloading
Recovery/Salvaging
Unsatisfactory Condition Reports and Technical Failure Reports
Reporting Systems

Section 6 - Personnel and Personnel Services

Personnel Administration
Personnel Records
Replacements
Personnel Services

CHAPTER 6 - UNIT SIGNALS

Section 1 - Responsibilities and Employment of Signals

Responsibilities of Unit Commanding Officers
The Unit Signal Officer/Non-Commissioned Officer
Differences in Responsibilities
The Employment of the Signal Troop/Platoon/Section

Section 2 - Signals for all Arms Teams

Battle Group
Combat Team

Section 3 - Signals in Units

Armour
Artillery
Engineer

Infantry
Aviation
Service Battalion
Field Ambulance
Military Police

LIST OF ABBREVIATIONS

ANNEX A - THE CORPS MECHANIZED BRIGADE GROUP

ANNEX B - BRIGADE HEADQUARTERS STAFF (1) MAIN HEADQUARTERS

ANNEX C - TYPICAL LAYOUT OF A MAIN HEADQUARTERS

ANNEX D - TYPICAL LAYOUT OF AN ALTERNATE HEADQUARTERS

ANNEX E - TYPICAL LAYOUT OF THE "A2" ECHELON

ANNEX F - TYPICAL LAYOUT OF A RADIO PARK

ANNEX G - THE BRIGADE HEADQUARTERS AND SIGNAL SQUADRON

ANNEX H - MAIN HEADQUARTERS COMPOSITE SIGNAL TROOP

ANNEX J - ALTERNATE HEADQUARTERS COMPOSITE SIGNAL TROOP

ANNEX K - OPERATIONS NETS FOR THE BRIGADE (2)

ANNEX M - ADMINISTRATIVE NETS FOR THE BRIGADE (2)

ANNEX N - A TYPICAL ARMOURED REGIMENT RADIO NET

ANNEX P - A TYPICAL ARTILLERY REGIMENT RADIO NET

ANNEX Q - A TYPICAL ENGINEER REGIMENT RADIO NET

ANNEX R - A TYPICAL INFANTRY BATTALION RADIO NET

ANNEX S - A TYPICAL HELICOPTER SQUADRON RADIO NET

ANNEX T - A TYPICAL SERVICE BATTALION RADIO NET

ANNEX U - A TYPICAL FIELD AMBULANCE RADIO NET

ANNEX V - A TYPICAL MILITARY POLICE PLATOON RADIO NET

CHAPTER 1

COMMAND AND CONTROL OF ALL ARMS FORMATIONS

SECTION 1

TACTICAL EMPLOYMENT OF BRIGADES/BRIGADE GROUPS

GENERAL CONSIDERATIONS

1. No battle can be fought successfully without reliable and adequate communications. Increasingly, the degree of command and control which must be exercised on the battlefield generates the requirement for faster, more flexible and higher capacity communication systems. Signals play a large part in every aspect of command and control. The doctrine calls for a fully integrated command, control and information system because all three functions are so closely interrelated as to be inseparable.
2. The number of users and the ranges over which communications must be provided are increased in nuclear war because of greater dispersion, higher frequency of moves, the need to act on one's own, and the ability to strike or react to the action of the enemy. Similarly, at the lower end of the scale of warfare, the direction of a large number of lightly equipped forces, and the requirement for enhanced control of all forms of support, dictate a comprehensive and extended communication system.
3. Overlying the need to achieve greater mobility, capacity, and range of signals is the increasing vulnerability of all communication systems to bombardment, ambush, sabotage, electromagnetic pulse (EMP), and a host of electronic countermeasures. Moreover, the use of radio as a primary means of communication, must often be accomplished in spite of the growing congestion of the radio frequency spectrum.
4. Anticipation of the battlefield requirements and individual human proficiency are the keys to providing successful communications:
 - a. The pace of operations demands that signal plans be made well in advance. The plans must conform not only to the present course of operations but also to probable future operations. Plans must provide for a wide variety of contingencies yet must be realistic, flexible, and as thorough as time and circumstances will permit.
 - b. Planning cannot cater for all eventualities. The ability to react to the unforeseen depends largely on the individual's knowledge of the situation. Each signal officer and non-commissioned officer (NCO) must understand the commander's plan and the manner in which operations will likely develop. Similarly, every signalman

must have a knowledge of the general situation and be aware of the intentions of his superiors.

- c. The disruption and compromise of command by interrupting or intercepting communications will always be an aim of the enemy. The signalman must possess a high level of skill, awareness, and initiative if these actions are to be overcome.

5. The area of responsibility of a brigade or a brigade group varies, but may be as large as 20 by 30 km. Signals must be able to provide efficient communications throughout this area, in the face of many hazards. Enemy forces will use every means available to destroy, damage and disrupt signal systems; enemy radio electronic combat support (RECS), artillery, nuclear, biological and chemical warfare (NBCW) capabilities will be utilized; natural and man-made obstacles will be present; friendly forces may inadvertently damage or disrupt communication lines, routes and systems; terrain, climate, weather and population will undoubtedly create conditions which will call for knowledgeable and enlightened actions in order to ensure survival and success of operations. Signals must be totally dedicated and well trained in the accomplishment of its tasks on the battlefield.

CHARACTERISTICS

6. Brigades and brigade groups are the basic army formations. To fulfil its role, the headquarters (HQ) of the formation must maintain the closest possible contact with its units. This requires a degree of mobility equivalent to that of the combat units it directs, and the capability of carrying out its functions in proximity to the enemy. Above all else, the requirement for mobility determines the nature of communications that must be provided.

7. The brigade/brigade group does not usually deploy a rear HQ as is done at higher levels of command. G1, G4 and G5 functions normally performed at a rear HQ are carried out at the main HQ.

8. The general characteristics of brigades and brigade groups are:

- a. **The Brigade.** This formation is not designed to operate independently on the battlefield. It is employed as part of a division from which it receives artillery, engineer, electronic warfare, aviation and combat service support as required for operations.
- b. **The Brigade Group.** This formation contains a mixture of combat arms, combat support arms and CSS elements. It is capable of independent operations on a limited scale.

TASKS

9. The roles and possible tasks of brigades/brigade groups are found in, B-GL-300-000/FP-000, The Army, article 504.

SECTION 2

ORGANIZATION OF BRIGADES/BRIGADE GROUPS

ORGANIZATION

10. The types of brigade level formations which the army may field are:
 - a. corps mechanized brigade group, see Annex B;
 - b. armoured cavalry brigade group;
 - c. independent mechanized infantry brigade group;
 - d. airborne brigade group;
 - e. armoured brigade; and
 - f. mechanized infantry brigade.

SINGLE ARM/SERVICE BRIGADES

11. A number of single arm or service brigades/ brigade groups exists at corps and division level. Some examples are the artillery brigade, the engineer brigade, the aviation group, the divisional support group (DISGP), etc. Their organizations are described in B-GL-303-001/AF-001, Corps '86 Establishments. Their HQ and signal units (squadrons or troops) are employed in much the same way as those in all arms brigade HQ and signal squadrons except that no defence and security (D&S) sub-units are provided in single arm/service formations where self-protection tasks are shared by all members of the HQ. Therefore, the employment doctrine described herein is largely applicable to all HQ and signal squadrons.

SECTION 3

REQUIREMENTS

GENERAL

12. On the battlefield, fighting will occur over widely dispersed areas. Greater distances result in increased requirements for mobility and for command and control of activities over larger areas of responsibility. It is increasingly difficult for the commander of a formation to be present and to have a personal influence over the battle at every site or location of engagement. The command and control system must therefore be capable of providing accurate and detailed information so that timely decisions may be made, orders and instructions passed to all concerned, and control and co-ordination of operations and plans carried out.

COMMANDER

13. The formation commander remains responsible for the success or failure of his command at all times and in all circumstances. The formation is capable of fighting in a number of roles and tasks. The commander requires an efficient and reliable command and control system to permit proper direction of all integral and supporting forces and positive control over their activities.

14. The commander must plan and think two levels down and one level above his own command. He plans what is to be done, by whom, and how and when it will occur. He must be able to direct, control, sustain and motivate forces under his command.

15. Continuity of command must be maintained. The commander must establish clear orders for the succession of command in case he becomes a casualty. Normally, at brigade level, the commanding officer (CO) of a major unit is designated as alternate commander. This alternate commander would exercise command from either the formation main or alternate HQ.

16. The location of the commander is important. The commander must decide on a location where he can best feel the battle, judge the situation and make sound and timely decisions. He must strive to be at the right place, at the right time, with the right answers.

STAFF

17. The staff serves the commander and the units of the formation. Staff officers do not interfere with the personal relationship between a superior and a subordinate commander. The army staff organization is based on the continental staff system:

- a. **Staff.** The staff assists the commander in planning, coordinating and supervising the execution of operations and arranging for combat and CSS for the formation.

- b. **Advisers.** Although not staff officers, COs of the combat, combat support and CSS elements have the additional responsibility of advising the commander and the staff on the capabilities and employment of their respective units. Thus, the COs of the armoured, artillery, engineer, signal, aviation, medical and military police (MP) elements have the dual task of commanding their troops and advising the commander and staff. Details on advisers are contained in B-GL-301-001/FP-001, Land Formations in Battle, article 305.

18. The staff collects and analyses information on which the commander bases decisions and plans. It completes the details of these plans, transmits them to subordinates and monitors the conduct of operations. It has no authority independent of the commander. At this level of command, the G3 co-ordinates all staff activities in the HQ for the commander.

19. At the brigade level signal personnel become involved with HQ functions and HQ survival. It is important that the responsibilities of the staff be known by signal personnel and that co-operation with the staff remains very close at all times. The responsibility of the staff toward signals, and of signals toward the staff, are explained in B-GL-321-001/FT-001, Signals in Battle, Principles and Employment, article 103.

20. The organization of the formation HQ staff is illustrated in Annex B. For further information on the staff, and other appointments and their duties, see B-GL-300-000/FP-000, The Army, and B-GL-303-002/FP-001, Operational Staff Procedures.

FORMATION SIGNAL OFFICER

21. The formation signal officer is also the CO of the HQ and signal squadron. As an arms adviser, he is responsible for advice to the commander and staff on all signal matters. As brigade signal officer (BSO), he is responsible to plan and co-ordinate signals in the formation with higher, flanking, supported and supporting formations and units; to control signal stores; and to assign maintenance priorities for signal equipment in the formation.

22. In all circumstances, the CO HQ and signal squadron retains responsibility for the command of the unit and its components including isolated elements. He remains responsible for the execution of the signal plan in support of the formation commander's plan, and for the administration of his unit and attached elements. He must carefully balance orders he issues as CO and instructions he issues as BSO to the brigade units.

23. Additional details on signal responsibilities may be found in B-GL-321-001/FT-001, Signals in Battle, Principles and Employment Chapter 6, and Chapter 2 of this manual.

UNIT COMMANDING OFFICERS

24. Unit COs are responsible for planning and executing tasks as ordered by the formation commander. A unit CO is entitled to request staff assistance from the formation HQ staff which cannot refuse such a request or proposal without the commander's direction in each specific circumstance. The CO of the HQ and signal squadron is equally entitled to receive the support of the staff. As BSO, he must also be ready to assist and advise other brigade unit COs.

SECTION 4

ORGANIZATION OF THE HEADQUARTERS

GENERAL

25. To exercise command and control, the commander and his staff require the facilities of an HQ consisting of support staff, vehicles, equipment, communications and administrative support. This HQ is normally separated into functional components which are positioned where they are best able to perform their missions.

COMPONENTS OF THE HEADQUARTERS

26. When deployed for operations, the formation HQ is normally organized into a main HQ and an alternate (altn) HQ. The alternate HQ is redesignated main HQ when it assumes command.

27. **Main HQ.** At brigade level, most of the staff is at main HQ. The commander remains at main HQ when he is not with his tactical command post (tac CP) or visiting. Members of his personal staff remain at main HQ when they are not travelling with him.

28. **Altn HQ.** The role of an altn HQ is to ensure the continuity of command and control when main HQ is not in operation whether as a result of enemy action or a move. An altn HQ is a permanent separate facility. It must be established with sufficient staff, communications and administrative support to enable it, in the event of the destruction of main HQ, to exercise control over the formation until it can be brought to full capability by reinforcement. The altn HQ should be capable of operating for up to 24 hours with its organic personnel and equipment. To avoid simultaneous destruction or neutralization, altn HQ is never collocated with main HQ. In peacetime, an altn HQ may not be manned. Step-up procedures will therefore be used in such cases.

29. **Tac CP.** A tac CP, consisting of selected personal and general staff, designated advisers, and a protective party, with a minimum of equipment may be deployed away from main HQ. From this facility, the commander may exercise closer personal control over a critical part of the battle for a limited time. The composition and size of the tac CP is dependent on the commander's method of operation.

30. Each HQ component may be further divided into functional groups, the composition of which may vary in detail from formation to formation. The following groups will usually be found:

- a. **Command Group.** Consists of the commander, accompanied by selected staff, advisers and a security element. It is located with either the operations centre or with the tac CP when deployed.

- b. **Operations Centre.** The hub of the HQ, it provides facilities for the effective control and co-ordination of operations. At main HQ, in addition to the G3 staff, the operations centre includes the intelligence cell, the fire support coordination centre, the airspace control cell, and the G1/G4 cell.
 - c. **Operations Support Elements.** These are elements of fire support, air defence and air space control. Liaison detachments from engineer, aviation and EW forces in support may also be present at main HQ. Some or all of these can be included within the operations centre.
 - d. **Signal Elements.** This group includes a command element, technical control facilities, communication facilities of all types, an administrative group providing logistic and personnel administration, and a D&S platoon providing local defence of the HQ.
31. Two other functional groups may be employed:
- a. **Radio Park.** When tactically advisable, radio transmission facilities are regrouped in a radio park on the periphery of the HQ, up to one or two km away.
 - b. **HQ Echelon.** Depending on the tactical situation, administrative facilities and the rest area are grouped near the HQ, or even split into an A1 echelon collocated with the HQ, and an A2 echelon located five to 10 km in the rear with the administrative units.
32. The composition of functional groups of formation HQ are discussed in The Army, article 818; in Operational Staff Procedures, article 205; and in Signals in Battle, Principles and Employment, article 506.

SECTION 5

HEADQUARTERS DEPLOYMENT PROCEDURES

DEPLOYMENT

33. When deployed for operations, the formation HQ is organized into a main HQ and an altn HQ. These locate where they can best fulfil their tasks: main HQ forward near the subordinate units; altn HQ in a location from which it can take over control from main HQ. They must be far enough apart to ensure survival in case of attack, yet close enough to provide good intercommunication.

34. High intensity operations require an increased emphasis on tactical mobility at all levels of command. Operations under the threat of NBCW require rapid movement of HQ without loss of control. The risk of being located by modern radio direction finding (DF) and target acquisition (TA) equipment forces frequent moves of HQ which have a high concentration of electronic emitters.

35. The layout of the HQ should follow a basic pattern so that personnel can find their way about a short time after each move. The layout will be decided by the staff. This decision will be based on advice from signals and other arms representatives. Typical layouts for a deployed brigade HQ are shown in the following Annexes:

- a. Main HQ - Annex C;
- b. Altn HQ - Annex D;
- c. A Echelon - Annex E; and
- d. Radio Park - Annex F.

36. The components of an HQ, its requirements and characteristics are covered in Chapter 2 of B-GL-303-002/FP-001, Operational Staff Procedures, and in Chapter 5 of B-GL-321-001/FT-001, Signals in Battle, Principles and Employment.

37. A brigade HQ changes location in order to keep its subordinate units within controlling range or to avoid detection and attack. It must always be ready to move on short notice by day or night.

38. It is essential to ensure continuity of communications during moves of the HQ. Early co-ordination of movement plans with higher and flanking formations, integral and supporting units is mandatory. Plans should include:

- a. time that altn HQ will assume control;

- b. new location of main HQ;
- c. time at which main HQ is to be ready for operations in the new location;
- d. agreement on selected sites for radio rebroadcast (RRB) and repeaters needed to maintain or extend communications;
- e. line routing;
- f. amendments to the signal despatch service (SIDS) schedule; and
- g. timings for the move and route(s) to be followed.

39. Altn HQ remains silent whenever main HQ has control of operations. Similarly, main HQ remains on listening watch in the new location to disguise the move and protect its new location for as long as possible.

40. It is not possible for a formation HQ to operate on the move (except for the tac CP). It is therefore essential that either main, or altn HQ, remain in position to maintain control of operations. Moves must be well practised so that no time is lost during a move which would prejudice continuity of the functions of the HQ.

It is clear also, should an HQ component be under attack while its counterpart is on the move, or otherwise unable to assume control at the time, that the HQ under attack must continue to operate.

41. Details on grouping for moves, tasking and methods of movement are described in Chapter 5 of Signals in Battle, Principles and Employment.

42. The drill for the movement of all the elements of the HQ must be detailed in unit standing operating procedures (SOPs) and be well practised.

RECONNAISSANCE AND SELECTION OF SITES

43. The usual practice is for the formation HQ to select a number of alternative sites from the map. These areas will then be checked by a preliminary ground or aerial reconnaissance (recce). A site will not usually be selected for occupation until a detailed ground recce has been carried out.

44. When it is planned to move the HQ, the G3 will authorize the despatch of the recce party, to start detailed layout of a selected site chosen from the several acceptable sites already reconnoitred. Normally the HQ will have a preferred layout for the location of each part of the HQ. This layout will be adjusted to the terrain by the officer in charge (OIC) of the recce party who will decide the configuration best suited to the location selected, and will have the area sign-posted accordingly. This will ensure a smooth and rapid settling-in of the HQ.

45. The tasks of the recce party are: to select a site, conduct a sweep of the area, mark out the site, then call up the advance party. The advance party must establish communications, lay out defences, prepare a helicopter landing zone (LZ), and sign traffic circuits.

46. Major communication tasks which must be completed during reconnoitering and establishing of the site are:

- a. to confirm that the proposed sites are suitable for radio and radio relay (RR) communications;
- b. lay out the signal areas;
- c. supervise the laying of lines within and outside the HQ;
- d. co-ordinate the establishment of the signal centre; and
- e. as far as possible, to confirm routes for despatch riders (DRs) and trunk cables.

47. Operating under the concept of a permanently deployed altn HQ renders the need for step-up facilities obsolete. A recce party will be required for each of main and altn HQ, to look for, and confirm possible sites for each of the HQ elements. The composition of the two recce parties must permit flexible deployment, communications testing, and reporting. The OIC recce party must have the means to remain current with the battle situation. A typical recce party may consist of:

- a. OIC recce party.
- b. Staff officer (if assigned by G3).
- c. Radio detachment.
- d. MP detachment for traffic control and signing.
- e. D&S detachment for protection and defence planning.
- f. DRs.
- g. Line detachment if available.

48. The recce party must observe and report on activities and obstacles encountered on the way and at selected sites. Existing traffic control points and organizations along the route are identified and additional traffic control requirements are determined and reported promptly to assist in the planning for the move of the HQ component.

MOVEMENT

49. The HQ must be on the move for the minimum time possible. This requirement calls for careful planning in advance and judgement in selecting a time to move. Sufficient warning must be given to allow time for:

- a. recce of the new area;
- b. signal communications to be prepared;
- c. the route to be marked (if essential);
- d. the new area to be sign-posted; and
- e. packing up.

50. Once plans to move have been established, the preferred site chosen, and the altn HQ ready to assume control, the HQ will despatch an advance party to the new site as follows:

- a. **Signal Detachments.** RR, radio and line to establish basic signal facilities as quickly as possible.
- b. **D&S Detachments.** For local protection and securing entrances and exits.
- c. **Adm Elements.** To begin establishing the housekeeping facilities.

51. The layout of the HQ focuses around the command post (CP) where the vehicles in which the operations staff officers work are located. Immediately adjacent to these are the intelligence staff vehicles, the vehicles of the close support regiment CO and his party, and the operations staff clerks' vehicle. Close by are the adm staff's and supporting arms representative's vehicles. An area must be reserved for the commander close to the CP. These elements make up the operations centre.

52. The following points which apply equally for main and altn HQ must be considered when laying out the HQ:

- a. the signal centre should be close to the entrance;
- b. visitors and DR vehicle parks should be close to the entrance but away from the operations centre;
- c. protective troops are located to guard and help defend the HQ;
- d. camouflage, dispersion and track discipline must be observed;
- e. rest areas are located away from the operations centre and vehicular movement is kept at a minimum within the site; and

f. a signals area must be designated where maintenance can be carried out.

53. Examples of layouts provided in Annexes C to F are useful tools with which to develop detailed SOPs, and for training purposes. Depending on the tactical situation, any variation from practice/SOPs can quickly and simply be ordered at a great saving of time.

54. Activities related to the preparation and occupation of HQ sites include the:

- a. issue of orders for the move;
- b. passage of control to the other HQ component (main or altn);
- c. marshalling of troops into formed bodies in a designated zone;
- d. control of movement by schedule and by packets as ordered;
- e. protection of troops and material during moves;
- f. reporting of incidents and fighting actions as appropriate;
- g. occupation of hides and harbours along the route if necessary;
- h. actions on encountering NBCW contamination;
- j. timely and orderly arrival of packets at the new location;
- k. preparation to re-assume control as appropriate;
- m. preparation of field defences for the HQ; and
- n. occupation of designated battle positions when ordered.

55. Once command has been passed and the Ops group is ready to move, the main body will start to move in accordance with the movement serials established in SOPs. Packets may harbour, wait to be called forward or proceed directly to the new site. Care must be taken to ensure that vehicles do not arrive at a rate faster than guides can direct them into position. Vehicles must not be permitted to halt along the tracks within the old HQ or along the approach route awaiting entry to the new site. Vehicles are always positioned in such a way that they can move out of position easily and silently on short notice. When there is a threat from air attack, attempts should be made to move during darkness to lessen the risk of detection by enemy aircraft. Lights must not be displayed at night and noise must be kept to a minimum at all times.

56. A small rear party, usually consisting of a DR and a line detachment, will normally remain behind in the old location for a specified period of time. The function of this group is to relay any traffic received, to recover cable and to assist in redirecting late visitors as necessary.

DEFENCE OF SITES

57. The local defence of all elements of the formation HQ and signal squadron, at all sites, is the responsibility of the CO. Protection while on the move and at harbours and hides is also his responsibility. This is explained in B-GL-321-001/FT-001, Signals in Battle, Principles and Employment, Chapter 6.

58. While all personnel at the HQ component concerned must participate in the defence of respective sites, the majority of personnel will be preoccupied primarily with the operation of the HQ, with its communication systems, or in its administration. The D&S platoon is the only body of troops continuously available for local defence duties. It is essential, therefore, that procedures are adopted which ensure an effective defence of the sites using a minimum of resources. When there is a continuing threat of infiltration, additional resources may be requested and employed in the defence of the HQ.

59. SOPs must clearly detail the methods and responsibilities for the local defence of each element of the HQ, either in defended localities or on the move. Allocated air defence (AD), anti-tank (AT), engineer resources, etc, must be integrated into defence plans. Elements to be protected are:

- a. the commander, and his tac CP when deployed;
- b. Main HQ;
- c. Altn HQ;
- d. radio park;
- e. "A" echelon;
- f. deployed RRBs and repeaters; and
- g. other mobile detachments such as rovers, special despatch riders (SDRs), line and mobile repair teams (MRTs).

60. Protection of sites may be gained by the following:

- a. **Concealment.** The proper use of ground, buildings and camouflage, and the rigid enforcement of movement discipline by men, vehicles, and aircraft can do much to conceal the location and identity of a site.
- b. **Dispersion.** Dispersion can reduce the effect of enemy area weapons but greatly increase the vulnerability to infiltration. A balance must be struck between dispersion, which overstrains communications and local defence resources and reduces efficiency of operations, and too little dispersion which increases the risk of destruction from air attack or bombardment,

- c. **Security.** Communication discipline must be of a high standard to prevent compromise and to deny or lessen the effects of enemy RECS.
- d. **Mobility.** Vulnerability may be decreased by moving frequently. However, large numbers of moving vehicles can present easy targets for enemy aircraft; smaller packets are vulnerable to ambush and sabotage. Also, moving too often reduces efficiency of operations and exhausts personnel.

61. The defence of brigade HQ is normally included in the overall plan for the defence of the formation area. Dependent on the nature of the threat the following measures may be directed:

- a. siting the HQ within a unit locality or immediately adjacent to it;
- b. allocation of infantry, armour, AD, and AT weapons from brigade or higher formation resources; and
- c. use of host country military, paramilitary, or police forces.

62. The aim of local defence plans is:

- a. to provide early warning of intruders;
- b. deny penetration;
- c. minimize the effects of bombardment, by air and NBCW weapons; and
- d. avoid the physical destruction of HQ facilities in case of ground attack.

63. The defence plan should provide for:

- a. a defensive perimeter with key positions continuously manned;
- b. assignment of areas of responsibility along the perimeter to the major functional groups of the HQ;
- c. if required, a second line of defence surrounding the operations, communications, and supporting arms areas;
- d. delegation of responsibility for the preparation of positions;
- e. detail on the extent of defensive works to be undertaken and the priority of these works in relation to primary tasks;
- f. a system of warning and alerting for intrusion, air and NBCW attacks;
- g. establishment of check points, listening posts and observation posts;

- h. a scale of manning during day and night;
 - j. orders and procedures for engaging hostile aircraft; and
 - k. civil control measures including the removal of civilians from adjacent areas if necessary.
64. Depending on the threat, the following may be considered when planning defence for a move:
- a. avoiding routes or points at which ambush is likely;
 - b. reconnoitering routes by road or air to detect likely enemy ambushes or obstacles;
 - c. regulating the size, composition and interval of groups of vehicles in accordance with the threat;
 - d. seeking support or augmentation as follows -
 - (1) fire support from artillery or AD,
 - (2) addition of escorts and pickets, including troops mounted in armoured fighting vehicles, and
 - (3) reserve or relief forces on call; and
 - e. SOPs and orders for a move should include -
 - (1) counter-ambush drills or action on reaching an obstacle;
 - (2) location and responsibilities of security elements,
 - (3) action in event of air attack,
 - (4) coordinating measures when escorts are employed,
 - (5) convoy control, warning, and relief procedures; and
 - (6) size and composition of protective elements for recce and rear parties.

SECURITY TASKS

65. Security tasks will be assigned according to the tactical situation. Normal security tasks must be met with the material and human resources available. These tasks include:

- a. posting guards at entrances and exits to a position;

- b. manning check points, listening and observation posts;
 - c. providing rudimentary detection and warning devices such as trip flares and contact illuminating devices;
 - d. digging weapons pits, clearing fields of fire, and constructing rudimentary obstacles; and
 - e. manning defensive positions in the event of alerts or attacks.
66. Other security tasks also must be considered and planned for:
- a. establishing and protecting an LZ suitably close to the HQ but outside the perimeter of defence;
 - b. escorting and protecting key unit installations and detachments deployed in isolation on the battlefield;
 - c. ensuring the protection of unit re-supply details to and from a commodity point in support; and
 - d. assisting in the protection of VIPs and dignitaries as required and ordered by the commander.

67. The security tasks listed above give an indication of the scope of defence and security activities which must be planned and executed by the CO HQ and signal squadron. Other tasks during operations such as protection of casualties and refugees may be required for limited periods of time. These tasks are listed to press home the point that detailed SOPs and much training is required to meet the requirements. However, the HQ and signal squadron does not operate on its own on the battlefield. Requests for assistance must be made without hesitation and as soon as needs are confirmed. Early planning is essential.

68. The protection of all elements of the formation HQ and signal squadron cannot be accomplished without the full integration of all attached elements into the defensive plan. Positive command and control of all activities must be exercised by the CO over all integral and assigned resources.

CHAPTER 2

HEADQUARTERS AND SIGNAL SQUADRON ORGANIZATION

SECTION 1

ROLES AND TASKS

ROLE OF THE BRIGADE HEADQUARTERS AND SIGNAL SQUADRON

1. The role of this unit is to provide communications, ACIS and administrative support and protection for the formation HQ:

- a. **Communications.** Both operational and administrative links are provided:
 - (1) from formation HQ to HQ of integral units and independent sub-units of the brigade, and to supporting unit and sub-unit HQ;
 - (2) from brigade HQ to the higher formation HQ within the area of operations (although the HQ and signal squadron terminates these links, they are the responsibility of the signal officer of the higher formation);
 - (3) from main HQ to all components of the HQ and to the formation HQ on the right; and
 - (4) from brigade HQ to integral and supporting unit echelons and to the service battalion.
- b. **ACIS.** This includes all the tactical ADP facilities required by the staff to operate the ACIS.
- c. **Administrative Support.** This includes provision of staff and clerical sub-staff, vehicles, equipment, and the immediate administration of the HQ.
- d. **Protection.** This includes the protection of all brigade HQ and signal elements.

ROLE OF THE BRIGADE GROUP HEADQUARTERS AND SIGNAL SQUADRON

2. The role of this unit is the same as that of the brigade HQ and signal squadron: to provide the communications, the ACIS, administrative support, and protection for the formation HQ.

3. The additional elements assigned to the brigade group to enable it to operate independently, require additional communications and administrative support resources to be

added to the HQ and signal squadron, commensurate with the brigade group mission. This means that more communications resources are integral to the brigade group than to the brigade.

4. Units of the formation, including the service battalion, whether integral or in support, have sufficient signal resources to join the formation communication systems and to provide rear links to higher formations as required.

TASKS OF THE HEADQUARTERS AND SIGNAL SQUADRON

5. The communication tasks of the HQ and signal squadron are to:

- a. plan, co-ordinate and control the use of all communication resources provided by signal units and sub-units organic to or allotted in support of the formation;
- b. provide all formation level communication facilities for the formation HQ links to the higher formation HQ and to the HQ of the formation on the right;
- c. provide radio communications down to the HQ and A echelons of armoured, artillery, engineer, infantry and aviation units, service battalion, and the field ambulance;
- d. provide terminals and interconnections for the automated combat information system (ACIS) for the staff;
- e. provide trunk system communications as follows-
 - (1) through the access nodes at main and altn HQ, by RR or line, to the trunk nodes within the area of responsibility,
 - (2) by line to the HQ of integral and supporting units,
 - (3) by single channel radio access (SCRA) to designated subscribers, and
 - (4) by radio-wire integration (RWI) for selected users;
- f. provide a SDS including facilities for air despatch service (ADS) when authorized by the staff;
- g. advise the commander and staff on all signal aspects of command and control including -
 - (1) the signal plan, and the best use of available resources,
 - (2) allocation of resources by priority,
 - (3) the siting and layout of formation HQ and HQ echelon,

- (4) the employment of EW resources and the implications of EW operations, and
 - (5) the training of users;
- h. supervise all aspects of battlefield frequency spectrum management (BFSM), including frequency assignments and electromagnetic compatibility (EMC), to include -
 - (1) frequency allocation and monitoring of all radio frequency emissions,
 - (2) control and co-ordination of power outputs and types of antennas, and
 - (3) when required, frequency registration and co-ordination with allied or international forces, national and civil agencies;
- j. advise commanders and staffs on signal security (SIGSEC) and enforce SIGSEC policy among all users including -
 - (1) the distribution and custody of all cryptographic stores and equipment within the formation,
 - (2) operation of on-line and off-line encryption systems and equipments,
 - (3) implementation of electronic deception plans as ordered by higher HQ,
 - (4) monitoring of all formation radio nets, and reporting SIGSEC violations and interference problems,
 - (5) distribution of daily changing frequencies, call signs, net identification signs and address groups, and
 - (6) notification of start/stop timings for voice codes and key settings for voice, telegraph and data encryption equipment;
- k. establish liaison with civil and other military communication agencies as required;
- m. provide maintenance and repair services for signal equipment as follows -
 - (1) advice to the staff for the allocation of priorities for repair and maintenance of signal equipments in the formation,
 - (2) level one and two maintenance of signal equipment, as detailed in Chapter 5, Section 5, and
 - (3) assistance and supervision of maintenance in other units organic to, or allotted to formation;

- n. hold a reserve of controlled signal stores in accordance with brigade or higher formation policy;
 - p. supervise and assist in the provision of communications at all levels of command in the formation as follows -
 - (1) ensuring the best use of equipment,
 - (2) developing training programmes for users and signallers, and
 - (3) providing technical advice and materiel assistance to meet special communication requirements;
 - q. keep and distribute official time; and
 - r. provide or co-ordinate communications for movement control.
6. The administrative tasks of the HQ and signal squadron are to:
- a. provide the operational and clerical sub-staffs needed for the operation of the formation HQ and its echelons;
 - b. operate and maintain the vehicles and equipment used by the HQ; and
 - c. provide first line CSS to all HQ elements.
7. The protection tasks of the HQ and signal squadron are to:
- a. provide early warning of enemy action, approach, intrusion or infiltration;
 - b. minimize the effects of strafing, bombing, mining and NBCW; and
 - c. arrange the optimum use of available combat power to repel an actual attack.
8. Further details on protection are covered in B-GL-321-001/FT-001 Signals in Battle, Principles and Employment Chapter 6.

SECTION 2

ORGANIZATION

GENERAL

9. All HQ and signal squadrons are organized to conform to the organization and roles of the supported formation, the operational environment, the concept of operations and the technical characteristics of signal equipment. A change in any of these factors may dictate a change in the organization of the unit.

10. A HQ and signal squadron has been established integral to the organization of the formation. It is capable of providing signal support for the main HQ, the altn HQ, and the tac CP; and from these elements to unit HQ, and higher and flanking formation HQ.

COMPOSITION OF HQ AND SIGNAL SQUADRONS

11. The unit is organized functionally to meet its role and tasks. Basically, the same organizational structure prevails whether the unit is integral to a brigade or to a brigade group. Other than EW which may be placed under command of the brigade group only, it is the quantity of resources which varies with the nature of the unit.

12. The unit is organized into a squadron (sqn) HQ and several troops (or platoons) with specific responsibilities as follows:

- a. **Sqn HQ.** Sqn HQ includes the CO's planning office and the signal command post (sig CP). Depending on the tactical situation and with due regard to space, defence and organizational considerations, sqn HQ may be formed as a small troop to include the following -
 - (1) CO's planning office,
 - (2) Sqn HQ rovers,
 - (3) Sig CP, under control of the operations officer and including the chief communication operator and the foreman of signals,
 - (4) monitor detachment, and
 - (5) the formation crypto stores elements and field mobile distributing authority (FMDA).
- b. **Access Troop.** The access troop provides access to the area trunk system via RR or trunk line, signal centre facilities, line, SDS, ACIS, and common user crypto facilities. These functions are carried out by sections as follows -

- (1) **Distribution Authority Section.** This section looks after the unit crypto distribution account.
 - (2) **Access Node.** This section includes the message centre, RR, switching equipment and cipher functions. It provides -
 - (a) automatic voice and data switches,
 - (b) facility control centre (FCC),
 - (c) narrative traffic facilities,
 - (d) facsimile terminals,
 - (e) message handling facilities,
 - (f) off-line cipher, and
 - (g) RR detachments.
 - (3) **Line Section.** The line section lays and maintains all line communications down to regiment, battalion, and independent squadron or company level. It is also responsible for -
 - (a) local and tie-lines within main and altn HQ,
 - (b) tails from RR terminals,
 - (c) remote control cables to a radio park when deployed,
 - (d) termination of lines laid by higher or flanking formations, and
 - (e) manning a line FCC.
 - (4) **DR Section.** This section furnishes the SDS for the formation and attached units. It provides SDR and ADS when appropriate.
 - (5) **ACIS Section.** This section operates automatic data processing (ADP) facilities at main and altn HQ.
- c. **Radio Troop.** Radio troop provides combat net radio (CNR) as follows -
- (1) radio control stations for formation nets,
 - (2) RRB stations,

- (3) radio detachments for liaison officers (LOs) and flanking formations,
 - (4) radio stations to terminate rear links to higher formation HQ, and
 - (5) a rover section.
- d. **EW Troop.** The EW troop is not established as part of the unit but a brigade group could have an EW troop attached under command from the corps EW regiment. EW combat support provided by this troop could be -
- (1) EW LO to the main HQ,
 - (2) Intercept and analysis section,
 - (3) DF section, and
 - (4) ECM section.
- e. **CSS Troop.** This troop is organized to carry out all unit administrative responsibilities as follows -
- (1) **CSS Troop CP.** This element plans, executes and controls all unit administrative functions. It is the hub of all administrative activities in the unit.
 - (2) **Transport Section.** This section manages unit transport activities to include petrol, oil and lubricants (POL), vehicle despatch records, vehicle safety, and operator maintenance. It assists in the preparation of the unit movement staff tables.
 - (3) **Supply Section.** The supply section holds and maintains authorized unit stores and repair parts to include: ammunition, defensive stores, general stores, controlled stores and messing facilities. The food services sub-section operates under the control of the quartermaster (QM) who also performs unit financial duties and responsibilities.
 - (4) **Maintenance Section.** This section provides recovery and first line repair of all unit vehicles, trailers, generators and weapons. It provides -
 - (a) MRTs for in situ repair in the forward area of operations,
 - (b) vehicle recovery detachments, and
 - (c) battery charging, field lighting and heating detachment(s).
 - (5) **Telecommunications Maintenance Section.** This section is responsible for -

- (a) first line maintenance and repair of all signal equipment,
 - (b) levels one and two maintenance and repair of EW, terminal and cipher equipment, and
 - (c) levels one and two maintenance and repair of ACIS facilities.
- (6) **Administration Section.** This section is organized to provide clerical services for the formation HQ staff and the unit orderly room (OR). The post office function is performed at the OR.
- (7) **Unit Medical Station (UMS).** This section is responsible for -
- (a) the provision of advice on maintaining health, preventing disease and maintaining hygiene,
 - (b) the collection and treatment of casualties, and their preparation for evacuation or return to duty,
 - (c) the management of medical supplies, and
 - (d) the maintenance of medical records.
- f. **D&S Platoon.** The D&S platoon consists of a HQ and several sections of infantry whose primary duties are -
- (1) operations centre protection at both main and altn HQ,
 - (2) protection and escort for the commander and the tac CP when deployed, and
 - (3) planning for the defensive arrangements of the HQ.
- g. **Bde HQ Staff and Sub-Staff.** The staff and sub-staff are held on the establishment of the HQ and signal squadron. They perform their duties within the components of the HQ as directed by the commander.

TYPICAL HQ AND SIG SQN

13. A typical HQ and signal squadron organization is shown in Annex H. The composite main HQ signal troop is shown in Annex H. The composite alternate HQ signal troop is shown in Annex J.

SECTION 3

COMMAND AND CONTROL OF SIGNALS WITHIN THE FORMATION

RESPONSIBILITIES

14. The formation commander is responsible for the adequacy and proper use of the signal systems within his command. He delegates the authority to plan, establish, control, co-ordinate and maintain signal resources to the formation signal officer. This authority includes co-ordination and technical control of the communication systems of subordinate units of the formation, and of the communication links to supported and supporting units and flanking formations which must be integrated to form an effective working entity.

15. Control of the formation communications is therefore exercised by the brigade signal officer (BSO). In addition to his responsibility for the employment of squadron resources, the BSO is responsible for the coordination of communications provided by all units or detachments deployed within his formation's area of responsibility and for advising the commander on all signal matters.

16. Although the BSO responsibility for the command and co-ordination of signals within the formation is clear, It cannot be carried out in isolation. Certain aspects of communications must be coordinated with higher HQ. This includes:

- a. BFSM;
- b. SIGSEC including electronic counter-counter-measures (ECCM);
- c. allocation of additional resources and provision of reinforcements, signal stores, and equipment;
- d. planning of future communications; and
- e. standards and procedures covering the operation and maintenance of signal equipment.

17. Co-ordination is achieved through the authority for technical control vested in the senior signal officer at each level in the chain of command. In a Canadian or NATO force, overall technical control will generally be exercised by the senior signal officer of the formation to which the brigade is subordinated.

18. In addition, much closer co-ordination is required when operations are conducted in concert with the arms and services of other nations. Planning for these operations must take into consideration the methods, procedures, language, and characteristics of equipment of these other arms and services.

EXERCISE OF COMMAND

19. The successful command of the HQ and signal squadron and the control of formation signals during operations will depend on:

- a. the receipt of accurate and up to date information needed to develop the signal plan, especially -
 - (1) early knowledge of the commander's intentions and plans,
 - (2) the plans of unit COs, and
 - (3) the tactical situation including the RECS threat;
- b. an effective system for disseminating orders and information;
- c. the development of drills and procedures covering all aspects of operations;
- d. the ability to maintain a continuous knowledge of the state of communications and the potential of the unit; and
- e. the possession of a detailed knowledge of the characteristics and capabilities of the signal resources of organic and attached units including their operational status.

20. As BSO, the CO of the HQ and signal squadron is the adviser to the commander and staff on all signal matters. He is present when orders are given and when operations are planned. He has direct access to the commander on matters of signal policy. He must ensure, by frequent consultation, that the communication implications of any plan are not overlooked and that whenever possible the signal plan can be developed ahead of, or at least concurrently with, the operational plan. To accomplish this he must develop a close personal relationship with the staff. He must visit the operations centre regularly and be immediately available during critical periods.

21. The CO is responsible for technical supervision of all signal systems in the formation. It is important that he visit units regularly to ensure that any shortcomings are corrected before they become serious, that maintenance is being properly conducted, and that signal personnel are performing efficiently. He should visit the units to advise and assist COs and unit signal officers on signal problems. Visits to higher and flanking formations are essential in arranging communications, particularly in mobile war, and they are a useful way of obtaining advance information and ideas. He must, therefore, resist any tendency to tie himself to the HQ. He will be represented by his second in command during his absence.

SIGNAL PLANNING

22. Signal planning consists of determining the most economical allocation and efficient employment of resources which will best meet the command and control requirements in support of the commander's plan.

23. In any signal plan two details must always emerge: the selection of the means, and the allocation of priorities:

- a. In selecting the means the following must be examined -
 - (1) alternatives available and the effect on the tactical plan when the ability to provide normal communications is prejudiced by distance and terrain,
 - (2) alternative means and any other measures required when radio or electronic silence is imposed, and
 - (3) probability and effect of RECS on an operation.
- b. In any operation there will usually be a greater demand for signal services than resources will permit. It is essential, therefore, that priorities be directed by the staff covering all aspects of installation and establishment of signal systems. These will range from priorities for laying local lines in an HQ, which can be detailed in SOPs, to the provision of signal detachments for a specific operation which will be directed in the relevant orders. In phased or subsidiary operations priorities should be confirmed for each phase or portion of the operation.

24. An example of a signal estimate is given in B-GL-321-001/FT-001, Signals in Battle, Principles and Employment; proper signal estimates will assist in ensuring success of signal support.

25. Orders and instructions used to regulate signals on the battlefield are described in detail in Signals in Battle, Principles and Employment, Chapter 7. Their use will save the user's time while ensuring that no major aspect of signal planning is overlooked under the pressure of operations.

SIGNAL COMMAND POST

26. The sig CP, provided and manned by the squadron HQ is the nerve centre for the detailed planning and the execution of the signal plan for the formation. As such, it must be capable of carrying out the following duties and responsibilities for the formation signal officer:

- a. maintaining battle maps, traces and overlays;
- b. planning for signals to include -
 - (1) monitoring, interpreting and integrating the higher formation signal plans,

- (2) notifying units and other formations of changes to the signal plan,
 - (3) preparing appropriate communications and electronics operating and technical instructions,
 - (4) planning the frequency assignment, usage and monitoring for the brigade,
 - (5) preparing and transmitting signal reports and returns,
 - (6) tasking the monitor detachments, and
 - (7) advising the CO on signal matters and, in his absence, providing advice and guidance on signals to the HQ staff and to the units of the formation; and
- c. controlling and coordinating signal support.

27. The sig CP must operate continually. Its function is that of a small operations centre; to be efficient it must have information which is accurate and current on the:

- a. commander's plans and intentions;
- b. battle situation;
- c. status of signal systems in the formation;
- d. availability of reserves of signal resources in the formation;
- e. state of maintenance of signal equipment and ancillaries; and
- f. location and availability of specially trained signal personnel in the formation.

28. SOPs must be developed and practised which will facilitate the passage of information in a coordinated manner. Signal information must be passed freely and rapidly between units and formations if command, control and information systems are to remain responsive in the face of the constantly changing tactical situation. To this end, the sig CP exchanges information with:

- a. units' signal officers in the brigade;
- b. HQ staffs;
- c. internal technical control agencies -
 - (1) radio control (RADCON),
 - (2) trunk system control (syscon),

- (3) FCCs,
 - (4) FMDA, and
 - (5) Adm CP, parts of which may be included in the sig CP;
- d. flanking formation sig CP; and
 - e. higher formation sig CP.

29. Cooperation and loyalty between all elements of signals on the battlefield is a must. No request for assistance or advice can remain unanswered; indeed, help must be offered when it is appropriate or required. Within the formation, signals must be of one mind and of single purpose: to ensure that the commander has an efficient and reliable CCIS.

HEADQUARTERS AND SIGNAL SQUADRON INTERNAL COMMUNICATIONS

30. The dispersed elements of the unit will not be able to function adequately unless all elements required to provide information to, and receive direction from, the sig CP have good communications. Local communication systems, such as, intercoms and telephone locals may meet the requirements for some elements. Elements not connected by these systems require a unit command radio net controlled from the sig CP at main HQ.

31. It is essential that information be passed to all concerned as soon as it has been received. Early planning is thus promoted while troops are kept aware of the situation and remain involved in unit activities. In addition to orders groups (OGp), briefings should be conducted regularly for replacements, administrative and maintenance personnel, who would not know of the battle situation otherwise. Troops in A echelon are keenly interested in happenings at main HQ, altn HQ, and in radio park and vice versa; all want to be part of the action and especially share in the success or grief of any part of the unit. Administrative clerks for example, whether working for the HQ staff or in B echelon, must be kept current of the battle situation to be effective.

SIGNAL TRAINING STANDARDS AND SELF DISCIPLINE

32. The need in signals for high standards of training and self discipline cannot be overstressed. As an arms unit all ranks of signal units must be soldiers first and tradesmen second.

33. The command, control and information system is the vital third element on the high intensity battlefield. It provides for the co-ordination of fire and movement needed to destroy the enemy.

34. The result of action or inaction and errors in signals is magnified greatly because of the number of soldiers that could be affected. A vital order received too late could result in the loss of many lives, or the loss of the battle. Dedication and a sense of urgency are vital qualities of field signal personnel.

35. Co-operation is essential to make signals work and to have efficient signal systems. In spite of the principle that communications are provided from higher to lower levels of command, all stations/elements within systems/links must strive to establish and maintain communications. All personnel must work together to achieve the signal aim - good, reliable treatment and transfer of information.

36. For individuals and detachments to operate successfully in the field, a high standard of individual competence and versatility must be attained. This can only be accomplished by constant practice and rehearsal under the most realistic settings that peace-time training will permit. Training within the squadron must provide for:

- a. the maintenance of a high standard of individual fitness, fieldcraft, and weapon handling;
- b. progressive development of the skills and competence of the newly joined members of the unit while maintaining and improving the proficiency of the older members;
- c. continuous development of the skills and knowledge of Junior officers and NCOs;
- d. attainment of basic skills and knowledge in associated trades and specialties by NCOs and men; and
- e. the attainment of approved signal battle drill standards by signal detachments, sections and troops.

CHAPTER 3

SIGNAL SYSTEMS IN BRIGADES AND BRIGADE GROUPS

SECTION 1

INTRODUCTION

GENERAL

1. Signal systems in brigade groups allow independent operation so there is more equipment and resources than in brigades. The signal systems are, however, the same. Differences in quantity and use will be noted.
2. The major factors affecting the provision of command, control and information systems, and the principles in accordance with which they are provided, are explained in detail in Chapter 1 of B-GL-321-001/FT-001, Signals in Battle, Principles and Employment.

THE MEANS

3. The signal systems employed in the formation are:
 - a. radio (all modes of CNR);
 - b. trunk (RR, line and SCRA);
 - c. hand carriage (SDS, SDR, ADS, LOs and visitors);
 - d. ACIS; and
 - e. EW.
4. CNR is the primary means of communication within the formation.

SECTION 2

COMBAT NET RADIO

BACKGROUND

5. The characteristics of radio, its application, modes of operation and facilities are described in Chapter 3 of B-GL-321-001/FT-001, Signals in Battle, Principles and Employment. The employment, deployment and controls for CNR are explained in Chapter 4 of the same manual.
6. The features of CNR that make it the preferred signal means for brigades and brigade groups are flexibility, mobility, economy, adaptability, and security.
7. The disadvantages of CNR are its vulnerability to enemy RECS, its susceptibility to interference, and its limited range and capacity.

VERY HIGH FREQUENCY (VHF) RADIO

8. VHF radio is the most widely used CNR in brigades and units because of its frequency modulation (FM) feature which allows good clear voice communications. VHF (FM) radio is normally equipped with crypto devices to give good secure operations. Other advantages include its use for data communications, its range extension by RRB and its capability to be operated remotely.
9. VHF (FM) radios are normally used in nets providing a capability for all users to be informed without retransmission.
10. VHF (FM) radio requires near line of sight paths between stations for good operation. It is also susceptible to DF and jamming.

HIGH FREQUENCY (HF) RADIO

11. HF radio is used primarily as a back-up system for VHF radio, and for longer range communications. It can be used for clear or secure voice, narrative traffic and data, and morse code using continuous wave (CW) telegraphy.
12. HF radio is normally used in one-to-one links over extended distances, or as a back-up system to work through interference or jamming.
13. HF radio requires larger antennas and often separation between transmitters and receivers when using higher power. It is susceptible to DF and to jamming, but to a lesser degree than VHF radio.

ULTRA HIGH FREQUENCY (HF) RADIO

14. UHF radio is used for ground-to-air and air-to-air communications for aviation units. It is normally equipped with crypto devices to provide secure voice or data communications.

15. UHF radio requires clear line of sight paths between stations to operate effectively. It is susceptible to DF and jamming.

COMBAT NET RADIO COMMUNICATIONS AT BRIGADE/BRIGADE GROUP HEADQUARTERS

16. The functions of CNR systems in support of the formation command and control requirements are carried out by the radio troop of the HQ and signal squadron which is tasked to provide:

- a. formation voice and data command net (VHF);
- b. formation voice and data guard net (HF);
- c. formation voice and data administrative nets (VHF and HF);
- d. operating and guard sets on divisional or higher formation links; and
- e. a signal squadron command net (VHF).

17. Other CNR elements may be present at formation HQ in support of the FSCC, the engineer LO, the tactical aviation (tac avn) cell, and the EW LO at brigade or EW co-ordination centre (EWCC) at brigade group; however, these resources are integral to the supporting unit/element.

18. Radio troop is established with vehicle-borne equipments which are deployed as needed on the formation nets. Vehicle-borne equipments are installed with at least two modes of operations to provide an alternate means for communication for the users. Installations are as follows:

- a. **Rovers.** Light vehicles equipped with VHF and HF radios for command and liaison away from the HQ (some rovers also have SCRA equipment to access the trunk system covered in the next section).
- b. **Radio detachments.** Vehicles equipped with two or more radios are used as control stations, sub-stations, rear links and special task detachments.
- c. **RRB detachments.** Vehicles equipped with two VHF radios connected to extend automatically the range of VHF (FM) nets.

19. The troop has a small number of VHF manpack radios which are available for special tasks or to meet unit protection and administrative requirements.

20. A limited number of UHF radios are also available for use on air or aviation nets.
21. RADCON is the hub of all radio troop activities. This is where the radio tasks are planned and where control of radio systems and RRB is effected. The responsibilities of RADCON are to:
 - a. establish and maintain the command net;
 - b. establish and maintain a guard net;
 - c. establish and maintain the administrative nets;
 - d. ensure that net stations comply with operating and security procedures;
 - e. maintain radio diagrams and communication state boards;
 - f. establish and maintain altn HQ and tac CP radio detachments to support these functions;
 - g. assist the staff in directing net traffic and in correcting procedural errors on the nets; and
 - h. plan the deployment and administration of RRBs and other troop detachments.
22. The monitor detachment is part of squadron HQ. It receives direction from and reports directly to the sig CP. The monitor detachment may be located within the radio park but it is usually deployed on its own in a location less susceptible to interference.
23. It is the responsibility of the sig CP to plan the employment and the administration of the monitor detachment in support of the formation signal plan.
24. The duties of the monitor detachment include:
 - a. monitoring CNR nets as tasked;
 - b. reporting any security infraction and/or compromise immediately;
 - c. monitoring and validating the frequency allocation (particularly HF) in preparation for its planned use;
 - d. assisting the sig CP in identifying sources of interference; and
 - e. obtaining official signal time.

COMBAT NET RADIO COMMUNICATIONS IN THE BRIGADE/BRIGADE GROUP

25. Typical CNR communications in the formation fall under two categories, formation and unit nets. Unit nets are detailed in Chapter 6.

26. The formation command net is a secure radio net using voice or data communications for the command and control of the formation. RRBs and alternate facilities are available to extend the range and to move communication installations. CNR is provided from main HQ to the altn HQ, tac CP and to the CPs of organic and attached units. Units provide their own rear link sets. A radio detachment is provided for communication with the HQ of the right flanking formation. This command net is guarded by a secure HF voice/data net.

27. The formation administrative net is also a secure radio net for voice or data. It has RRBs to extend the range. This net extends to the service battalion and other administrative units and echelons. Units provide their own rear link sets on this net. They have an HF guard net in parallel. Net control resides with the brigade G4 staff.

28. Combat and supporting arms units normally represented at formation HQ provide their own communications means. They are:

- a. artillery including AD;
- b. engineers;
- c. EW; and
- d. supporting air elements.

29. A typical CNR diagram of the formation's operations net is at Annex K. A typical administrative net is in Annex M.

SECTION 3

TRUNK

GENERAL

30. The major components of an area trunk system are described in Chapter 3 of B-GL-321-001/FT-001, Signals in Battle, Principles and Employment. The employment, organization, deployment and control of a trunk system are explained in Chapter 4 of the same manual. Trunk systems employ RR, troposcatter, satellite and line links with the necessary multiplexing, submultiplexing, line networks and tails to associated terminal equipment. Trunk systems are linked together to form a theatre-wide secure communication system. This section will focus on trunk facilities which can be found in the brigade and brigade group.

31. The trunk system has a very high capacity; it provides secure transmission of all modes of traffic including high speed data; it is very flexible, and it is much less susceptible to enemy RECS than CNR. The trunk system not only covers the combat zone, it connects to the communication zone and flanking formations.

32. The primary disadvantages of the trunk system are its size and complexity, using much equipment and resources; the time to deploy such resources; and the vulnerability of trunk nodes with a concentration of emitters. These concerns are not the responsibility of brigade and brigade group signals.

TRUNK ACCESS AT BRIGADE/BRIGADE GROUP HEADQUARTERS

33. Access troop is given the responsibility to plan and execute the following signal tasks:

- a. the employment of access nodes as allocated in support of the formation HQ;
- b. interconnection of the internal HQ systems through the access nodes to the trunk system; and
- c. the integration of CNR with the trunk system through RWI.

34. Access troop is capable of providing the following facilities:

- a. secure common and sole user teletype;
- b. secure common and sole user telephone;
- c. non-secure local telephone;
- d. secure trunk lines to forward elements;

- e. secure common and sole user facsimile;
- f. secure common and sole user data processing;
- g. SDS and SDR; and
- h. common user off-line cryptographic systems.

35. Access nodes are established integral to the HQ and signal squadron organization, as part of access troop. These access nodes are allocated to main and altn HQ. An access node includes the following facilities:

- a. RR terminals;
- b. message centre (msgcen);
- c. automatic switching for voice and data and associated multiplexers;
- d. cryptographic equipment;
- e. an FCC; and
- f. various communication and data terminals for users.

36. **Radio Relay.** Higher formation signals are responsible for planning the employment of RR and ensuring that access to the trunk system is guaranteed by planning at least two RR links for each access node, and by pre-positioning trunk nodes and RR repeaters in the area. To this end, higher formation signals produce the following diagrams:

- a. trunk system diagrams to show the deployment of RR and line;
- b. circuit diagrams to show details of the trunk system; and
- c. RR diagrams to include details of -
 - (1) grid reference,
 - (2) elevations and antenna heights,
 - (3) magnetic bearings between stations,
 - (4) frequencies,
 - (5) antenna polarization,

- (6) distances, and
- (7) number of channels.

37. RR terminals which form part of an access node are deployed and sited by the BSO in support of the brigade and brigade group signal plan. The siting requirements may conflict with needs for concealment and defence. The BSO must negotiate with the staff to reconcile any differences when selecting sites.

38. In system planning, early information is necessary if a sound system is to evolve. Automatic aids help to speed up site and path calculations. The brigade staff and units must be apprised of projected sites and probable timings of occupation, so as to obtain site reservations.

39. In addition to the technical requirements the following must be considered in the selection of sites:

- a. Sites must be selected with local defence in mind, if possible, in secure areas within defended localities.
- b. Sites must be selected with regard to accessibility and proximity to the HQ being served.
- c. For defence against ECM, stations should be sited to gain shielding from terrain or structures.

40. **Msgcen.** The msgcen is normally sited near the entrance to the HQ location and on the route to the operations centre. It is usually signed as are the DR and the visitors parks. The handling of all formal message traffic is controlled at the msgcen which is responsible to ensure its prompt transmission. The increase in staff-prepared data traffic ready for release to circuit, and automatic electronic delivery of incoming traffic will reduce the amount of record traffic handled by the msgcen.

41. The msgcen must be able to select the best available means to pass information. An accurate communication state-board as well as a tactical map of the area of operations is maintained at all times. Means of communications generally available are:

- a. secure voice over the trunk system;
- b. secure voice over CNR;
- c. secure narrative and data circuits over CNR;
- d. secure narrative and data circuits over the trunk system;
- e. facsimile over the trunk system;

- f. hand carriage by SDS and SDRs; and
- g. hand delivery by LOs and visitors.

42. Off-line encryption of messages is done at the collocated crypto office. Close co-operation must exist between crypto operators and msgcen personnel to ensure the secure and uninterrupted flow of messages and traffic. Crypto personnel must be fully conversant with msgcen procedures. Conversely, the speed of encryption and/or decryption of messages must be appreciated when determining the system to be used and the estimated transmission times.

43. The staff must be informed when a back-log of traffic has developed and when an unusual delay in transmission is likely to occur. Indeed, it may be necessary for signals to recommend minimize procedures for a time in certain operations. Should such advice be needed, it should be channelled through the appropriate sig CP.

44. Msgcens are provided at main and altn HQ as part of the access nodes to the trunk system. Each centre functions as a tributary station on the area trunk system and also performs the duties of a relay station to pass traffic to and from combat unit HQ and echelons. Routing at this level is manual. Fixed routing indicators are allotted by the formation which controls the trunk system.

45. The signals despatch office may be located in the msgcen complex but outside the classified area within it.

46. **Automatic Switching.** Automatic switching facilities are provided at each access node. Digital telephone circuits are available at each location as well as a number of ports (terminals) to extend trunk lines to selected units within range and for purposes of interfacing with the indigenous facilities.

47. The standard fixed numbering system or directory is detailed by the formation which controls the area trunk system. Numbers are related to a function and can be deduced logically by subscribers. Automatic switches provide facilities for precedence override, automatic re-dialling of busy numbers, conference calls, call transfers, etc.

48. Dedicated circuits may be established for very important functions within a HQ or to link key staff officers between HQ for certain critical periods of operations; however, care must be taken to avoid making these arrangements into a matter of routine or SOP. For example, such important links might be required to a demolition guard commander, a key breaching party or to link air support staffs during an emergency airborne redeployment. They are not the norm.

49. **Cryptographic Equipment.** All trunk circuits are secured with integral crypto equipment. This includes indigenous civilian lines.

50. **FCC.** An FCC forms part of the system at the access node to provide best circuit utilization, automatic testing and reporting facilities, and restoral capabilities. The functions of the FCC are expanded in Section 8.

TRUNK ACCESS AT SERVICE BATTALION HEADQUARTERS

51. An access node for the service battalion HQ is provided as part of the service battalion signal troop. The only difference between this access node and the access nodes at main and altn bde HQ is its size. The msgcen and automatic switching system are smaller. There are fewer line detachments and DRs.

TRUNK ACCESS AT UNITS

52. No access nodes are provided to other units of the formation. Major units are provided with SCRA equipment which is well suited to their mobility. SCRA terminals allow secure voice and data access to the trunk system via the radio access points (RAPs) located at each trunk node.

53. If units are close enough to trunk nodes or formation HQ, they may be connected to the trunk system by line. This expands the units' capability for communications.

SECTION 4

LINE

GENERAL

54. Line provides a good quality and stable means of communications but it is expensive in time and resources to install and maintain. Although vulnerable to bombardment, sabotage, and accidental damage, line is not susceptible to most forms of ECM, especially fibre optic cable. Line communications are described in Chapter 3 of B-GL-321-001/FT-001 Signals in Battle, Principles and Employment.

55. The following conditions will affect the use of line in the formation:

- a. Well laid lines in friendly areas provide high capacity means of communications which may be secured by on-line crypto facilities.
- b. The use of line is seldom feasible in conditions of wide dispersion, frequent movement, or intense hostile activities. In areas where penetration or clandestine forces are active, line outside of protected localities may be disrupted or destroyed.
- c. Line affords a useful alternative means to radio especially over short distances. It may be the only means of transmitting information under conditions of imposed electronic or radio silence.
- d. The bulk and weight of cable may limit its use unless fibre optic cable is used.
- e. The use of local indigenous line facilities may be possible, depending on the attitude of the local populace and on the amount of effort needed to restore and maintain them.

56. Line section is normally controlled by access troop. Line crews are detached with the access nodes at main and altn HQ. Normally telephone locals and remote cables only will be laid and maintained. The laying of trunks and the recovery of line may be carried out where practicable.

NETWORK PLANNING

57. The scale of line which may be employed in the formation will vary widely, ranging only from HQ locals in general war to an extensive network needed in some peacekeeping operations. The nature and extent of line communications will be determined by operational considerations as follows:

- a. vulnerability and protection;
- b. availability of human and materiel resources;
- c. distances;
- d. routes and accessibility;
- e. numbers of circuits needed;
- f. types of circuits needed;
- g. priorities for completion;
- h. time available for completion;
- j. maintenance requirements; and
- k. estimated time in use.

58. Line route plans and map overlays must be prepared and distributed as part of the formation signal plan and instructions. Amendments and modifications to line plans must also be transmitted to all interested parties. Otherwise interference and even damage may occur from uninformed bodies of troops moving in the area. A line route plan should include:

- a. the full title and scale of maps to which it refers;
- b. at least three clear map co-ordinates;
- c. the route of each cable indicating the type of cable;
- d. the correct location of each formation/unit served;
- e. location of test points;
- f. pair numbering; and
- g. security classification of circuits.

59. A comprehensive line network requires considerable coordination. Detailed planning should begin early and the following points must be considered:

- a. The plan must provide for the needs of the formation as a whole and should be developed as a single entity.
- b. Future expansion of the system and/or relocation of parts of the system must be planned in anticipation of changing operational conditions.
- c. Co-ordination and assistance to units may be necessary.
- d. Improvement to the plant such as re-routing, poling or burying should be planned, especially when conditions permit the use of high capacity cable.
- e. The plan must incorporate the requirements of higher formation.
- f. Possibilities for employment of existing civil systems in the area should be studied.
- g. The plan must provide for the cut-over of circuits to occur without interruption to the service.
- h. A reporting system must be enforced.

INTERNAL HEADQUARTERS LINE

60. A line system for the formation's main and altn HQ must provide:

- a. locals and tie trunks within the HQ;
- b. tails to RR sites; and
- c. remotes to radio park.

61. Unit SOPs must detail the general layout for line interconnections, and priorities of installation. The following must be specified:

- a. routing of line within the HQ location;
- b. location of main and subsidiary distribution frames;
- c. security classification, segregation and physical security afforded to circuits;
- d. provisions regarding routing of remote control lines and tails;
- e. coordinating and control measures needed for other units to lay lines to and within the HQ;

- f. line discipline and standards of construction;
- g. method of pair and system identification; and
- h. priorities for installation.

LAYING AND RECOVERING OF LINE

62. If line is to be of use, reliability rather than speed should be the ruling consideration. Decisions must be taken on the type of construction to be used at each locality, between localities, and as a function of the prevailing operational circumstances. Overhead cable may be essential to gain protection from local movement in an area while ground laying may be adequate over difficult terrain and to achieve speed elsewhere.

63. The laying of line by helicopter may become necessary when time, terrain, or ground contamination makes it advantageous to do so. It is an acceptable method for laying cable over impassable or difficult country, or water obstacles. Drawbacks to this method are:

- a. If used over normal terrain the line should be secured by a construction party on the ground.
- b. If a fault occurs while cable is being layed over an obstacle, the only resource is to re-lay it.
- c. It is extravagant in cable, particularly when layed from dispensers and the line cannot be positioned with any degree of accuracy.

64. Line crews must be highly trained and disciplined to achieve economy of resources, and to meet the needs of the users. More time taken in construction may save time in repair due to the reliability of line. Line discipline must be rigidly enforced and line crews must seek advice when facing unforeseen situations and obstacles.

65. Security of line crews at work on the battlefield is directly related to their knowledge of basic tactics, and of the terrain. They must be trained to make best use of cover to avoid the disclosure of HQ locations and approaches by aerial surveillance, and to understand the tactical situation which confronts them.

66. Recovery of cable will depend on the tactical situation, time available, and the availability of line stores for construction in new locations.

MAINTENANCE OF LINE

67. The usefulness of any line system depends on the adequacy of preventative and corrective maintenance measures.

68. A line FCC is constituted from the line section to carry out this task. It functions directly under the control of the access troop commander and will work in close liaison with the system or access node FCC. The composition of this organization will normally provide for a 24-hour operation. Functions of this troop include:

- a. supervising preventative maintenance measures including periodic patrolling and routine testing of circuits;
- b. when faults occur, estimating the location and dispatching repair parties; and
- c. maintaining line records.

CIVIL INTERFACE

69. The use of civil line systems in friendly areas may be deemed necessary, or considered preferable because of the distances to be covered and difficulty in constructing lines. Use of the civil telephone system should be made with care for the following reasons:

- a. **Security.** Unless lines are covered by crypto devices, traffic may be subject to monitoring and interruption. Circuits are generally graded unclassified -
 - (1) although judged to be in a friendly area, the extent of subversion can seldom be accurately known; and
 - (2) routing cannot be controlled and traffic may be directed through insecure areas.
- b. **Reliability.** Circuits may be of substandard or varying quality and the proficiency of operators questionable.

70. The availability and range of civil systems must be weighed against the probability of intercept and interruption. Encryption devices should be used on these circuits to improve SIGSEC.

SECTION 5

SIGNALS DESPATCH SERVICES (SDS)

GENERAL

71. Next to personal contact, SDS is the most effective means of communications. SDS operates by either regular scheduled runs or on an as required basis. SDS is formalized and despatches are always recorded and receipted for.

72. SDS permits passage of large volume, highly classified and low precedence traffic, keeping the other means of communications free for other traffic. This means of communication, however, is slow and can be risky where secured and passable routes cannot be assured. In such circumstances, use of air or aviation support may be warranted. Even with ACIS in place, SDS is still required as an alternate means and for back-up purposes. Hand carriage communication is described in Chapter 3 and SDS is covered in Chapter 4 of B-GL-321-001/FT-001, Signals in Battle, Principles and Employment.

RESPONSIBILITIES

73. SDS is responsible for the manual transmission of despatches and messages. At this level of command, responsibilities include:

- a. SDS to altn HQ and to units attached or in support of the formation to include HQ of the deployed major sub-units of the service battalion; and
- b. SDR as required and as specified in SOPs.

74. SDS section is part of access troop. SDS is provided as part of the access nodes at main and altn HQ. DRs may also be allotted to tac CP and to the echelon of the HQ and signal squadron where these are deployed. Additionally, DRs will be included in each of the major groupings of the formation HQ during tactical moves.

75. Provision of SDRs is as follows:

- a. An SDR is always available at the msgcen.
- b. Officers empowered to order an SDR task must be detailed in SOPs. Usually these officers hold key appointments and are also authorized to frank messages with a precedence of IMMEDIATE.
- c. The duty signal officer (DSO) has the authority to despatch an SDR when he considers that it is the best means of clearing traffic.

76. A despatch office will be formed either as part of the msgcen or located separately within the HQ. If formed separately, additional personnel may be required to ensure full time operation:

- a. The despatching NCO must ensure that all DRs are fully briefed on the tactical situation and the route to be followed. A large scale location map is displayed within the despatch office and is easily accessible. It is essential that maps showing route conditions be kept current.
- b. DRs have a responsibility to report important and unusual incidents and changes to the road conditions as soon as practicable. Reports may be given to the next scheduled location or in emergencies at the closest friendly forces location. Any disruption of the scheduled service (delay, mechanical breakdown, etc.) must be reported immediately.
- c. On return from a run, DRs will be debriefed by the NCO in charge. Information will be passed to the DSO who will ensure that appropriate follow-on action is taken.

77. The co-ordination of SDS entails the following activities:

- a. maintenance of accurate and current location states for all HQ and units within the assigned area of responsibility;
- b. co-ordination with connecting SDS schedules of higher and flanking formations;
- c. notification of arrival and departure of DRs at each location on the scheduled route and/or as detailed. This procedure is mandatory especially where schedules are deliberately varied. In certain situations, these reports may have to be encoded to protect both the service and the DRs; and
- d. SOPs must detail the action to be taken by DRs in the event of ambush or imminent capture. These procedures must specify the method of destroying despatches. When destruction devices such as incendiary grenades are issued for this purpose, DRs must be trained in their use.

PLANNING

78. It is essential to organize regular and routine runs to conform to local staff routine and to co-ordinate with higher formation SDS runs. The ability to maintain a scheduled service depends on weather conditions, route going, enemy activity and the frequency of moves of HQ and units.

79. DRs must follow pre-designated routes. The following considerations will determine the routes to be employed:

- a. concealment from enemy fire and observation;
- b. protection from ambush and sabotage;

- c. restrictions to road movement -
 - (1) obstacles,
 - (2) traffic conditions, and
 - (3) day or night limitations;
- d. distances involved; and
- e. the tactical situation.

80. The SDS schedule must be published and distributed as part of the formation signal instructions. Changes in orbat, re-grouping and changes of locations of units and HQ must be incorporated immediately and the schedules amended accordingly. Changes to the schedules must be transmitted to all parties concerned in an expeditious manner as soon as they are made. An SDS schedule may be issued in either diagrammatic or time-table form. It should include:

- a. number and direction of runs;
- b. timings of arrival and departure at each unit/HQ served;
- c. clear indication of origin of runs; and
- d. timings of higher formation runs.

81. SDS protection must be planned to ensure the reliability of ground despatch. In areas where ambush, sabotage, or bombardment are likely the following measures should improve the assurance of delivery and reduce the risks of compromise:

- a. Routes and timings may be varied.
- b. Prior reconnaissance of routes may determine possible ambush or obstacle sites.
- c. Mounted guards and escorts may be necessary.
- d. Techniques of double DR teams, for despatches of overriding importance, may be employed -
 - (1) two DRs, each carrying the same despatch are sent along two different routes; or
 - (2) two DRs each carrying the same despatch along the same route but at sufficient time interval to ensure that both are not caught in the killing ground of an ambush.

e. Messages may be encrypted.

82. Air delivery methods or ADS may be advantageous where distances are excessive, terrain is impassable, or because ground routes are hazardous due to hostile activities. Air delivery is conditional on weather, restrictions on day and night flying, and on availability of aircraft. Aircraft should be assigned to this task from supporting aviation units. SOPs or orders should indicate the method of allocation of the needed aircraft support. At this level of command, the requirement is usually for special air despatch tasks as opposed to scheduled ADS which is employed mainly in rear of corps areas. When air delivery is used, a DR always accompanies the aircraft. Signals remain responsible to ensure delivery and collection of despatches in all circumstances.

LIAISON OFFICERS AND VISITORS

83. There are normally a number of officers moving between formation and its subordinate units and to flanking and higher formations. These officers must be employed as much as possible to carry despatches to save the volume of traffic that must be carried by ADS/SDS/SDRs. Their use will speed up transmission of despatches.

84. Visitors and LOs may travel by air or by ground vehicles. It is normal for notification of a visit to be sent ahead. Visitors and LOs seldom arrive at an HQ unannounced, but in every case their identity and their parent unit is verified. At formation HQ, this is done at the LZ or at the information post at the entrance to the HQ location.

85. SOPs include instructions for these officers to call at the msgcen before they leave an HQ, to collect any despatches for the HQ which they will visit next. Timings are compared against the existing SDS schedule and, if it is appropriate and advantageous to do so, despatches are prepared, recorded for transmission and despatched with the officer.

86. The msgcen sends notification of these despatch arrangements ahead for easy recognition of the despatched matter and for identification of the despatch party. Timings are given and the addressee must acknowledge receipt of the despatch as soon as practicable.

SECTION 6

ELECTRONIC WARFARE

GENERAL

87. EW operations are either conducted in support of our own operations as a combat support weapon system or in the defence against the enemy RECS action. This section will deal with the offensive use of EW. Reference should be made to B-GL-321-004/ FT-001, Tactical Electronic Warfare which details the employment, the organization and the tactics of EW operations on the battlefield.

88. There are some differences in the requirements of communications and non-communications EW. Both types of intercept and Jamming equipments are likely to be located in the formation area. Though both communication and non-communication EW resources are subject to a single control system, elements may operate under delegated control of lower formations for specific operations.

RESPONSIBILITIES

89. The responsibility to employ EW rests with the G-3. EW is directed and controlled at corps level by means of an EW command and control system which provides for:

- a. command and control at the highest possible level;
- b. co-ordination of the requirements of all users of electronic equipment;
- c. a close link with the formation intelligence organization, since intelligence sources provide much of the information upon which the EW plan is based, an EW intercept is a major source of signal intelligence; and
- d. processing of information by specialist personnel and by representatives from the main users of electronic equipment.

90. EW resources form part of signals and it is a signals responsibility to ensure that commanders, staffs and users/operators are knowledgeable about the EW environment, skilled in exploiting EW resources and, are able to cope with degraded communications during operations. The BSO is therefore the adviser to the commander in these matters.

91. EW operations in the formation are coordinated by the operations staff as follows:

- a. **Brigade.** EW resources are allocated in support by higher formation in accordance with the EW plan. An EW LO is attached to main HQ. His duties are to provide communications with his EW unit, to relay taskings to the EWCC and to pass immediate threat warning to the brigade staff.

- b. **Brigade Group.** An EW troop is attached from the corps EW regiment. It provides a small EWCC at main HQ. It is responsible for the command of EW elements in the area of operations of the formation, as directed by the G-3. It also provides liaison with signals, intelligence and other EW organizations as required.

CAPABILITIES

92. EW elements allocated in support of the formation have the following offensive capabilities:
- a. search activities to discover new emissions, the enemy frequency plan and emitter characteristics, and to determine the best intercept targets;
 - b. intercept to collect information about the enemy capability and intentions;
 - c. position finding of enemy transmitters;
 - d. analysis of the information gained and conversion of it into useful short-term or long-term value signal intelligence;
 - e. jamming activities to disrupt enemy electronic systems and to force security breaches to gain information; and
 - f. deception to give false or misleading information to the enemy or to upset and confuse his electronic systems.

SECTION 7

AUTOMATED COMBAT INFORMATION SYSTEM (ACIS)

CAPABILITY

93. A considerable increase in the tempo of operations, significant improvements in technology, and increased information available at formation HQ resulted in a need for ACIS.

94. ACIS receives information from formations, units and individuals; from sensors and surveillance devices; and from other forces and sources. The staff evaluate, interpret and record this information so that it can be recalled, displayed and disseminated to commanders and staff that need to act upon or exploit it. The staff use the stored information or resulting intelligence for planning and presenting proposals and options to the commander. Once decisions are taken, ACIS is used to issue directions, to monitor feedback, and to control operations.

95. ACIS serves the following combat functions:

- a. operations;
- b. intelligence;
- c. fire support;
- d. air defence and airspace management; and
- e. combat service support,

These functions are interconnected to allow sharing of data and to interchange information.

96. ACIS uses any data circuit between terminals and computers. These can be via the trunk system, line, CNR or SCRA. Circuits are identified and transmissions are completed automatically.

97. Terminals of ACIS have the capability to:

- a. present stored data in visual, alpha-numeric, graphic or printed form;
- b. carry out word processing chores for orders and instructions or for message preparation;
- c. release information to be displayed at other terminals, or messages to circuit;
- d. receive information from other terminals or messages distributed from circuit;

- e. selectively input data to central storage; and
- f. selectively update or remove data from central storage.

98. ACIS is a corps-wide system, connected at each formation level to share information or intelligence, and to provide a capability at each formation for command and control. The ACIS is explained in detail in Chapter 2 of B-GL-321-001/FT-001, Signals in Battle, Principles and Employment.

OPERATIONS FUNCTION

99. Connected to the primary computer are user terminals for the G-3 staff cells and for the commander. Information received electronically from units, or inserted by the staff, is displayed in priority sequence for review by the duty staff officer. He evaluates the information, stores it, uses it to update the data base, and/or has it distributed to appropriate terminals or units for action or information.

100. The capability to change combat information is restricted to the G-3 cell only, although certain files can be accessed by a number of staff cells.

INTELLIGENCE FUNCTION

101. This function is connected to the operations computer but each terminal is a mini-computer, which allows rapid access to stored information, is capable of a multitude of varied sorts and collations, and allows extrapolation of data to suggest possible trends. Information is received from other intelligence cells and sources including EW elements, reconnaissance units, the FSCC, sensors and surveillance devices, and manoeuvre units.

102. This information when received must be evaluated, coordinated, and entered into the data base by authorized staff. Access to this data is carefully restricted. Intelligence needed by other staff will be stored for their use or distributed to their terminals by the G-2 staff.

FIRE SUPPORT FUNCTION

103. To co-ordinate fire support, carry out detailed fire planning, and get best use of resources, the FSCC staff use ACIS. It is used to integrate the wide range of direct, indirect, tactical fighter, and aviation fire support resources.

104. Terminals are mini-computers, connected to the dedicated computer at artillery formation HQ. These terminals allow rapid storage and retrieval of data, and are capable of carrying out specific data manipulations required for fire support.

105. Some data may be entered directly to the data base such as survey, location or TA, but like other systems, most information is entered by key staff after it has been vetted and evaluated.

106. Terminals are located in the FSCC and in the artillery tac CP, with input/output devices with fire units, surveillance and TA systems. Interconnection with the other functions is normal.

AIR DEFENCE AND AIRSPACE MANAGEMENT FUNCTION

107. For this function there is a computer at AD bde HQ, cross-connected to the operations computer, to the FSCC, and to the ASCC. Input/output is provided for fire units, TA sources, radars and sensors.

108. User terminals are used by the staff in the operations centre to co-ordinate AD and to manage the airspace. This function integrates the wide range of AD systems, artillery, air and aviation resources to provide good AD yet controlling and using the airspace at the same time.

ADMINISTRATION FUNCTION

109. This function interconnects the administrative staff at main and altn HQ with the service battalion, the DISGP and other formation CSS elements. The G1, G4 and G5 staff have terminals to plan the CSS for the formation. The terminals are connected to the administration computer at the COSCOM HQ, with interconnection to the other ACIS functions.

110. Terminals at CSS formations and units, including the service battalion, are used by the CSS personnel to respond to the staff and to execute their plans.

SECTION 8

TECHNICAL CONTROL OF SYSTEMS

CONTROL OF THE HEADQUARTERS AND SIGNAL SQUADRON SYSTEMS

111. Control of systems operated by the HQ and signal squadron must remain centralized and revolve around the sig CP. However, that is not to say that the sig CP controls operations of systems directly; rather it directs and guides sub-unit level control centres and helps them to efficiently meet their tasks.

112. Technical control of systems within the unit is accomplished at the following agencies:

- a. radio at RADCON;
- b. trunk RR and resources at the access node FCC;
- c. line locals at the line FCC;
- d. SDS/SDRs at the SDS office or at the msgcen;
- e. crypto systems at the FMDA and at the msgcen;and
- f. maintenance and repair at the adm CP.

113. This technical control system is paralleled at altn HQ. Control shifts to the altn HQ sig CP when the main HQ passes control to its altn HQ.

CONTROL OF BRIGADE/BRIGADE GROUP SYSTEMS

114. The signal officer at each unit is responsible for technical control of CCIS within the unit. He collects information from the control agencies responsible for unit systems at his sig CP. The unit sig CP reports on the technical aspects of unit signal systems to the formation sig CP.

CONTROL OF HIGHER FORMATION SYSTEMS

115. Technical control of signal systems supports the operational responsibility. In the case of systems terminated at brigade level, this evolves as follows:

- a. The trunk system is under the technical control of the corps signal brigade HQ, as described in Chapter 4 of B-GL-321-001/FT-001, Signals in Battle, Principles and Employment. Reporting is automatic within the system from the FCC at each node, to the SEP at the signal brigade HQ.

- b. The ACIS is under technical control of the signal brigade as described in Chapter 2 of B-GL-321-001/FT-001, Signals in Battle, Principles and Employment and Chapter 2 of Signals in the Corps and the Division.
- c. Radio links are controlled from the higher level of command to the lower level.
- d. SDS is controlled from the originating level, down to the served levels.

116. SOPs are developed to ensure that responsibility for technical control is known, and reporting procedures are established and followed.

CHAPTER 4

SIGNAL SECURITY

SECTION 1

GENERAL

SCOPE

1. This chapter is to be read in conjunction with Chapter 6 of B-GL-321-001/FT-001, Signals in Battle, Principles and Employment. There is no attempt to write SOPs herein and comments will remain related to the brigade level of operations. This chapter deals with the nature of the threat and the general defensive measures that are organized to protect brigade signal systems.

REQUIREMENTS

2. Enemy signal intelligence is obtained by the intercept of our emissions, the analysis of these intercepts, and the DF of our emitters. The aim of signal security (SIGSEC) in the formation is to deny to the enemy, as much as possible, the opportunity of gaining signal intelligence from the brigade electronic systems including navigation, surveillance, fire control, and similar non-communication emitters.
3. SIGSEC consists of all measures designed to prevent unauthorized disclosure of information of value from friendly electronic emitters. It includes electronic security and communication security (COMSEC) and consists of transmission, emission, cryptographic, personnel and physical security.
4. Requirements for SIGSEC are based on the policies of the higher commander and the prevailing tactical situation. SIGSEC requires minute attention from all personnel and the dedication of personnel to monitor, report, advise and control the execution of the commander's signal plan and thus its SIGSEC content. It is a task which is normally assigned to the senior signal officer of the formation; therefore, the BSO is appointed as the formation SIGSEC officer.
5. The formation command control and information system includes more new technology apparatus including ADP systems, sub-systems and terminals. Remote and interactive access to computers must be via protected electronic communication paths. SIGSEC means and practices are employed to ensure security of these systems.
6. SIGSEC arrangements must be developed during the planning stage of any operation. Security measures for the protection of information, equipment and material include defence against capture, observation, photography, salvage, theft, interception, DF, traffic analysis, crypto-analysis, imitative deception, and personal carelessness.

7. All personnel concerned with radio communication must be in possession of certain transmission security material, eg, call signs, frequencies, etc, in order to carry out their function. Special provisions must be included in SOPs covering the possession of this material by personnel engaged in duties where a high risk of capture is entailed. These precautions include memorizing the necessary data or carrying only the essential extract of the communications-electronics operating instruction (CEOI) and RNIIS. Notwithstanding, LOs and others are frequently required to carry additional lists relating to supporting units and possibly to co-operating formations while moving about the battlefield. Hence, the extent of compromise if captured may be great. All that can be done is to limit the risk by providing quick destruction means and by holding replacement lists ready for issue on short notice. However, the distribution of replacement lists takes time and during some phases of war may be hazardous or difficult to accomplish. In any case an adequate reserve of lists must be available to cater for this eventuality.

8. Whenever possible, the use of CNR particularly in the rear of brigade HQ will be restricted except for emergency transmissions. Radio silence will normally be directed by a higher formation; however, on occasion it may be imposed by the brigade HQ. When imposed locally it should apply to as large a part of the formation as possible. Also, radio silence may be imposed by a higher HQ as part of a deception plan. During this type of programme, silence may be broken by periods of maximum transmission activity in accordance with a planned transmission schedule. This schedule will be issued through staff channels from the higher formation and the BSO will advise the staff how these schedules are to be applied.

9. Metallic line is vulnerable throughout its length to tapping and to the use of induction techniques. Enemy patrols can be expected to infiltrate forward areas and clandestine groups may operate anywhere in the brigade area for the purpose of interception. Cable laid in built-up areas and in dense undergrowth is more susceptible to intercept as buildings or vegetation provide concealment for tapping operations. Any line laid outside a protected area must generally be considered insecure except when protected by cryptographic devices. Cables carrying classified circuits in an HQ must be kept as short as possible and be kept under surveillance. The use of fibre optics provides enhanced signal security.

THE THREAT

10. Formation electronic systems are characterized by the fact that they are vulnerable to all forms of direct attack as well as to the complete range of hostile electronic activities. The following are some of the special factors which determine the nature of SIGSEC arrangements needed within the formation:

- a. Officers, signallers, and equipment are liable to capture, with the consequent compromise of SIGSEC equipment, documents and traffic which they may be carrying.
- b. All communications are within range of enemy intercept. Some means of communication such as RR and metallic line, which possess an inherent degree of security when operated in protected areas, are insecure outside of these protected localities.

- c. The needs of local defence for all HQ within the formation may lead to a concentration of vehicles and personnel including radio stations. This concentration of radios coupled with the dependence of the HQ on net radio communications facilitates DF and HQ identification by the enemy.
- d. Because of the rapidity with which decisions must be made and actions carried out, the need for speed may conflict with security requirements. Where on-line encryption equipment is inoperable it may be deemed preferable to accept the risks involved in the loss of security rather than accept the greater risk caused by the delay needed to encode and decode a message. The need for this command decision rarely arises in a higher formation.

11. Lack of proper SIGSEC measures and/or the non-observance of good SIGSEC practices could lead to loss of life and equipment not only in the formation but also in other formations to the front, flanks and rear. The impact of SIGSEC on tactical operations is great; it must be maintained everywhere in the formation and in all circumstances. Denied the means to gain intelligence from secure radio nets and RR links, it is likely the enemy will jam these systems first, to drive traffic onto the insecure means where it can be intercepted and analyzed. Signal officers must be alert to this pattern if it develops and immediately notify the staff and users. It is apparent that such an attack will impose a considerable strain on the handling of traffic but it is important that the greatest attention be paid to transmission security during the period of attack.

RESPONSIBILITIES

12. SIGSEC is a command responsibility. Operators and users of signal systems and equipment are therefore responsible to the commander for compliance with security regulations. Thus the formation commander is concerned with SIGSEC matters in all units and HQ of his formation.

13. The BSO is responsible for reporting on the standard of SIGSEC in the formation, on all SIGSEC violations, advising the commander and staff on the necessary measures to improve it or repair the damage caused by the violations and for enforcing the SIGSEC plans.

14. The BSO is assisted in this task by the following elements of the HQ and signal squadron whose primary function involves the supervision and execution of measures to ensure SIGSEC:

- a. **Off-line Encryption Section.** This section of access troop provides detachments to establish off-line crypto offices at main and altHQ. This resource is used to superencrypt ultra sensitive material before transmission or to decrypt incoming traffic.
- b. **Radio Monitor.** A monitoring station capable of listening to any CNR net of the formation and to report on SIGSEC violations is provided as part of squadron HQ. It functions directly under the sig CP.

- c. **FMDA.** The formation FMDA also functions under the direct supervision of the sig CP. It provides first and second line supply of cryptographic material and low level codes for the formation. Operations of this section are discussed in Section 3 of this chapter.
- d. **D&S Platoon.** This platoon provides guards and sentries needed for the physical security of main and altn HQ and tac CP. In the case of main and altn HQ this includes the classified area of the operations centre.

15. The methods of preserving SIGSEC are described in detail in B-GL-321-001/FT-001, Signals in Battle, Principles and Employment, Chapter 6.

SIGSEC MATERIAL

16. SIGSEC material is divided into two categories: material that is necessary for transmission security, and material that is necessary for cryptographic security. The former category includes documents containing net identification signs, address groups, call signs, frequencies, telephone switchboard nicknames, and voice code data. These are included in the Radio Net Information Identification System (RNIIS) and CEOIs. It may also include information protection software. The latter category includes encryption equipment, book ciphers, insert keys, crypto software and lists of key settings.

17. The methods of encryption available are of the on-line (voice and data), and off-line machine and manual systems:

- a. On-line voice and data security equipment is employed on formation command and administrative radio nets, unit nets, rear links to flank and higher formations, and on selected telephone links.
- b. On-line encryption equipment is employed on all RR and line trunks of the area trunk system.
- c. ACIS will also receive appropriate cryptographic protection.
- d. Off-line systems are available in machine and book methods at formation HQ and service battalion HQ. Book method may be provided within the formation at unit HQ.

18. CEOIs are prepared and issued by the HQ and signal squadron from lists supplied by higher formation signals. Voice code systems include operation codes, numerical codes, authentication codes, and formation code-words. These lists are accountable documents. Preparation of these lists is the responsibility of the sig CP. Lists are distributed to:

- a. units, in a consolidated CEOI covering a period of several days; and
- b. stations or detachments of the squadron in the form of extracts for periods of from one to four days at a time.

19. Lists of key settings are supplied through cryptographic channels from the higher formation. The frequency at which settings must be issued and the number of settings which may be in the hands of users at one time is regulated by theatre or national cryptographic instructions. Generally, where key settings change daily, a maximum of one day's reserve and one day's current usage may be on hand. Lists are issued directly to a designated custodian. The distribution of key settings is the responsibility of the unit custodian.

20. All encryption equipment and material is accounted for by the custodian of the unit. Crypto equipment on distribution is subject to regular accountability checks and inspections by the custodian. This includes equipment held by the deployed detachments.

21. The disposal of registers, receipts, and traffic that are no longer required, particularly in the msgcen and the crypto office, requires careful supervision. The time for which old traffic and records are kept will usually be laid down in higher formation CESIs. Destruction of classified waste is the responsibility of the custodian depending on the content and classification. Classified waste of the operations centre is normally destroyed by operations personnel under the direction of the senior administrative clerk.

22. Telephones within the formation range from secure trunk channels to insecure single circuits over field cable. Operators must be trained to ensure that users are informed when calls are routed over an insecure system. Telephone circuits must be monitored from time to time to ensure there is no laxity by either operators or staff.

SECTION 2

COMMUNICATION SECURITY MONITORING

FUNCTIONS

23. COMSEC monitoring in the formation is carried out on friendly CNR and telephone systems. The function of reporting is also carried out by monitoring personnel. Actions necessary to correct or improve COMSEC are the purview of the commander and staff:

- a. **Unit.** The unit signal officer must employ available resources to monitor unit CNR. Reports are sent to the unit CP and/or to the sub-unit CP exercising control of a net. Corrective action, when required, is directed by the appropriate commander. Monitoring of telephones is practised at random and lines are observed and patrolled as much as possible.
- b. **Formation.** CNR at formation level is monitored and reported on according to a planned schedule. The monitor detachment reports to the operations staff via the sig CP. The staff analyses the implications and the impact of an infraction and advises the commander on corrective actions to be taken. Local lines are laid within the defended locality when possible. Remote lines laid between localities are either observed or patrolled. Trunk lines are considered non-secure unless crypto protected.

24. The application of emission control (EMCON) policy is described in B-GL-321-001/FT-001, Signals in Battle, Principles and Employment, chapter 6.

COMPROMISE PROCEDURES

25. The most serious types of compromise concern infractions which lead to disclosure of operational plans and which imperil friendly forces. Should such security violations occur, it is imperative that the appropriate commander be apprised of the situation and that alternate plans be enforced. Notification of such a compromise must be swift, and must accurately describe what has been disclosed and what corrective action has been taken locally if any. Reports are sent by secure means.

26. Suspected compromise procedures must be carried out for each case involving an infraction which could lead to partial or total disclosure of operational plans. Reports must be made rapidly and contain sufficient information on circumstances and events to permit an assessment of the impact of the compromise, and to allow for timely decisions and actions.

27. Compromise and suspected compromise of crypto systems, codes, and other SIGSEC infractions must be reported immediately, on another secure means if possible. Reports must be accurate and factual and describe what corrective action has been taken locally. In cases where systems are controlled at a higher HQ, information must be passed at intervening levels of

command without delay. Crypto systems are often widely distributed and all concerned agencies and HQ must be informed of events.

28. Compromise procedures must be developed fully in unit and formation SOPs. They must be practised and strictly enforced.

SECTION 3

FIELD MOBILE DISTRIBUTING AUTHORITY

RESPONSIBILITIES

29. The FMDA is located at main HQ with assets in altn HQ for survivability, ease of access, distribution and control. The decision of where to locate what assets is taken in consideration of the tactical situation, the formation signal plan and the capabilities of the DA organization.

30. The FMDA is responsible for the operation and administration of accountable crypto material within the formation. Transactions are conducted with unit custodians, with the FMDA at higher HQ and with other supporting or flanking FMDAs/custodians when appropriate. The formation DA officer, usually the HQ and signal squadron DCO, is appointed by the BSO, whereas unit custodians are appointed by the CO of the unit concerned, with the approval of the formation SIGSEC officer.

31. Duties of the FMDA and unit custodian are:

- a. requisitioning and actioning the receipt, distribution, transmission, custody, storage, correction as required, accounting for, and disposal of accountable material;
- b. controlling issues on a strict need-to-know basis according to established allowances;
- c. providing technical advice and guidance to commanders and staff on problems related to accountable material (for the FMDA this advice is provided through the sig CP);
- d. enforcing controlled accounting procedures;
- e. checking muster and inventory reports;
- f. inspecting unit/sub-unit accounts as called for in orders and instructions;
- g. providing DA courier service for delivery of material to units/sub-units as required;
- h. maintaining close working liaison with crypto equipment repair facilities on matters concerning repair, inspection, provision and consumption of crypto equipment and components;
- j. acting as technical advisor to boards of inquiry dealing with losses of accountable material;

- k. maintaining records; and
- m. reporting all registered and non-registered accountable material transactions to higher FMDA.

SUPPLY

32. FMDA and custodians receive accountable material on a direct-charge basis through the DA system. Sources of the material may be national or allied/combined. Use, protection and disposal instructions will vary according to the specific and detailed instructions issued by the appropriate authority.

33. Holdings and supplies of SIGSEC equipment, codes and key lists will be allocated and controlled at the highest level of SIGSEC authority. Suggested holdings, in days, by types of material, according to the level of command concerned, are directed by the corps signal brigade.

34. Although responsibility for maintaining allowances rests primarily with commanders, it is essential that DAs and custodians co-operate closely especially when re-groupings and changes in tasks/missions occur. Whenever possible issues of material should be effected automatically; anticipation of the requirements based on experience will help to ensure that adequate stocks are distributed in a timely manner.

MAINTENANCE

35. FMDA is responsible for maintaining SIGSEC equipment status records and for coordinating repair, maintenance and replacement of cryptographic material for the formation.

36. The HQ and signal squadron is the first level at which capabilities for the repair and maintenance of cryptographic material are established. The CSS troop has crypto MRTs capable of first and second line repair in situ in the formation area.

37. The field crypto maintenance system follows the DA chain of responsibility.

EMERGENCY DESTRUCTION

38. Emergency destruction plans must be prepared and practised at all levels of command in order that information which would otherwise gravely prejudice operations and command and control systems is denied to the enemy. The higher the classification of documents, the more stringent and demanding the safeguard requirements. It is therefore essential that appropriate orders are promulgated and that all responsible personnel are trained adequately to carry out emergency destruction procedures even in the face of danger.

39. An emergency destruction plan is required to ensure the security of classified accountable material held at a specific FMDA, by unit custodians and loan holder detachments. Prepared in accordance with CIS/01/2 Chapter 11, emergency destruction plans should detail the following:

- a. responsibilities of personnel involved in the security of material including who can order destruction to be carried out;
- b. duties of personnel assigned to execute emergency destruction of material;
- c. the order of priority of destruction of material;
- d. the methods of destruction to be employed;
- e. the degree of destruction required by types of material; and
- f. reporting procedures;

40. Further details on destruction of military equipment may be found in STANAG 2113 and ACP 122.

CHAPTER 5

ADMINISTRATION

SECTION 1

GENERAL RESPONSIBILITIES

INTRODUCTION

1. Administration is a service support function. Its purpose is to maintain the effectiveness of men and material. In an HQ and Sig Sqn it pertains specifically to the maintenance of the elements of the command, control and information system and to the support of the HQ functions.
2. The administration of the unit is the responsibility of the CO. On his behalf, the unit logistics officer (OC CSS Tp) plans in detail all unit administrative operations. He exercises judgement in the use of resources in order to maintain an efficient, well-equipped, well-disciplined and contented unit.

ADMINISTRATION OF THE HEADQUARTERS

3. The HQ and Sig Sqn is responsible for the administration of the formation commander and staff, attached elements and unit personnel. The unit provides and maintains the vehicles, weapons, communication and computer equipments, and stores needed for the operation of the HQ. It must also support those equipments belonging to other units or elements operating at the HQ.

ADMINISTRATION OF THE UNIT

4. The responsibility for the administration of the HQ and Sig Sqn is given to the CSS Tp. The tasks of this troop are given in Chapter 2.
5. The OC CSS Tp is responsible for the day to day administration and housekeeping of the HQ and echelons of the unit wherever deployed. He acts as the camp commandant. When a unit A echelon is deployed separately, he also becomes responsible for planning its protection.

FUNCTIONS OF ADMINISTRATION

6. The following administrative functions will be discussed in the next sections:
 - a. control of administration;
 - b. transportation;

- c. supply;
- d. maintenance; and
- e. personnel and personnel services.

RELATED PUBLICATIONS

7. The following publications are related to and should be used in conjunction with this chapter: B-GL-311-001/FP-001 Administration in Battle; and B-GL-304-002/FP-001, Unit Administration; and B-GL-303-002/FT-000 Staff Duties in the Field.

SECTION 2

CONTROL OF ADMINISTRATION

PLANNING AND CO-ORDINATION

8. The planning and the co-ordination of administrative tasks depend on a sound estimate of the situation. Continuous monitoring of unit administration is necessary to ensure that unit requirements are met and that the CO is aware of new requirements or of changes to plans which might affect the operations of the unit or of the formation HQ.

9. Administrative planning must cater for the following functions:

- a. replenishment of the unit including -
 - (1) the collection and distribution of supplies, and
 - (2) the collection and issue of spare parts, and major equipments;
- b. supervision of unit maintenance on all vehicles, weapons, non-communication equipment and general stores;
- c. control of non-communication vehicles and the training of drivers;
- d. general supervision of the UMS and inspections for hygiene and sanitation;
- e. operation of messes and supervision of cooks;
- f. the detailed operation of institutes;
- g. supervision of postal arrangements;
- h. the operation of the unit OR;
- i. carriage of controlled signal stores held by the unit;
- k. organization and operation of a HQ LZ and billet area;
- m. assistance to all bde/bde gp units in the maintenance of signal equipment; and
- n. maintenance of spare parts stores for the repair of signal equipment.

ADMINISTRATION COMMAND POST (adm CP)

10. The adm CP is the nerve centre for all unit administration, and functions as the camp office for the HQ. It is responsible for administrative plans and operations and for the daily maintenance of all elements of the unit in the field. Plans and operations to support the unit are difficult to execute especially when the unit is deployed into several elements, located many kilometres apart. Administrative support operations for the HQ and Sig Sqn demand tight command and control and extensive technical support facilities to cater for all deployed echelons. When elements of the unit are detached to other organizations for periods of time, changes in support must be coordinated as appropriate.

11. Administration must remain flexible and responsive to the tactical situation. CSS may be conducted on an area rather than on a chain of command basis. In such circumstances, it may become more viable, simple and efficient to demand and co-ordinate some of the unit administrative needs through another unit echelon. The reverse may occur and the HQ and Sig Sqn may be called upon to co-operate and provide administration for other units or sub-units. The adm CP must therefore be in a position to know unit capabilities and limitations, and resources status to plan early, to anticipate unit administrative requirements and to meet needs and demands rapidly.

SECTION 3

TRANSPORTATION

VEHICLE FLEET

12. The HQ and Sig Sqn holds all the vehicles needed for the operation of the HQ and the provision of its CCIS. It is the responsibility of the transportation section to maintain records on each vehicle in the unit and to ensure its proper use and maintenance.

CONTROL OF TRANSPORT

13. The unit transportation controller is responsible for the efficient and economical operation of the unit transport resources. He reports to the adm CP. The transport office is usually located close to the adm CP to assist in plans and operations of unit transport in the following ways:

- a. field transport operations to include -
 - (1) road movement,
 - (2) traffic circuits,
 - (3) route reconnaissance and reports, and
 - (4) daily replenishment, of the unit;

- b. layout and operation of a helicopter LZ to include -
 - (1) use of panel markers and light beacons,
 - (2) operation of beacon navigation equipment if authorized,
 - (3) provision of communications, and
 - (4) provision of aircraft marshalling personnel;

- c. transport management to include -
 - (1) adherence to orders governing transport in the formation,
 - (2) unit POL accounting and replenishment, and
 - (3) vehicle operations and despatch records; and

- d. vehicle safety to include -
 - (1) implementation of formation safety orders and instructions,
 - (2) accident investigation, and
 - (3) driver education programmes and records.
14. The unit transportation controller will also ensure that:
- a. all unit drivers have been properly trained;
 - b. all drivers possess a valid driver's permit;
 - c. vehicle markings are correct;
 - d. vehicles are properly loaded;
 - e. tools and equipment are properly cared for; and
 - f. march discipline is maintained during unit moves.

CONTROL OF MOVEMENT

15. The OC CSS Tp, assisted by the unit transport officer, is responsible for publishing and maintaining the unit movement SOPs. Whenever the unit moves as a single body, the unit transportation controller or his representative will act as the unit marshalling officer and he will control the move of the convoy by packets as called for in orders and in unit SOPs.

16. Under normal tactical conditions, deployment of the unit will be such that these duties and responsibilities must be shared at each unit element. Unit SOPs will designate the duties and appointment of separate officers or NCOs to marshal and control the move of respective unit elements. Normally, the following will be designated:

- a. Main HQ. A radio troop warrant officer.
- b. Altn HQ. An access troop senior NCO.
- c. A Echelon. The transportation controller.

17. Radio park elements will always marry-up with main or altn HQ, in formed packets, and move with it to its new location or to an appropriate release point.

SAFETY

18. Safety of unit transport is detailed in unit SOPs to ensure that lives and material are not endangered unnecessarily whatever the battle situation may be. Aspects covered are:

- a. control of permits and authority to drive unit vehicles;
- b. backing of vehicles and trailers;
- c. movement on foot around vehicles;
- d. reporting of defects;
- e. personnel riding on loads in vehicles and trailers;
- f. proper stowage of stores and tools for moves; and
- g. handling of POL and ammunition in unit transport.

19. Special orders may be required to supplement unit SOPs should the unit move by sea, rail or air.

LANDING ZONE OPERATION AND DEFENCE

20. Requirements for the layout and operation of a helicopter LZ are given in paragraph 13 of this Chapter. In addition, as part of the operations of an LZ, the transportation controller co-ordinates the defence and protection of the site. He is supported in this task by allocated elements of the D&S platoon when necessary.

21. There may be circumstances when additional resources such as low-level air defence are required for the defence and protection of the LZ. These requests are channelled through the adm CP to the sig CP if demands exceed sub-unit capabilities or authority.

REFUELLING

22. Unit SOPs stipulate that unit vehicles are topped-up by unit transport after every move. It can be anticipated that the unit move at least twice in a 24-hour period; therefore, delivery of POL must be judged to meet these requirements. It may not be possible to hold to a planned schedule; therefore, plans should be flexible and include procedures for:

- a. making use of brigade bulk delivery points, (or commodity points open 24 hours a day in the area of unit operations);
- b. ensuring that unit reserves held in jerrycans are used on a rotation basis; and
- c. maintaining track discipline and keeping movement and noise within the HQ to a minimum.

23. The refuelling of attached forces' vehicles is an important consideration. All elements assigned to the HQ, or to the unit, or in support of the unit, must also be refuelled. These

elements might be artillery, AD, engineer, EW, tactical air, LOs from flanking formations, signals from higher formations, or visitors.

24. Refuelling of RRBs and other outlying detachments may be resolved through arrangements with the closest unit or by air in exceptional circumstances. Specific arrangements must be made for elements in location within other unit's lines.

25. Refuelling of detached elements is usually the responsibility of the supported unit for the period of the attachment. Requirements must be coordinated, and will be detailed in the administration order.

SECTION 4

SUPPLY

RESPONSIBILITY

26. The OC CSS Tp is also the unit QM. As such he is responsible for the provisioning, receipt, accounting, care, custody, control, maintenance, proper distribution and disposal of all material on charge to the unit except certain signal security matters. He is the CO's adviser on all supply matters. His specific responsibilities include the:

- a. implementation of detailed accounting orders and instructions;
- b. calculation of requirements and requisitioning of clothing, personal equipment, arms, ammunition, stationery, technical stores and repair parts in accordance with actual needs and battlefield expenditures;
- c. demanding, receipt, storing, securing, accounting for, and issue of rations, POL and general supplies;
- d. repair of stores through unit resources or, when beyond unit capabilities, the arrangement for repair through second or third line facilities as appropriate;
- e. arrangement for laundering and cleaning of stores;
- f. arrangement for the movement of stores, equipment and supplies;
- g. requisition of miscellaneous services such as removal of refuse, disposal of kitchen waste, fumigation and decontamination of areas and stores, etc;
- h. submission of unsatisfactory condition reports and technical failure reports on stores as required;
- j. ensuring that salvage and returnable containers are corrected and returned to second line supply facilities;
- k. ensuring that unaccounted losses of material are investigated and reported;
- m. provision of supply assistance to unit personnel as required;
- n. ensuring the efficiency of unit supply personnel;
- p. supervision of the unit senior cook;

- q. maintenance of the basic load of combat supplies and other commodities as necessary to meet unit operational tasks;
- r. control and submission of material authorization change requests as necessary;
- s. maintenance and custody of public funds and control expenditures when authorized;
- t. preparation of logistic reports and returns as required; and
- u. liaison with HQ administrative staff, second line CSS units and other unit QMs on reciprocal support matters.

UNIT HOLDINGS

27. Operational stocks are held in terms of numbers of days holdings in the area of operations. In the combat zone a total of 11 days is held as follows:
- a. **Combat Reserves.** 3 days.
 - b. **Corps Stocks.** 4 days.
 - c. **Maintenance Load.** 1 day.
 - d. **Basic Load.** 3 days.
28. The unit holds and carries a basic load or 3 days of combat supplies on unit vehicles.
29. The types of stocks held by the unit are classified as follows:
- a. **Combat Supplies.** POL, rations, ammunition and water. Basic load is held at the unit, as operational stock.
 - b. **General Stores.** Usable stores which are replenished as required. The unit holds 15 days of these stores.
 - c. **Technical Stores.** Weapons, mechanical and technical equipment and tools. The unit normally carries 15 days of these stores.
 - d. **Medical Supplies.** Controlled medical stores and drugs are held and supplied through the medical system to the unit UMS. Transport is by medical corps assets.
 - e. **Defensive Stores.** These consist of wire, pickets, shelters and other non-explosive stores required to construct field defences. Holdings are as authorized for operations.

THE REPLENISHMENT SYSTEM

30. The replenishment system is operated by army supply organizations. Their mandate is to meet requirements and demands of field units and formations and to sustain them in operations. The system will replenish the HQ and Sig Sqn for all types of stores described above less EW and cryptographic equipment and medical supplies.

31. Supplies are demanded daily. They are collected daily from an assigned delivery point (DP) or a designated commodity point in the unit area of operations. Locations and timings are notified in bde/bde gp administrative orders. Further details may be found in B-GL-312-002/FP-001, The Division Service Group in Battle, Chapter 5.

32. Breaking and distribution of bulk stores within the unit is supervised by the unit QM.

33. Plans for the replenishment of the unit are coordinated by the adm CP. The DP detail (DP run) will usually be by night and may involve movement to more than one location. The DP convoy must be protected throughout its journey and especially at the location of transfer of stores (the DP site). There may be requirements as well to pass friendly forces' lines and/or traffic control posts. Planning must be extensive and detailed and all personnel participating in DP activities must be briefed thoroughly on their respective duties and responsibilities. Further details may be found in B-GL-312-001/FP-001, The Brigade Group Services Battalion in Battle.

AMMUNITION

34. The unit holds the following types of weapons and ammunition:

- a. small arms (personal weapons);
- b. personal, light and medium AT weapons;
- c. light, medium and heavy machine-guns; and
- d. small quantities of pyrotechnics and explosives.

35. SOPs detail scales of ammunition to be carried on the man, in vehicles/detachments and in the unit. Re-supply is through the unit echelon via the normal replenishment system but there may be occasions when special delivery is required such as after a fire-fight or following unforeseen losses or damages to stocks.

36. Troops assigned in support of the unit will generally possess the same types of personal weapons as unit personnel. Their ammunition requirements must be planned and integrated as part of unit requirements.

37. Other forces, such as AD, may be in support and/or in location of the HQ. In such cases, missile and point gun ammunition remains the responsibility of the parent battery to maintain; however, replenishment in and around unit lines must be coordinated to control access to unit lines, to maintain track discipline and to minimize noise and movement.

RATIONS

38. Rations may be issued fresh, in ration packs or in emergency packs, depending on the tactical situation, their availability and the unit deployment. The unit normally holds a minimum of three days rations as part of its basic load of combat supplies. The usual combination will be one day fresh and two days hard rations.

39. Contamination of rations must be guarded against. Rations must not be transported or stored together with POL or contaminated stores and equipment. SOPs detail the handling and the distribution of rations within unit lines.

WATER

40. Unless rationed, water is drawn in bulk as required from assigned water points in the area of operations. Within the unit water is carried in jerrycans on vehicles and trailers. The unit reserve is carried in water trailers provided for this purpose. Five gallons per man per day is usually carried by the unit and is the planning scale for operations.

41. Bde/bde gp administrative orders detail regulations concerning the consumption of water from the local/indigenous water systems and the location of safe water points in the area of operation. Water points are established and maintained by field engineers, while sample testing and approval for use are medical responsibilities.

42. The unit carries out its own re-supply of fresh water from authorized water points close to its area of operations. Replenishment is by unit transport resources in accordance with unit SOPs and the battle situation.

LAUNDRY, DECONTAMINATION AND BATH SERVICES

43. The laundry and bath platoon of the supporting service battalion establishes ablution and laundry facilities in the bde/bde gp area of operations. Bde/bde gp administrative orders detail the location and hours of operation of these facilities and the unit is allocated timings according to a planned schedule. Further details are found in B-LM-312-010/FT-001, Laundry and Bath Units.

44. The range of services provided at a decontamination, bath and laundry site includes:

- a. laundry and decontamination of clothing and non-clothing items;
- b. bath facilities and decontamination of personnel;
- c. decontamination of vehicles and equipment; and
- d. exchange of clothing.

45. The designation of laundry, decontamination and bath sites is the responsibility of field engineers.

46. Unit SOPs and detachment orders should stipulate the requirements for personal hygiene and sanitation practices within unit lines. Personnel and equipment decontamination procedures must also be specified in unit SOPs.

DEFENSIVE STORES

47. Defensive stores are controlled items and are demanded and issued as such. Requirements for defensive stores (non-explosive material used in the construction of defence works) are coordinated by the adm CP. Demands are directed to the bde/bde gp administrative staff, in accordance with formation SOPs, on a daily or as required basis. Authorized issues are made via the normal DP system with stores picked up and distributed by unit transport.

REPAIR PARTS

48. Demands and issues of repair parts generally follow the same route as the equipment or stores to which they pertain. In the case of the HQ and Sig Sqn, repair parts are obtained as follows:

- a. **General Stores.** These are demanded and delivered through the normal DP system.
- b. **Technical Stores.** Armaments, radios, radar sets, generators, radiation detection equipment and fire control equipment are obtained through the normal replenishment system according to permissible repair schedules and authority. The unit holds 15 days of this type repair parts.
- c. **Signal Stores.** EW and crypto equipment is obtained through the signal repair system according to authorized repair scales. Demands go to the signal organization responsible for third line repair of this equipment, ie, the corps signal maintenance squadron. The unit holds 30 days of these repair parts.

SIGNAL CONTROLLED STORES

49. The release of certain major pieces of equipment because of its operational importance, or, any other item because of uncertain or short supply, is controlled by the bde/bde gp staff. Vehicles, communication and ADP equipment, and weapons are prime examples in this category. Requests for these items must be supported by an authority approving the release.

50. Most items of signal equipment, except repair parts and minor assemblies, are controlled by the staff and approved for issue on the advice of the BSO. Equipment and stores are normally held in the supply system; however, the HQ and Sig Sqn may be required to carry selected items of controlled signal stores for issue to units in an emergency or because normal supply procedures are too slow. The types of items likely to be specified for such issue are field cable and bare spare radios. The quantity of such stores that can be carried is limited unless additional transport is allotted to the unit for this purpose.

SECTION 5

MAINTENANCE

THE ARMY MAINTENANCE SYSTEM

51. It is undesirable in operations to have a hard and fast rule governing the repair and evacuation of equipment. The basic principle to apply is that equipment should not needlessly be backloaded, particularly when replacement may be difficult. The time required to repair a particular item, the work load on hand, the repair parts available and finally, the priorities arising from the tactical situation determine what can be done.

52. The maintenance system ensures the operational readiness of the material of the army and the land-based equipment of the navy and air force. It is a structure of organizations, personnel, resources, facilities and procedures involved in the maintenance, repair, inspection and recovery of that equipment. The system is described in detail in B-GL-002/FP-001, Maintenance in Battle.

53. The system includes four lines of maintenance to detail the various organizations responsible for maintenance. In turn, the term level of maintenance describes to users the extent of work that should be performed by organizations in the four lines of maintenance.

54. The levels of maintenance are defined as:

- a. **Level One.** Primarily servicing, preliminary diagnosis of faults, preventive maintenance and some minor corrective maintenance tasks.
- b. **Level Two.** Corrective maintenance by replacement of parts and assemblies.
- c. **Level Three.** Corrective maintenance including rebuilding assemblies such as engines, drive trains, and gun electrical/electronic assemblies, and calibration of mechanical tests and diagnostic equipment. This level may involve a production line, special test equipment and limited manufacture.
- d. **Level Four.** This level includes overhaul of equipment, and significant or complete fabrication or manufacture to design specifications; it may also involve the return to original specifications, retrofit, mid-life improvement, extension and reclamation. This level implies production line capability and use of specialist test and manufacturing equipment at a permanent facility such as a workshop depot.

55. Lines of maintenance are defined as:

- a. **First Line.** This is the first maintenance organization to which the user turns; this organization is integral to the unit where the equipment is used. First line principally performs level one maintenance. It may also be assigned responsibility

for level two maintenance for minor assemblies and components. First line is broken down into operator and technician maintenance;

- b. **Second Line.** Second line principally performs level two maintenance. It may be assigned selected level three maintenance functions. This organization is tailored to restoring an equipment to serviceability in the shortest possible time. Repairs are completed in situ to the maximum extent feasible. Second line supports first line and provides level one maintenance services to supported units without an organic maintenance organization;
- c. **Third Line.** Third line supports second line. It performs level two maintenance and selected level three functions. While second line is mainly limited by time available, third line is limited by maintenance resources available.

Third line also provides level one maintenance services to supported organizations without organic maintenance support; and

- d. **Fourth Line.** Fourth line performs level four maintenance and level three maintenance which cannot be carried out by second or third line units. This is the last category of maintenance organization in the system and as such supports the other lines. It provides all levels of maintenance to supply depots when collocated. It also provides maintainability engineering services.

PERMISSIBLE REPAIR SCHEDULE (PRS)

56. The maintenance effort within the bde/bde gp emphasizes forward repair. MRTs are tasked to conduct in situ repair, when possible, where the equipment breakdown occurs. Tasks beyond the time limitations or capabilities of the MRTs are backloaded and repaired in the maintenance company of the supporting service battalion, the telecommunication workshop of the HQ and sig unit, DISGP maintenance battalion, or in the supporting third line signal maintenance squadron as appropriate. See B-GL-312-002/FP-001, DISGP in Battle, for more details.

57. The PRS is a guide to commanders under operational conditions. It is designed to help maintenance officers plan maintenance loads and maintenance activities. A PRS is normally published for each type of equipment in the land force. The PRS authorizes certain maintenance functions to be carried out by a given line of maintenance.

ESTABLISHING MAINTENANCE PRIORITIES

58. The responsibility given to signals to advise the staff on the assignment of priorities for the maintenance of signal equipment in the field demands that signal personnel be thoroughly knowledgeable of the:

- a. tactical situation;
- b. commander's plans;

- c. status of signal equipment within his area of responsibility;
- d. work load of the maintenance organizations;
- e. availability of reserves and repair parts;
- f. limitations and capabilities of the maintenance systems to meet the existing and projected maintenance and repair requirements; and
- g. complementary facilities and capabilities of systems to pass information in an alternate or reconfigured mode for a period of time.

59. All facilities must be analysed and assessed as to the impact that damage or destruction will have on operations. Discussions with the commander and staff will ensure that the signal assessment is valid and that the latest plans and intentions have been taken into consideration. Priorities can thus be established early, before operations begin if possible, and they must be reviewed constantly. Priorities of maintenance are either given or confirmed unchanged in all orders and at each OGp.

60. Factors that can affect maintenance priorities vary with each operation. They will not be the same for forward units as for units in the rear areas. Conditions of radio silence or extensive use of line will affect decisions. There is no set way of establishing maintenance priorities. Common sense and the use of factual and current information should prove sufficient.

61. This task requires that system managers and maintainers co-operate continuously with one another.

UNIT MAINTENANCE

62. The maintenance responsibilities of the HQ and Sig Sqn include the two aspects of equipment maintenance and telecommunications (tels) maintenance:

- a. **Equipment Maintenance.** The unit is authorized and established to conduct first line repair of all unit equipment, weapons and stores; and
- b. **Tels Maintenance.** The HQ and Sig Sqn is established and tasked to carry-out first line maintenance of CNR and first and second line maintenance of all terminal, cipher, EW and ACIS equipment in the bde/bde gp.

EQUIPMENT MAINTENANCE

63. The equipment maintenance section is responsible to the adm CP for the coordination of all repair, inspection and recovery within the unit excluding tels equipment. It advises the adm CP on matters affecting the servicing, recovery, repair, modification and general condition of unit equipment.

64. The section is responsible for the maintenance of the unit's vehicles, trailers, generators, field lighting and heating equipment, weapons and weapon systems.

65. This section is normally given operational control of the repair parts support element, and it advises the CO, in conjunction with the unit QM, through the adm CP, on repair parts matters. Further details may be found in B-GL-314-002/FP-001, Maintenance in Battle.

TELECOMMUNICATIONS MAINTENANCE

66. The tels maint section is commanded by a senior communication technician. His duties include:

- a. assistance to all bde/bde gp units in the maintenance of signal equipment, excluding tactical radios which are repaired at second line by the service battalion maintenance company;
- b. holdings of repair parts stocks for the repair of signal equipment; and
- c. operation of unit repair shops and MRTs for the repair of signal equipment.

67. Tasks for the tels maint section are coordinated through the adm CP with the unit sig CP. Tasks include maintenance and repair as follows:

- a. first line repair of the squadron's tactical radio equipment; and
- b. first and second line maintenance of all ACIS, terminal, teletype, crypto and designated EW equipment within the Bde/Bde Group.

68. Most maintenance and repair is carried out in situ. MRTs conduct levels one and two maintenance work on signal equipment in the bde area. Others, equipped and manned for first line tactical radio maintenance tasks, work on unit tels equipment only.

69. **Cryptographic Equipment Maintenance.** Because of the sensitivity of cryptographic equipment, specialised repair facilities, including a Restricted Area, are required for its maintenance.

70. The recognized levels of maintenance for crypto equipment are:

- a. **Level One.** Carried out by the equipment operator -
 - (1) replacing unserviceable equipment with serviceable equipment, and
 - (2) disconnecting and reconnecting cables to the equipment.
- b. **Level Two.** Carried out by a qualified technician in the HQ and Sig Sqn tels maint repair shop or MRT -

- (1) fault finding to printed circuit boards, printed wiring assemblies or any non-soldered components as specified in the applicable maintenance manual,
 - (2) replacing unserviceable printed circuit boards and modules,
 - (3) adjusting power supply and input/output voltages and levels, and
 - (4) carrying out other tests and tasks as authorized in the applicable PRS.
- c. **Level Three.** Consists of all other tasks carried out at an authorized crypto repair field workshop, normally at corps level.

MOBILE REPAIR TEAMS

71. The unit may despatch several MRTs to many locations at any one time. They travel throughout the brigade area and often travel into the forward unit's areas. It is essential that MRT tasks are coordinated in detail, that thorough briefings are given and that MRTs report on their tasks.

72. The employment of MRTs on the battlefield demands good management. Unit SOPs must be precise to ensure effective employment, co-ordinate their movement in the area of operations, protect them adequately along their route and in situ while carrying out their task, and permit positive control over the progress of their activities.

73. Control of MRTs is exercised by the adm CP. Orders and timings are recorded in the appropriate log book. Activities and progress are monitored until completion of the task when a debriefing is carried out and follow-up action taken as required.

74. Priority of movement of MRTs must be coordinated with the operations staff.

FIELD LIGHTING/POWER GENERATORS

75. The employment of power generators for field lighting, heating, or non-CCIS equipment is the responsibility of the equipment maintenance section. There may be occasions when their use may be restricted for reasons of noise. The staff will advise conditions and requirements through the sig CP and the adm CP.

76. SOPs must be devised to ensure that generators and power cables are sited and laid to ensure concealment and security, and to avoid interference with CCIS facilities. Further details can be found in B-GL-321-001/FT-001, Signals in Battle, Principles and Employment, Chapter 9.

BACKLOADING

77. Repairable equipment and stores of all types which are beyond the unit capability to repair but which can be moved using unit resources are back-loaded to the appropriate second or

third line maintenance and repair organization. Records and transfer of equipment documents are completed in accordance with SOPs and bde/bde gp administrative orders.

78. Equipment beyond the capabilities of the unit to move to the designated backloading points are reported and identified for later removal by the bde/bde gp service battalion or the DISGP maintenance battalion.

RECOVERY/SALVAGING

79. Recovery is primarily the responsibility of the DISGP maintenance battalion located in rear of the bde/bde gp. Central control of recovery resources in the division allows for the move of repair tasks up the levels of maintenance (backloading), between maintenance units as required (cross-loading) or catering to special operations such as supporting unit moves across major obstacles.

80. The HQ and Sig Sqn has limited organic recovery capabilities intended for maintenance of mobility tasks. If vehicles cannot be repaired in situ, the unit normally is required to recover them to a unit designated equipment collection point.

81. Salvaging may be required for certain equipment which is in short supply or which cannot be abandoned for security reasons. Orders to this effect are a command responsibility and bde/bde gp, orders will normally provide direction in this regard. Salvaging actions must be duly recorded and reported.

UNSATISFACTORY CONDITION REPORTS AND TECHNICAL FAILURE REPORTS

82. Unsatisfactory condition reports (UCR) are part of the maintenance reporting system. The UCR is used to describe any unsatisfactory condition of equipment not specifically covered by other orders. Any person detecting a condition of unsatisfactory equipment is expected to initiate a UCR. Common examples of unsatisfactory conditions are:

- a. hazards to personnel, material or property;
- b. situations that reduce the effectiveness of the logistic system (shipping damage, pre-installation failures of spare parts, procedures, etc); and
- c. suggestions for further evaluation by higher HQ.

83. UCR problems should be resolved at the lowest level consistent with the responsibility involved. When considered necessary, an advance notification message describing the UCR should be sent. This is to advise higher authorities of urgent problems.

84. UCRs are processed through the adm CP to the sig CP for forwarding to the appropriate agency.

85. Technical failure reports (TFR) are required for certain groups of equipment such as special armoured vehicles, some weapons, and laser rangefinders. TFRs can be submitted on any

equipment where there is an indication that a failure trend is developing, where safety is threatened, or where operational readiness is impeded. TFRs are normally used for new equipment, for limited periods of time as directed by higher authority. They are prepared by technicians and sent to the adm CP for forwarding as appropriate.

86. The following are examples of failures worth reporting by TFR:
- a. recurring malfunctions which can be corrected by adjustment or parts replacement;
 - b. unsatisfactory performance associated with material failures requiring maintenance action;
 - c. cases where operation, handling or maintenance are made difficult because of design, layout or installation; and
 - d. abnormal wear or other conditions that might lead to premature failure of equipment.

REPORTING SYSTEMS

87. The maintenance system in the field functions best if users and maintainers provide each other with information about the equipment. There are several systems used to report on designated types of equipment. The operational status of equipment is a command responsibility. However, reporting systems normally follow the technical chain of command from the user up. Status reports, equipment failure reports, or redundant capabilities of systems provide useful information at every level of command for signal planning in support of operations.

88. The reporting system for signals in the field is as follows:
- a. The unit signal officer maintains operational status records of all unit signal equipment. He provides accurate information on the status of his equipment to the unit CO, and to the bde/bde gp sig CP together with any request for assistance. Each unit of the formation reports to the formation sig CP at times which are detailed in SOPs. The intent is to maintain a clear picture of signal resources available for operations at the unit level. Reserves must be declared.
 - b. The sig CP receives status reports and lends assistance to units as appropriate. Requirements for signal controlled stores are considered for any upcoming operation. Reallocation of bde/bde gp assets between units may be considered as a temporary measure. Many problems can be corrected quickly and operations sustained properly when signallers know the status of their resources. The sig CP can plan signals in support of the bde comd's plans. The sig CP reports on all formation signal resources to the divisional sig CP.

89. The system must be kept simple. Signal cooperation at all levels and between units will allow the system to work. A responsive signal reporting system is essential for effective signal operations.

SECTION 6

PERSONNEL AND PERSONNEL SERVICES

PERSONNEL ADMINISTRATION

90. The role of the personnel administration system is to serve both the commander and the troops of the supported formation or unit. The system must provide the commander with sufficient suitable personnel to accomplish his mission. It must also ensure that the individual soldier's administrative requirements are met, that pay, mail and amenities reach the soldier as quickly and as simply as possible without adversely affecting the commander's mission. Both tasks of the personnel administrative system require that records be maintained for each soldier deployed. These records must provide the necessary information for the commander's decisions on manning and any information necessary for the well-being of the soldier, both during and after the deployment period.

91. Personnel administration is a function of command. Personnel administrative policies and control are vested with the commander at each level and command. It is controlled by the commander's G1 staff in his HQ. See Chapter 1 for more details.

92. In the HQ and Sig Sqn, personnel administration is controlled by the adm CP.

PERSONNEL RECORDS

93. Personnel records are a unit responsibility. On deployment to an area of operations, a field records unit is deployed in the corps area which becomes the link between the unit and the national records system. The role of the field records unit is to:

- a. hold and maintain unit hard copy documents not required to be held by the unit while deployed;
- b. receive, record and transmit personnel occurrence reports from units to the national records system;
- c. dispose of the personal effects of dead, captured or missing personnel;
- d. act as a link in the notification of next-of-kin and in notification of family occurrences/problems;
- e. maintain graves registration records; and
- f. maintain a theatre personnel locator index.

94. Units communicate directly with the field records unit using simple, hand written formats for personnel occurrence reporting as specified in formation and unit SOPs.

95. More details may be found in B-GG-301-004/FP-001, Personnel Administration in the Field.

REPLACEMENTS

96. Replacement personnel are provided to satisfy replacement demands submitted by units, through bde/bde gp HQ in accordance with priorities assigned by commanders at all levels. Corps HQ, through the corps replacement unit, authorizes the release of personnel, who are then transported forward by corps and divisional transport.

97. Army replacement control detachments are deployed to division or brigade level to advise commanders and staffs on the availability, release and flow of replacements. These detachments provide a liaison function.

98. For the HQ and Sig Sqn, moving replacements from rear areas to unit lines is coordinated by the adm CP in accordance with SOPs and/or as specified in orders, using unit transport.

PERSONNEL SERVICES

99. Personnel services cover a wide range of administrative functions aimed at the individual's comfort and welfare. Commanders at all levels must plan services and amenities to preserve the fighting spirit of the troops. Plans to close down facilities when not in use, and proper rotation of personnel in detachments from rested reserves, help maintain an efficient standard of operations. Although it may appear better to detail the same men for particular duties, so they become experts, it may be better to create a pool of personnel familiar with a broad range of tasks and who will be available when needed. A timely change of personnel often stimulates interest.

100. Personnel services include medical, dental, financial, chaplain, postal and amenity services.

101. **Medical.** The UMS is responsible for providing first aid and arranging for the evacuation of casualties. Casualties requiring evacuation may be taken to the nearest unit having a medical officer unless specified otherwise in orders. Casualties may be moved in unit transport, by helicopter, if available, or collected by the field ambulance.

102. **Dental.** Treatment is available from the field dental company in the divisional administrative area, or in dental clinics assigned to the service battalion from the DISGP or from corps.

103. **Financial.** Pay services are provided by finance elements found in the DISGP and at corps.

104. **Chaplain.** Chaplains are assigned to major units only and the formation senior chaplains are located at bde/bde gp HQ. They ensure that chaplain services are available for minor units and for minority denominations. Religious services and welfare visits are scheduled and

coordinated under bde/bde gp arrangements. The administrative needs of chaplains at bde/bde gp HQ, normally transport, are channelled through the adm CP.

105. **Postal.** Postal detachments, organic to the transportation organizations at all levels, provide sorting facilities for internal distribution within their formation. Postal services for the HQ and Sig Sqn is provided by the squadron OR.

106. **Amenities.** Amenities can be divided into two classes:

- a. personal comfort items which are non-publicly funded;and
- b. personnel support programmes which are publicly funded.

107. Policies on both classes of amenities are set by G1 staff on behalf of the commander while the actual provision of amenities is a function of supply. Requirements of the unit are coordinated by the adm CP which, in turn, submits demands to the service battalion, Demands are filled by the supply organization tasked in support and forwarded to the unit in sealed containers. Funds may be available and authorized for local purchase of certain amenities. In such conditions, the unit QM is responsible to provide these services under the direction and control of the adm CP.

CHAPTER 6

UNIT SIGNALS

SECTION 1

THE RESPONSIBILITIES AND EMPLOYMENT OF SIGNALS

RESPONSIBILITIES OF UNIT COMMANDING OFFICERS

1. The responsibilities of the formation signal officer are detailed in Chapter 1. However, the responsibilities of unit COs in paragraph 24 (of Chapter 1) require further expansion, especially as they concern signals.
2. Signal officers may be employed by the CO of a unit as he wishes. The CO's needs may change with the type of operation, so certain specific duties which he assigns to his unit officers may vary. The CO must judge the necessity or advisability of taking unit specialist officers away from their primary tasks.
3. COs must insist that signal officers provide efficient command and control communications means. They usually appoint the unit signal officer as unit custodian and generally delegate signal planning and operations to him. COs should consult the unit signal officer during the preparation of battle plans, especially those requiring regrouping of sub-units and supporting elements.

THE UNIT SIGNAL OFFICER/NON-COMMISSIONED OFFICER

4. All major units of the bde/bde gp have a signal officer and a signal organization established for the purpose of providing their command, control and information system. Certain minor units have a signal NCO who carries out the signal officer's duties. The unit signal officer or NCO, assisted by other signal and regimental personnel, is tasked to operate and maintain the operational and administrative communication equipment of the unit, including rear links to the formation.
5. The unit signal officer or NCO is normally responsible to the CO for:
 - a. advice on all signal matters;
 - b. the operational efficiency of the unit CCIS;
 - c. the technical siting of all means of communications at unit level;
 - d. reconnaissance and siting of unit CPs;

- e. acting as unit sigsec and unit custodian officer;
- f. command of the unit signal platoon/troop/ section including all signal personnel attached to the unit;
- g. control of all communications-electronics (C-E) equipment within the unit;
- h. inspection and examination of C-E equipment as required by regulations or as ordered by the CO;
- j. publication/issue of signal instructions in support of the CO's tactical plan;
- k. first line maintenance of all signal equipment;
- m. co-ordination of signal matters with the BSO;
- n. preparation of signal reports and returns; and
- p. acting as a duty officer in the unit CP, if required.

DIFFERENCES IN RESPONSIBILITIES

6. There are certain unit organizations and customs, as well as deployment and employment variations, which change some of the responsibility statements listed in paragraph 4 of this chapter. Conversely, some unit COs may task signal officers with additional duties. These differences are described below:

7. Armour

- a. In some armoured units, the signal officer may not command the signal troop. He is responsible for all other tasks described above.
- b. In armoured units, the CO may wish his regiment to fight with two or more squadrons on the regimental net. This requires considerable skill and net discipline. The unit signal officer must train all signallers to this standard.
- c. In reconnaissance units, the width of frontage covered may require manual relay of radio traffic and the use of HF radio including CW to cover the range. Relay procedures and disciplines must be taught and practiced.

8. Artillery

- a. Fire support units require data from survey, meteorological, surveillance and TA units. They need high capacity circuits to the FSCC and to higher formation artillery for coordination. This means that internal and external communications must be capable of volume data traffic. Much line is used for internal communications. Connection to the area trunk system is essential particularly for

ACIS connections. The unit signal officer must plan the provision of an internal line network and connections by SCRA or line to the area trunk system, requesting line detachments from higher HQ if necessary.

- b. AD units require extensive communications to firing units. Connections are needed to artillery and air control agencies as well as the AD and airspace control centre. The unit signal officer must ensure that these communications, including any ACIS connections are planned and supplied.
- c. Artillery units employ special radio procedures for the transmission of firing data and fire orders. Signal officers must be completely familiar with these peculiarities and ensure that all signallers are trained accordingly.

9. **Engineers.** Engineer regiments involved in water crossing or minefield breaching operations may require special control and rear link communication systems. Links to the supported forces must be established at the appropriate level of command/CP. Communications must be coordinated for corps level engineers brought in for such operations. Squadron troops and LOs deployed on engineer tasks may cover a large area of operations. Connections to the area trunk system must be planned and coordinated by the unit signal officer.

10. **Infantry.** The unit signal officer must bear in mind that the unique capability of the infantry is in achieving surprise by moving over any terrain or obstacle, and in operating on foot. The signal officer must prepare and train for operation when all vehicles and baggage are abandoned. Communications must be effective using man-pack radio, or under radio silence. Training must cover airmobile and airborne operations.

11. **Aviation.** Aviation units tasked in support of a bde/bde gp will vary in composition according to the type of operation. The unit signal officer must plan for and co-ordinate the communications for the assigned aviation units, to include SCRA or line connection to the area trunk system for AD and air space control communications, and to the FSCC for any fire support units. Internal line communications may have to be arranged.

12. **Service Battalion.** The signal troop is an integral part of the service battalion. The signal officer must plan and co-ordinate the extra line communications to sub-units and to administrative units and echelons throughout the formation. ACIS links are required to main HQ and to the DISGP. The volume of traffic and the extent of data links will suggest the planning of line communications and the request for extra line resources from higher HQ.

13. **Field Ambulance.** A field ambulance is organic to the bde gp or allocated in support from the divisional medical group. Field ambulances require communications to control evacuation operations. It is not unusual for the entire evacuation system to be changed several times a day. The unit signal officer must co-ordinate signals with the widely dispersed supported forces and within the unit itself. Unit signal resources may be insufficient to meet requirements and the signal officer must plan early, and request assistance if necessary.

14. **Military Police.** MP personnel must be trained in accessing formation-wide communications systems by the signal NCO, to ensure communications for personnel dispersed throughout the formation area.

THE EMPLOYMENT OF THE UNIT SIGNAL TROOP/PLATOON/SECTION

15. The signal troop, platoon or section is normally commanded by the unit signal officer/NCO although the personnel are employed throughout the unit. Normally regimental signallers operate unit communications. Signal personnel operate rear link communications. Signal personnel also provide operational and technical supervision over all communications in the unit.

16. The senior communication NCO at each subunit acts as the signal officer's representative at that sub-unit. He also provides signal advice to the OC and normally assists in the handling of classified material for the sub-unit.

17. The signal troop, platoon or section, when established with the resources, also provides:

- a. A small signal centre including -
 - (1) line locals and trunk access when conditions permit,
 - (2) SDRs, and
 - (3) a small message centre.
- b. First line maintenance of signal equipment.

SECTION 2

SIGNALS FOR ALL ARMS TEAMS

BATTLE GROUP

18. A battle group is an operational grouping of infantry and armour with other elements of supporting arms and services allocated according to needs. An armoured battle group has an armoured regiment and at least one company of infantry. An infantry battle group has an infantry battalion and at least one armoured squadron. Battle groups are balanced forces employed to match the ground, the enemy and the task to be performed. Details of composition and employment of battle groups may be found in:

- a. **Armoured.** B-GL-305-001/FT-001, Armoured Regiment in Battle.
- b. **Infantry.** B-GL-309-001/FT-001, Infantry Battalion in Battle.

19. Grouping offers the best method of achieving the balance of arms required for a particular battle situation. It is emphasized that these organizations are temporary and should not last beyond the end of a particular battle. A new situation will probably require a different grouping of forces. It is therefore clear that groupings and regroupings will occur often and that signal officers must remain alert and react quickly to these changes.

20. The signal officer of the predominant arm is responsible for coordinating the overall communication plan for the battle group. He must ensure that all elements are provided with CEOs and codes, and are integrated into the battle group command, control and information system. Supporting forces report with their own signal equipment which is compatible. It is therefore easy to co-ordinate the use of this equipment into normal systems for intercommunication between armour, infantry, artillery, etc.

21. It is usual for the signal officer to prepare for the necessary distribution of signal details immediately after the CO's OGP. Plans may be made to distribute signal information during the OGP, to save time. The signal officer must know the operational plans to prepare for adequate communications.

COMBAT TEAM

22. Battle groups are composed of all arms teams which are based on the sub-units of the predominant arm, with other arms elements attached. These combat teams are larger in size than a single arm sub-unit.

23. Forming of combat teams takes place after the command relationship between regrouped elements has been determined. In practice, elements are either under command or in support. This relationship changes the signal requirements as follows:

- a. under command, troops may require to be supported administratively; and
 - b. in support, troops retain their own command and control arrangements intact and usually do not require administrative support from the supported unit.
24. Signal plans must cater to these command and control arrangements and co-ordinate the exchange of signal material accordingly.

SECTION 3

SIGNALS IN UNITS

ARMOUR

25. A typical armoured regiment radio net diagram is shown in Annex N.

ARTILLERY

26. A typical artillery regiment radio net diagram is shown in Annex P.

ENGINEER

27. A typical engineer regiment radio net, diagram is shown in Annex Q.

INFANTRY

28. A typical infantry battalion radio net diagram is shown in Annex R.

AVIATION

29. A typical helicopter squadron radio net diagram is shown in Annex S.

SERVICE BATTALION

30. A typical service battalion radio net diagram is shown in Annex T.

FIELD AMBULANCE

31. A typical field ambulance radio net diagram is shown in Annex U.

MILITARY POLICE

32. A typical MP platoon radio net diagram is shown in Annex V.

LIST OF ABBREVIATIONS

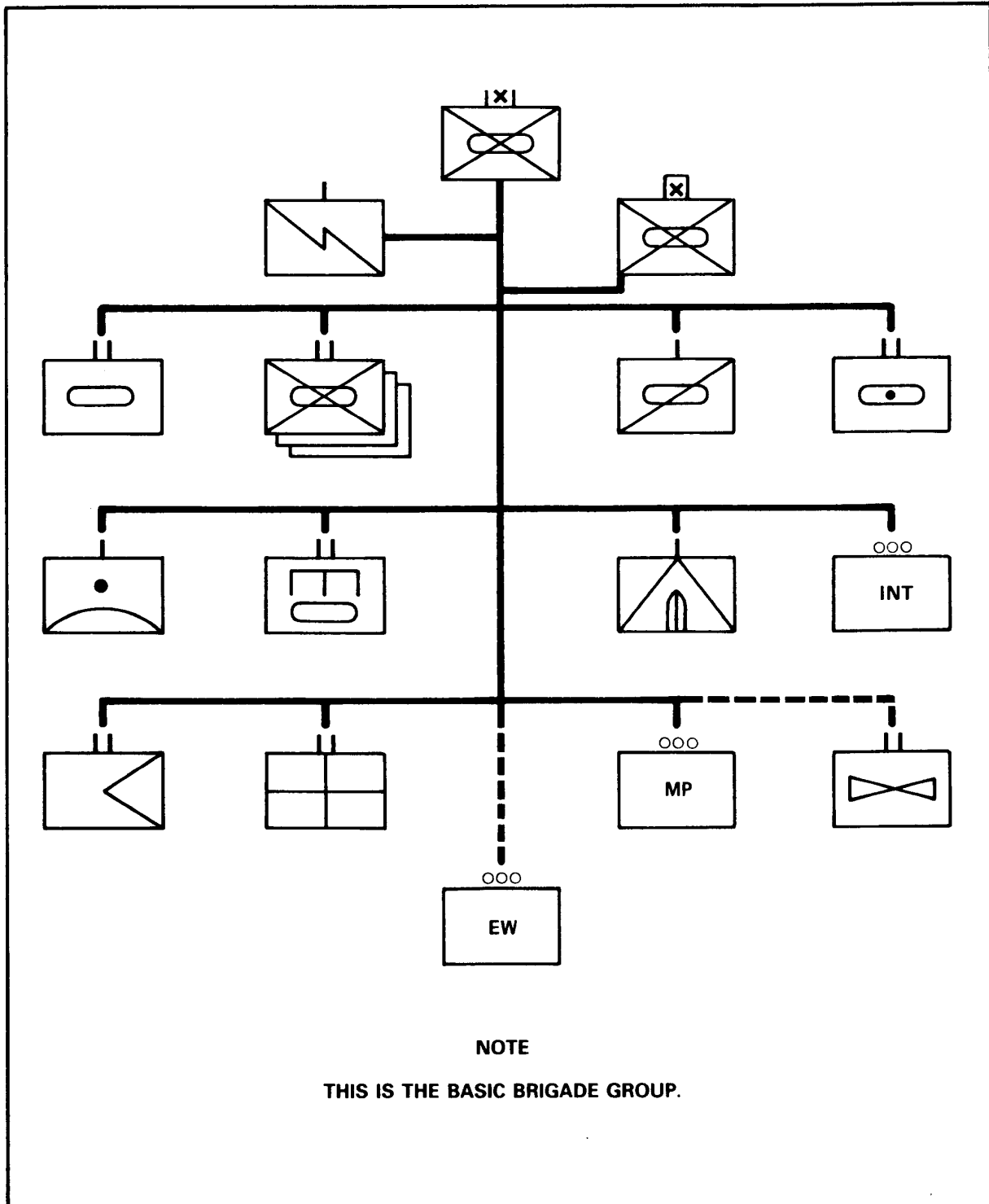
ACIS	automated combat information system
AD	air defence
adm	administration or administrative
ADP	automatic data processing
ADS	air despatch service
altn HQ	alternate headquarters
AT	anti-tank
bde	brigade
bde gp	brigade group
BFSM	battlefield frequency spectrum management
BSO	brigade signal officer
C-E	communications-electronics
CEOI	communications-electronics operating instruction
CNR	combat net radio
CO	commanding officer
COMSEC	communications security
CP	command post
CSS	combat service support
CW	continuous wave
DA	distributing authority
D&S	defence and security
DF	direction finding
DISGP	divisional service group
DP	delivery point
DR	despatch rider
DSO	duty signal officer
ECCM	electronic counter-countermeasures
ECM	electronic countermeasures
EMC	electromagnetic compatibility
EMES	Electrical and Mechanical Engineering Systems
EMP	electromagnetic pulse
EW	electronic war-fare
EWCC	electronic warfare control centre
FCC	facility control centre
FM	frequency modulated
FMDA	field mobile distributing authority
HF	high frequency
HQ	headquarters (including plural)

HQ and Sig Sqn	headquarters and signal squadron
LO	liaison officer
LZ	landing zone
MP	military police
MRT	mobile repair team
msgcen	message centre
NBCW	nuclear, biological, chemical warfare
NCO	non-commissioned officer
OC	officer commanding
OGp	orders group
OR	orderly room
POL	petrol, oil and lubricants
PRS	permissive repair schedule
QM	quartermaster
RADCON	radio control
RAP	radio access point
RECS	radio electronic combat support
RNIIS	radio net information identification system
RR	radio relay
RRB	radio rebroadcast
RWI	radio-wire integration
SCRA	single channel radio access
SDR	special despatch rider
SDS	signal despatch service
Sig CP	signal command post
SIGSEC	signal security
SOPs	standing operating procedures
syscon	system control
TA	target acquisition
tac avn	tactical aviation
tac CP	tactical command post
tels maint	telecommunications maintenance
UCR	unsatisfactory condition report
UHF	ultra high frequency
UMS	unit medical station

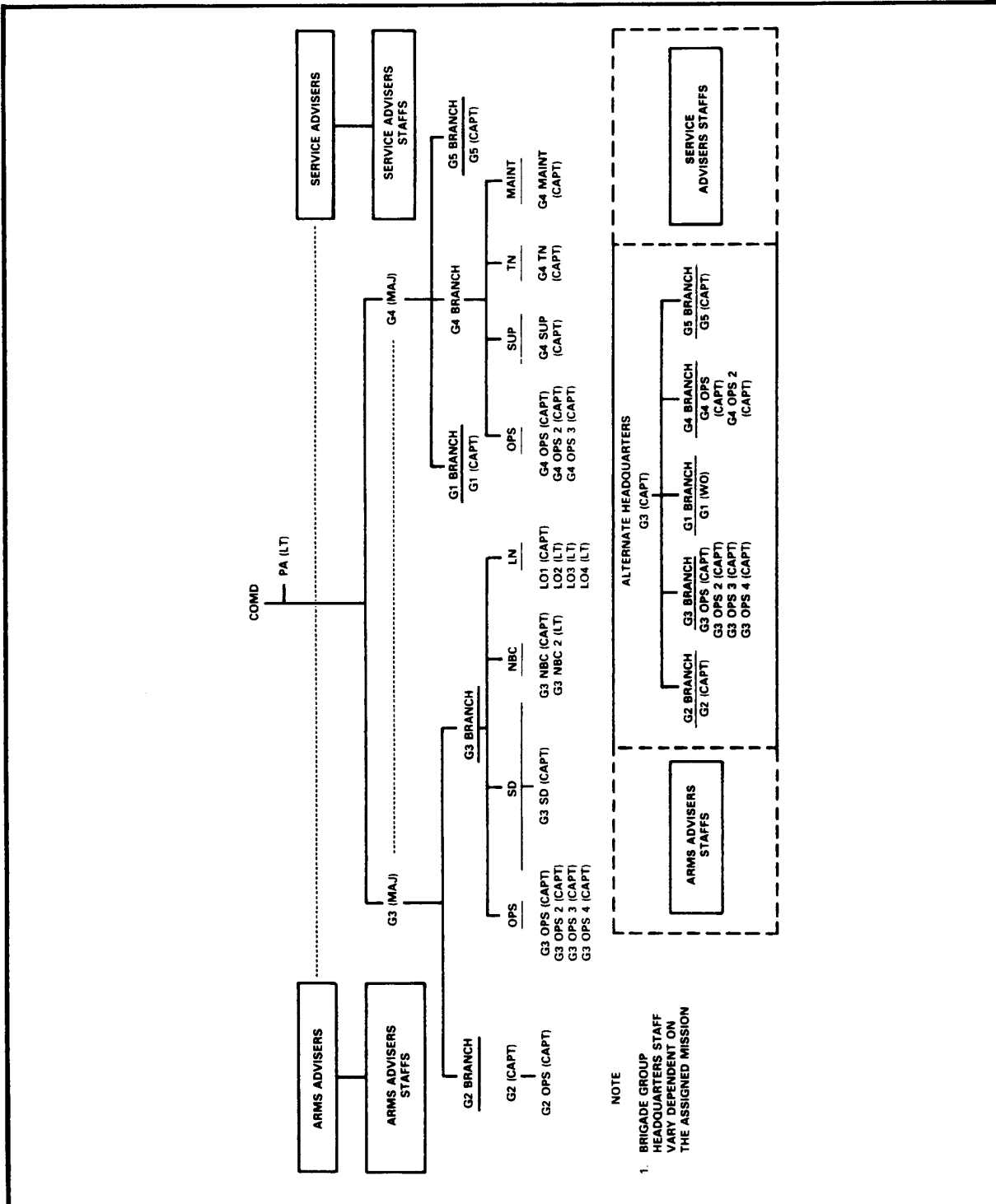
VHF

very high frequency

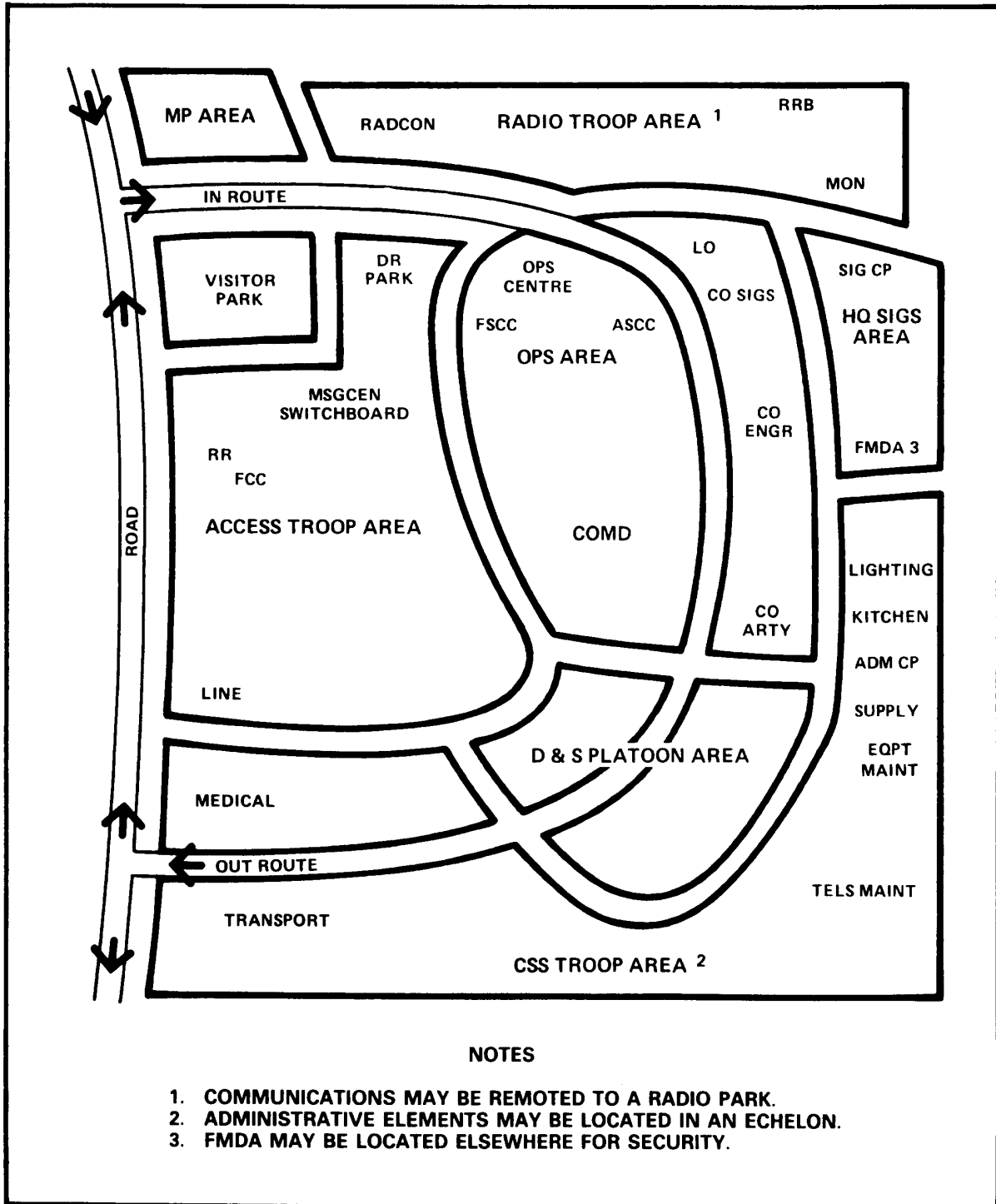
THE CORPS MECHANIZED BRIGADE GROUP



BRIGADE HEADQUARTERS STAFF (1) MAIN HEADQUARTERS



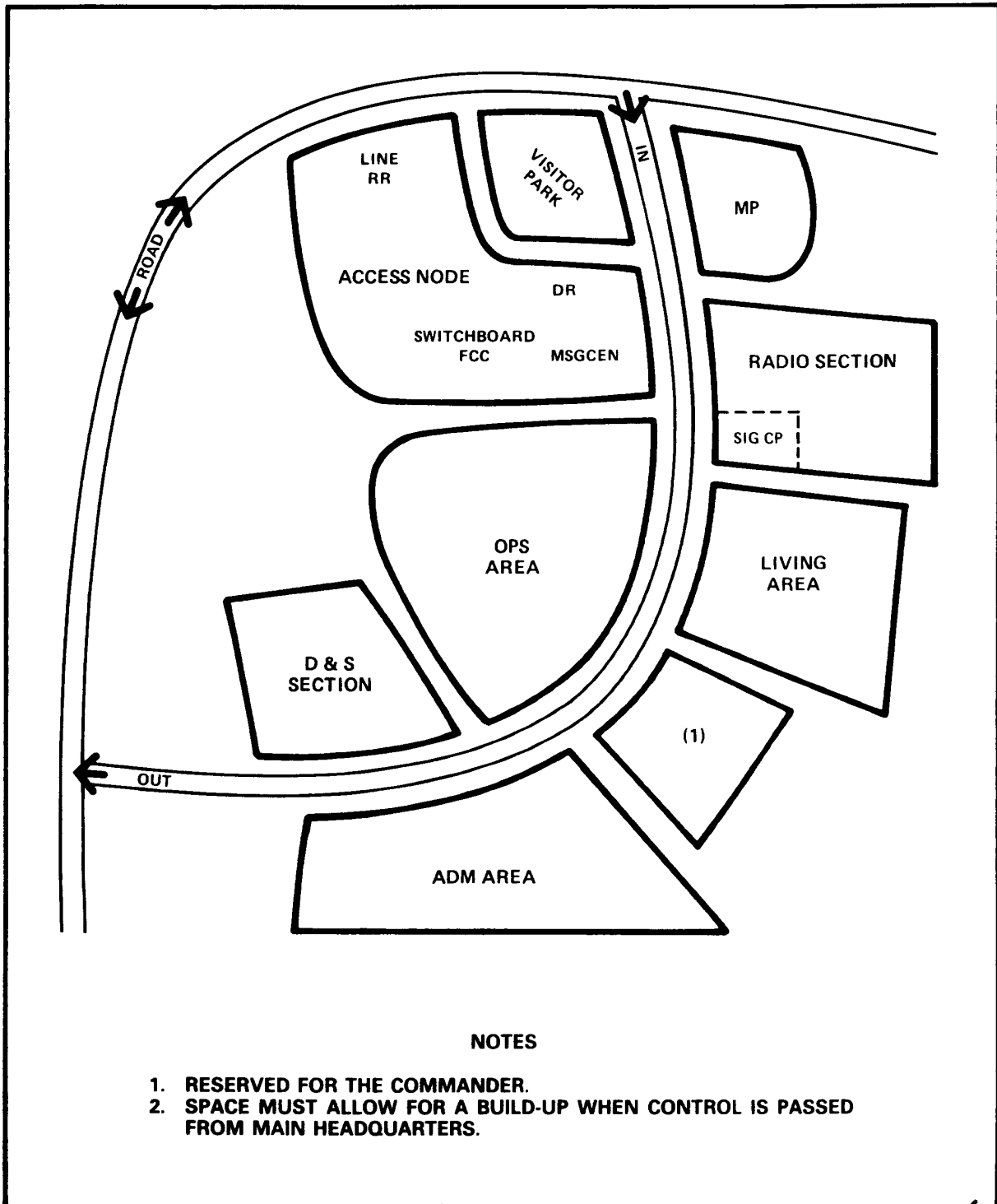
TYPICAL LAYOUT OF A MAIN HEADQUARTERS



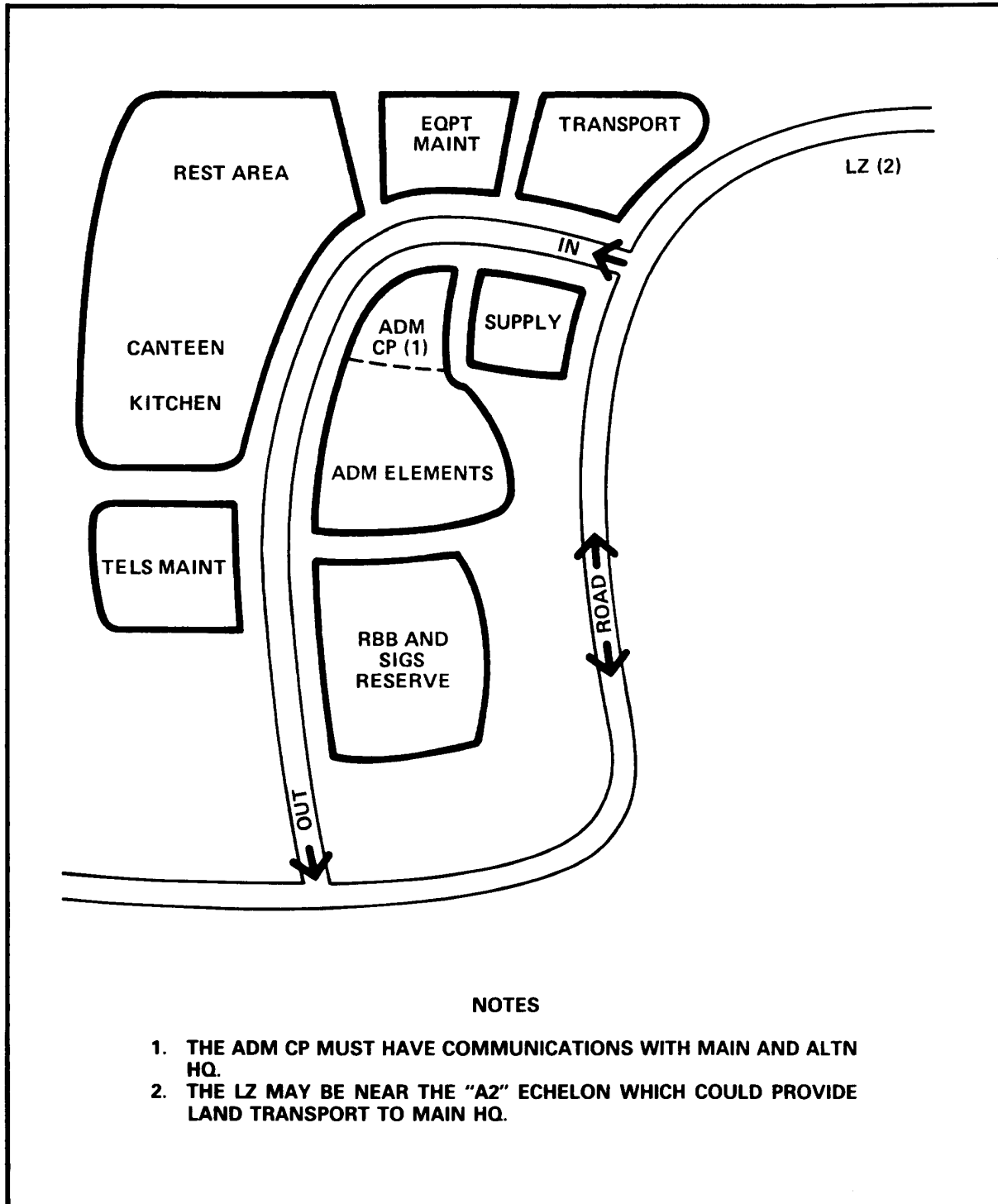
NOTES

1. COMMUNICATIONS MAY BE REMOVED TO A RADIO PARK.
2. ADMINISTRATIVE ELEMENTS MAY BE LOCATED IN AN ECHELON.
3. FMDA MAY BE LOCATED ELSEWHERE FOR SECURITY.

TYPICAL LAYOUT OF AN ALTERNATE HEADQUARTERS



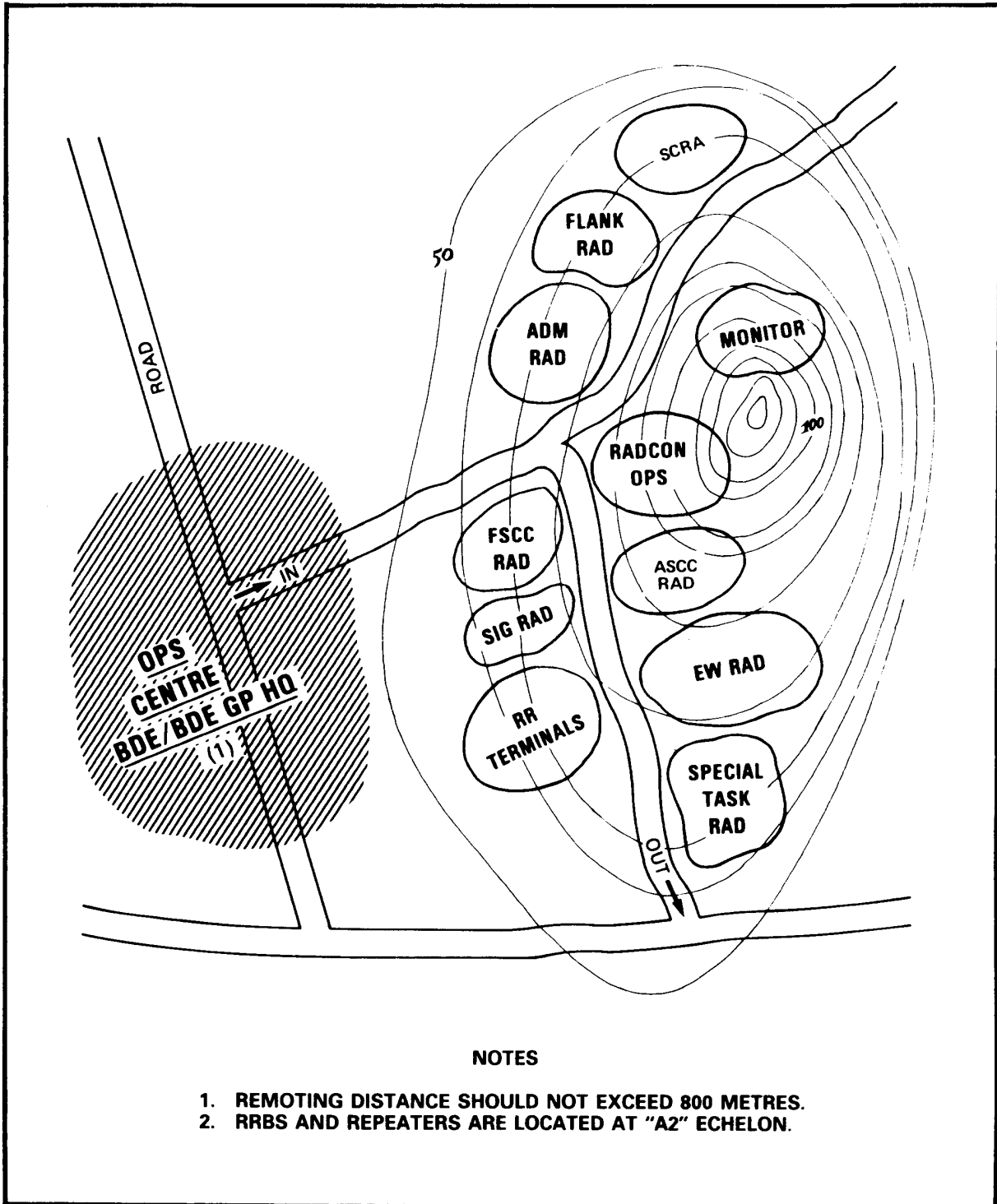
TYPICAL LAYOUT OF THE "A2" ECHELON



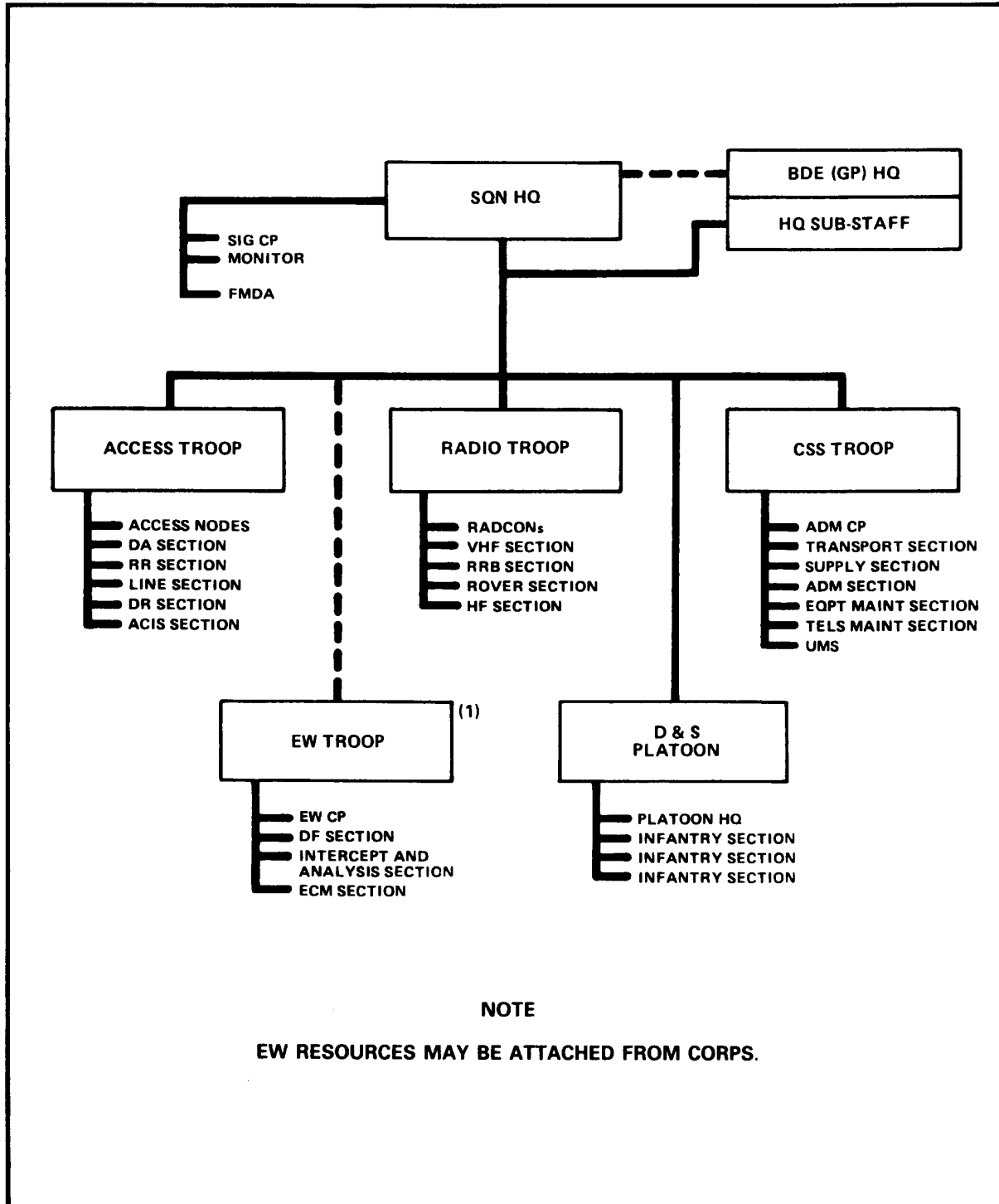
NOTES

1. THE ADM CP MUST HAVE COMMUNICATIONS WITH MAIN AND ALTN HQ.
2. THE LZ MAY BE NEAR THE "A2" ECHELON WHICH COULD PROVIDE LAND TRANSPORT TO MAIN HQ.

TYPICAL LAYOUT OF A RADIO PARK



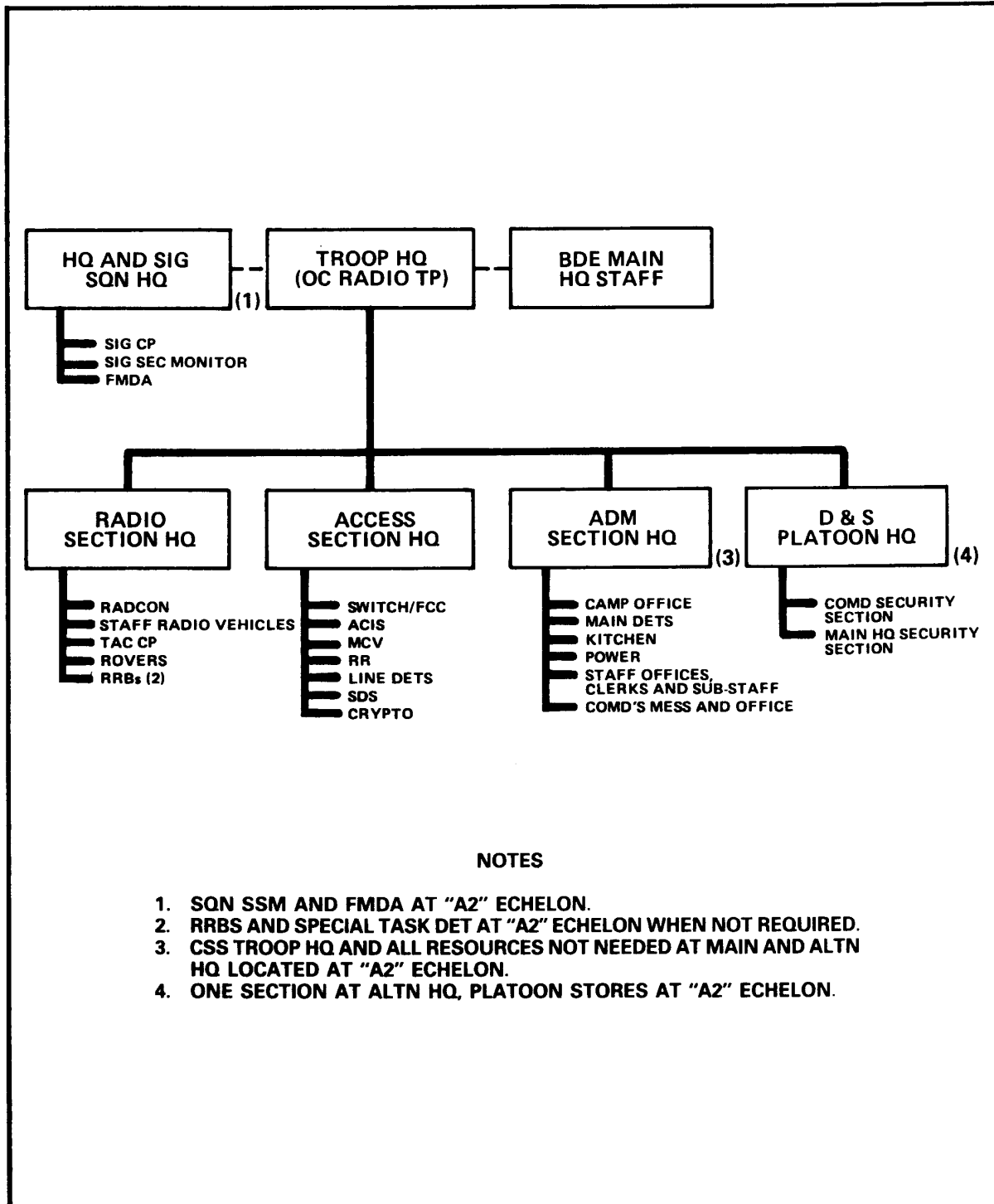
THE BRIGADE HEADQUARTERS AND SIGNAL SQUADRON



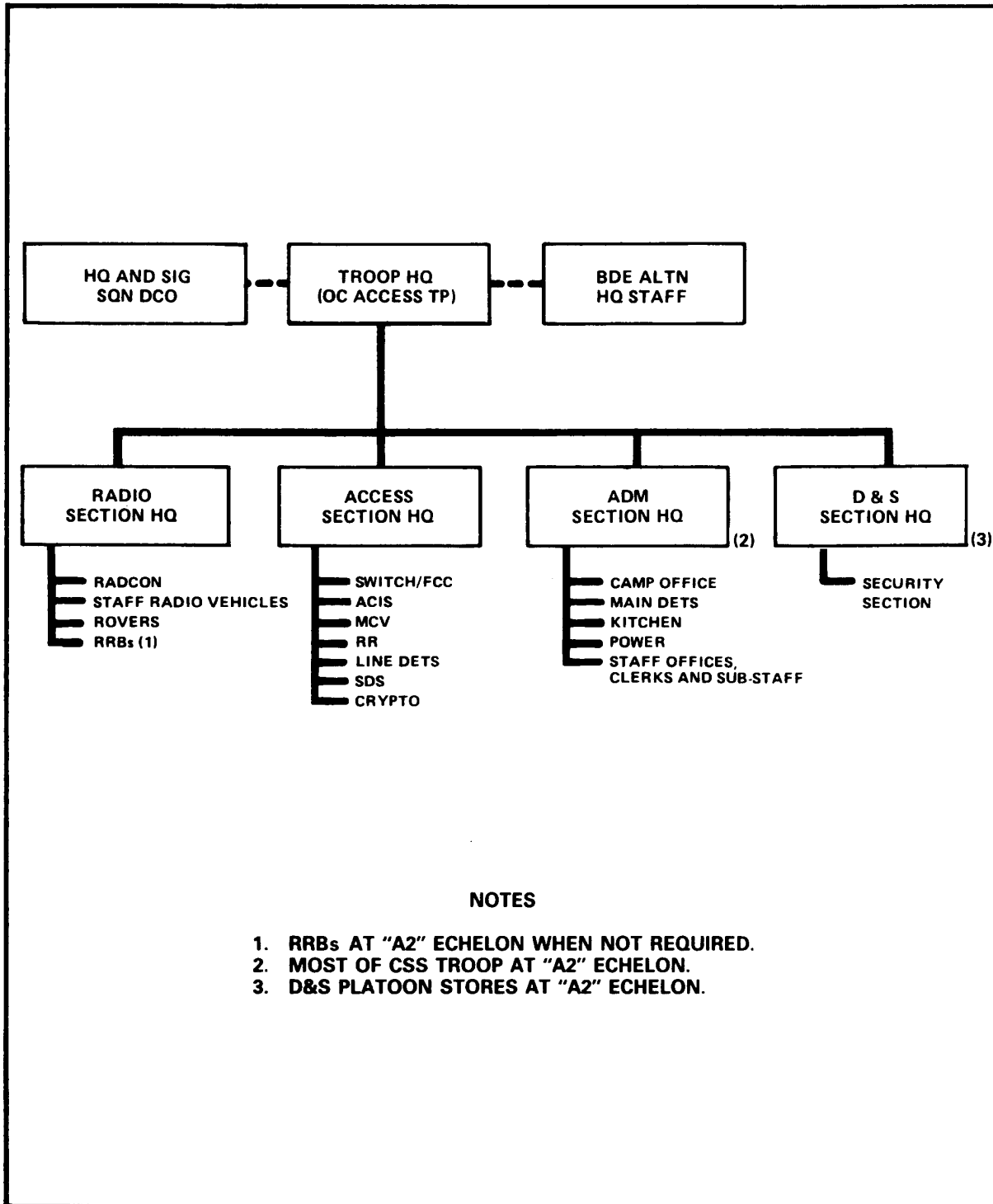
NOTE

EW RESOURCES MAY BE ATTACHED FROM CORPS.

MAIN HEADQUARTERS COMPOSITE SIGNAL TROOP



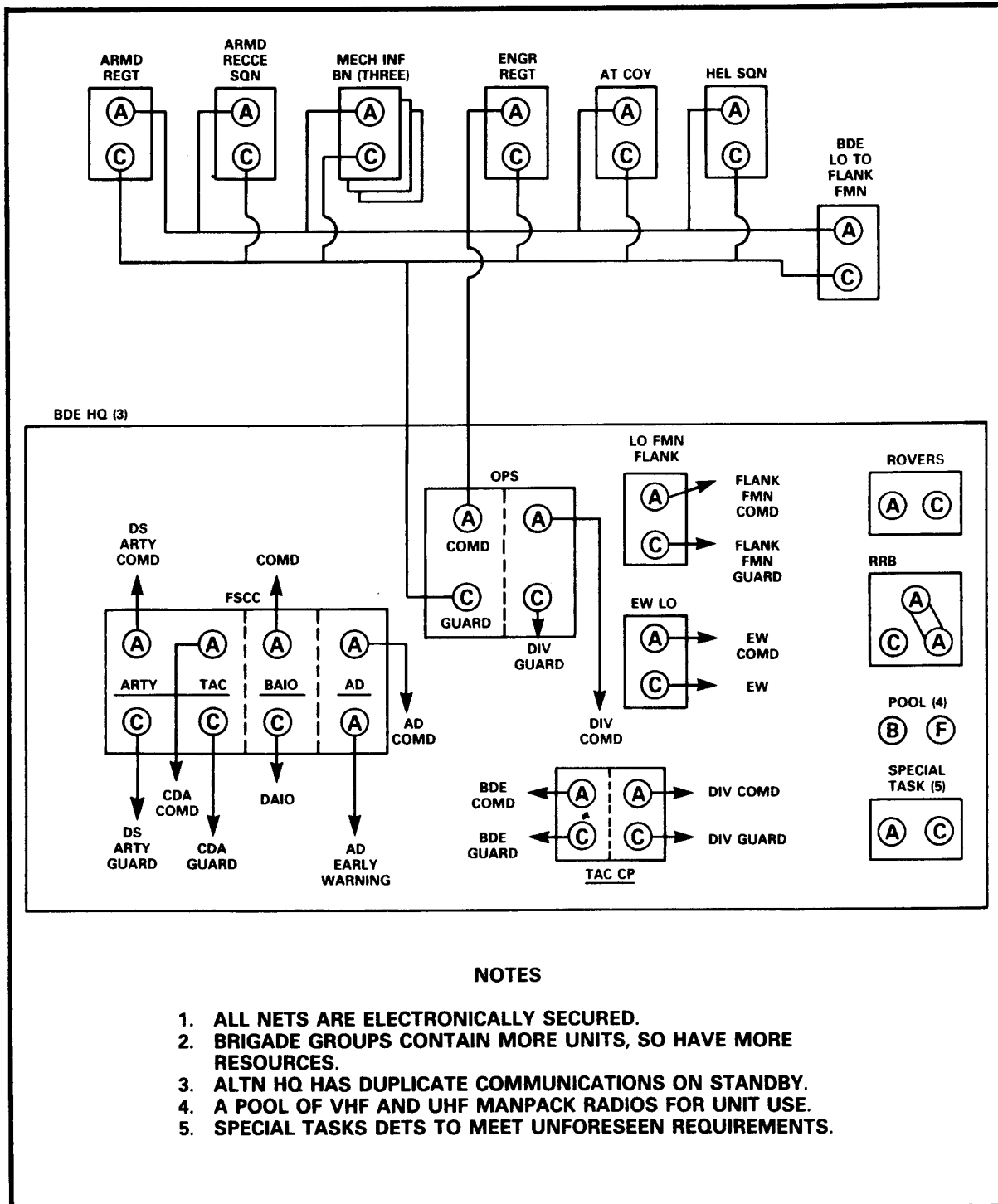
ALTERNATE HEADQUARTERS COMPOSITE SIGNAL TROOP



NOTES

1. RRBs AT "A2" ECHELON WHEN NOT REQUIRED.
2. MOST OF CSS TROOP AT "A2" ECHELON.
3. D&S PLATOON STORES AT "A2" ECHELON.

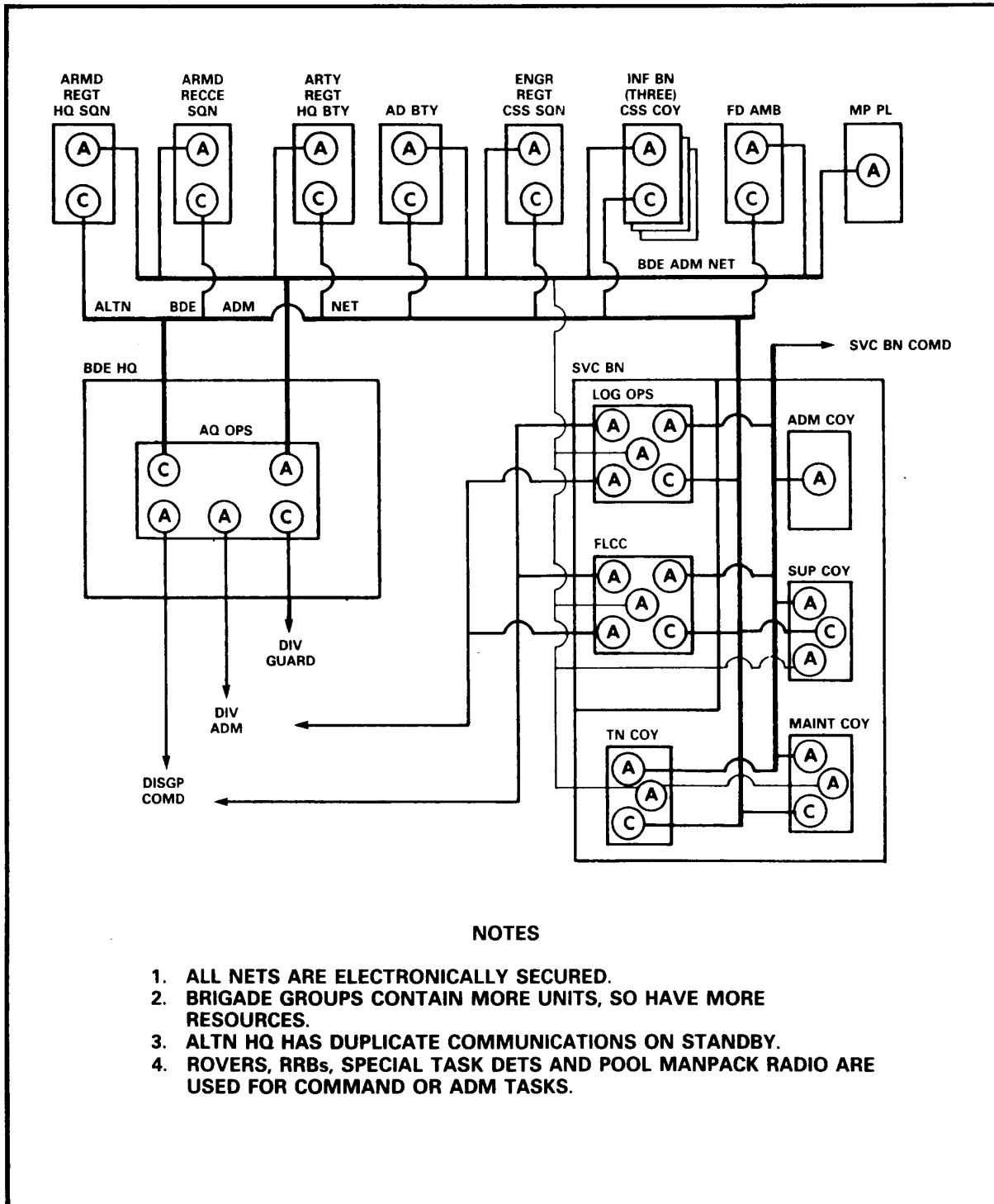
OPERATIONS NETS FOR THE BRIGADE (2)



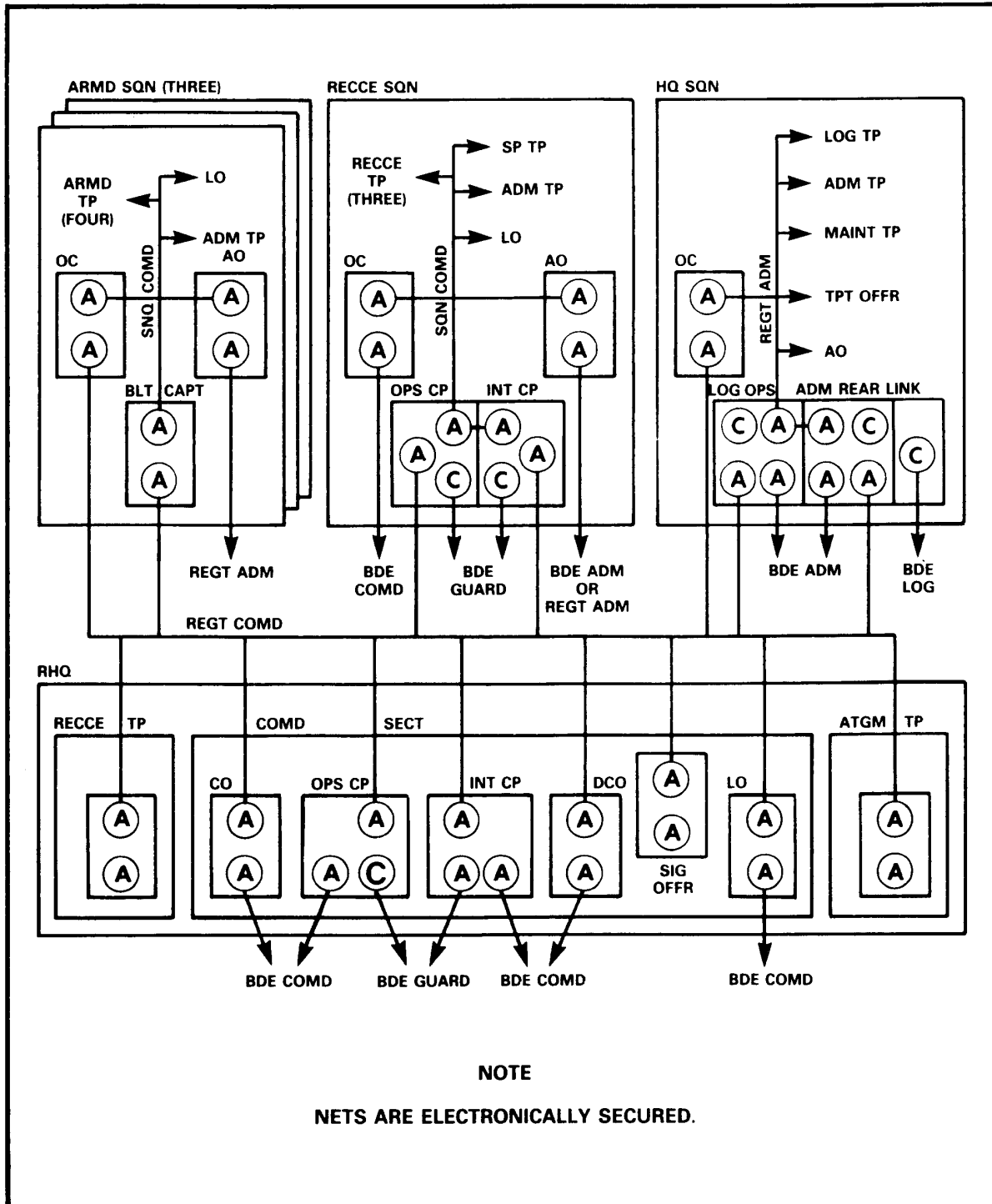
NOTES

1. ALL NETS ARE ELECTRONICALLY SECURED.
2. BRIGADE GROUPS CONTAIN MORE UNITS, SO HAVE MORE RESOURCES.
3. ALTN HQ HAS DUPLICATE COMMUNICATIONS ON STANDBY.
4. A POOL OF VHF AND UHF MANPACK RADIOS FOR UNIT USE.
5. SPECIAL TASKS DETS TO MEET UNFORESEEN REQUIREMENTS.

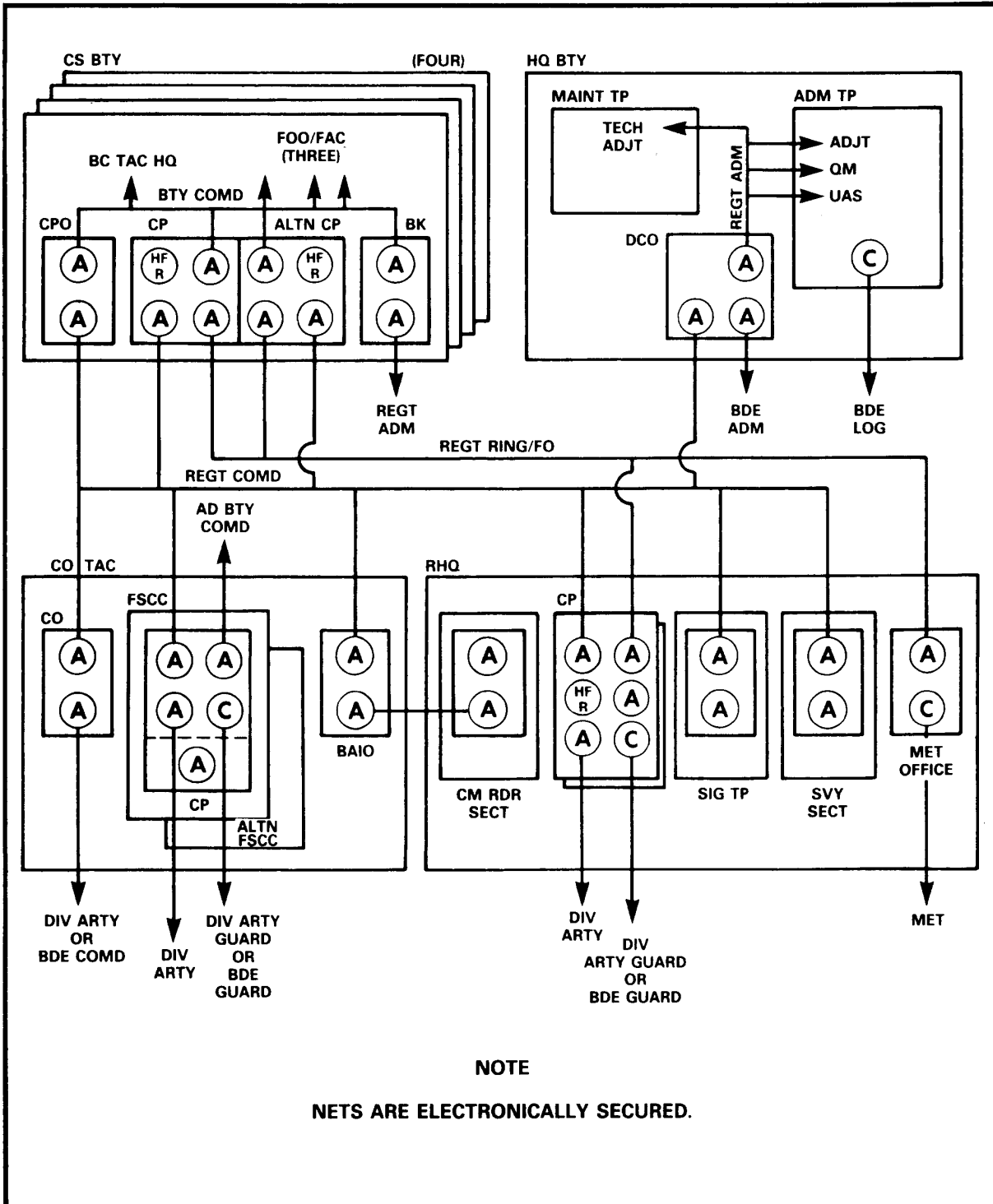
ADMINISTRATIVE NETS FOR THE BRIGADE (2)



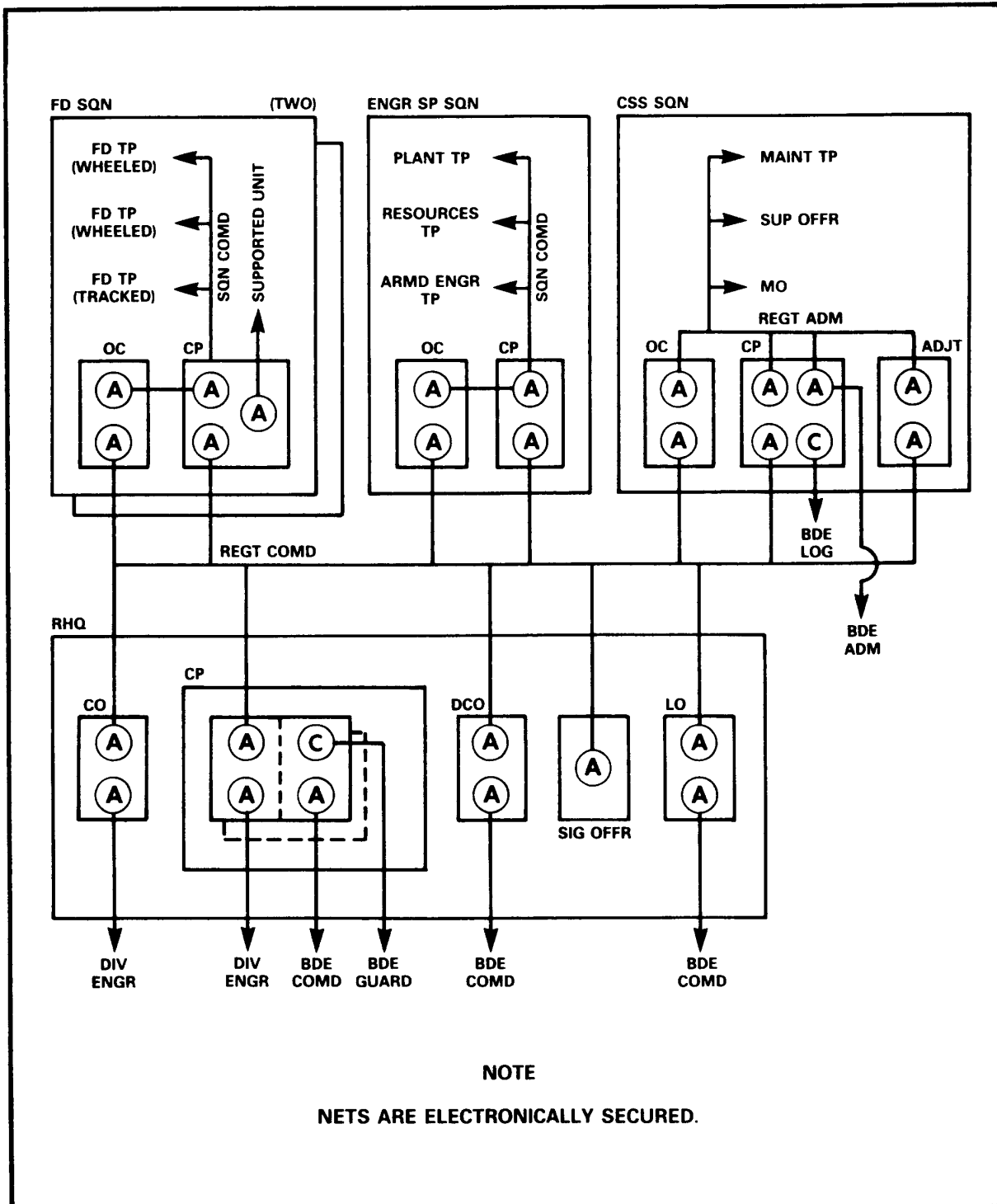
A TYPICAL ARMoured REGIMENT RADIO NET



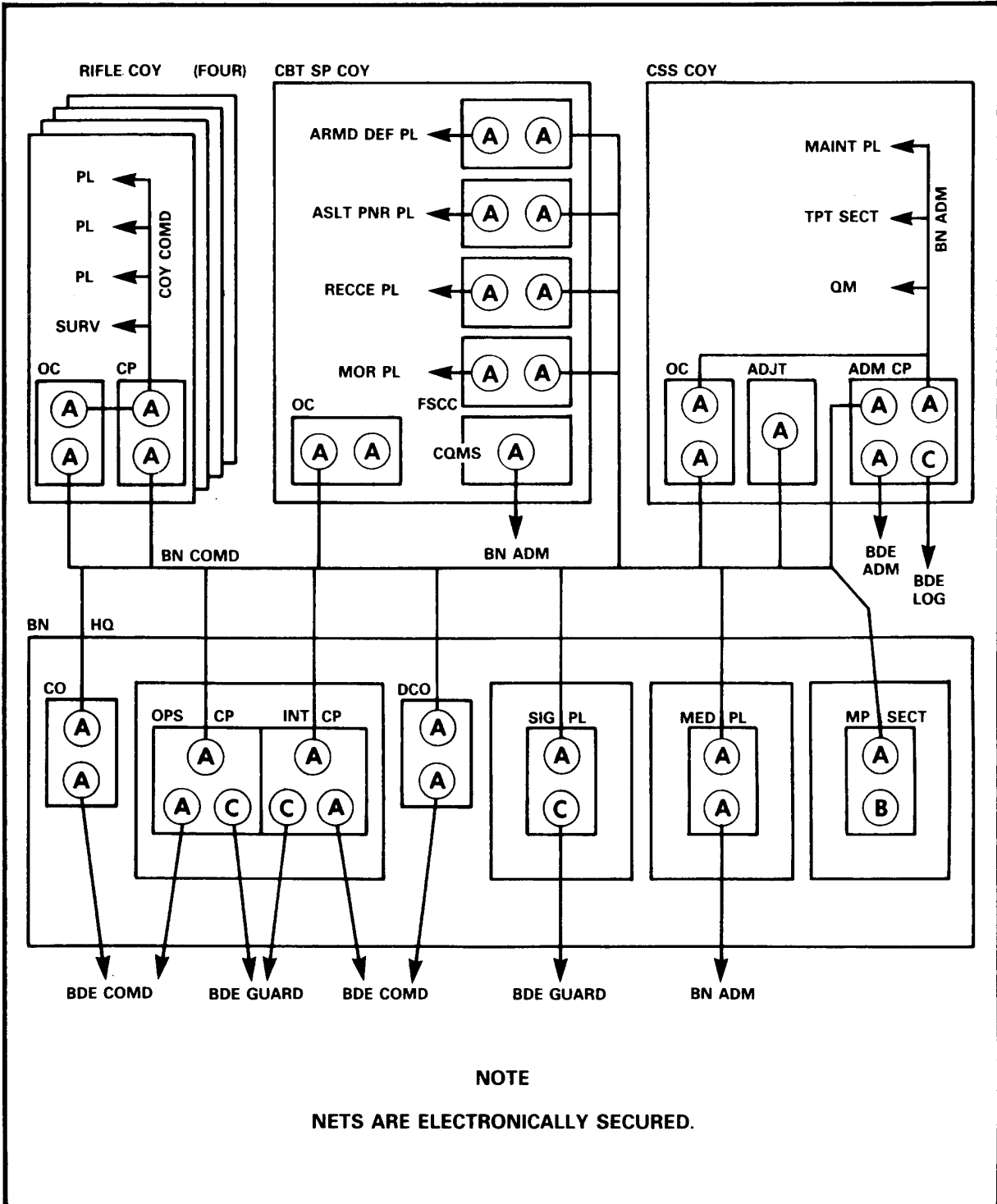
A TYPICAL ARTILLERY REGIMENT RADIO NET



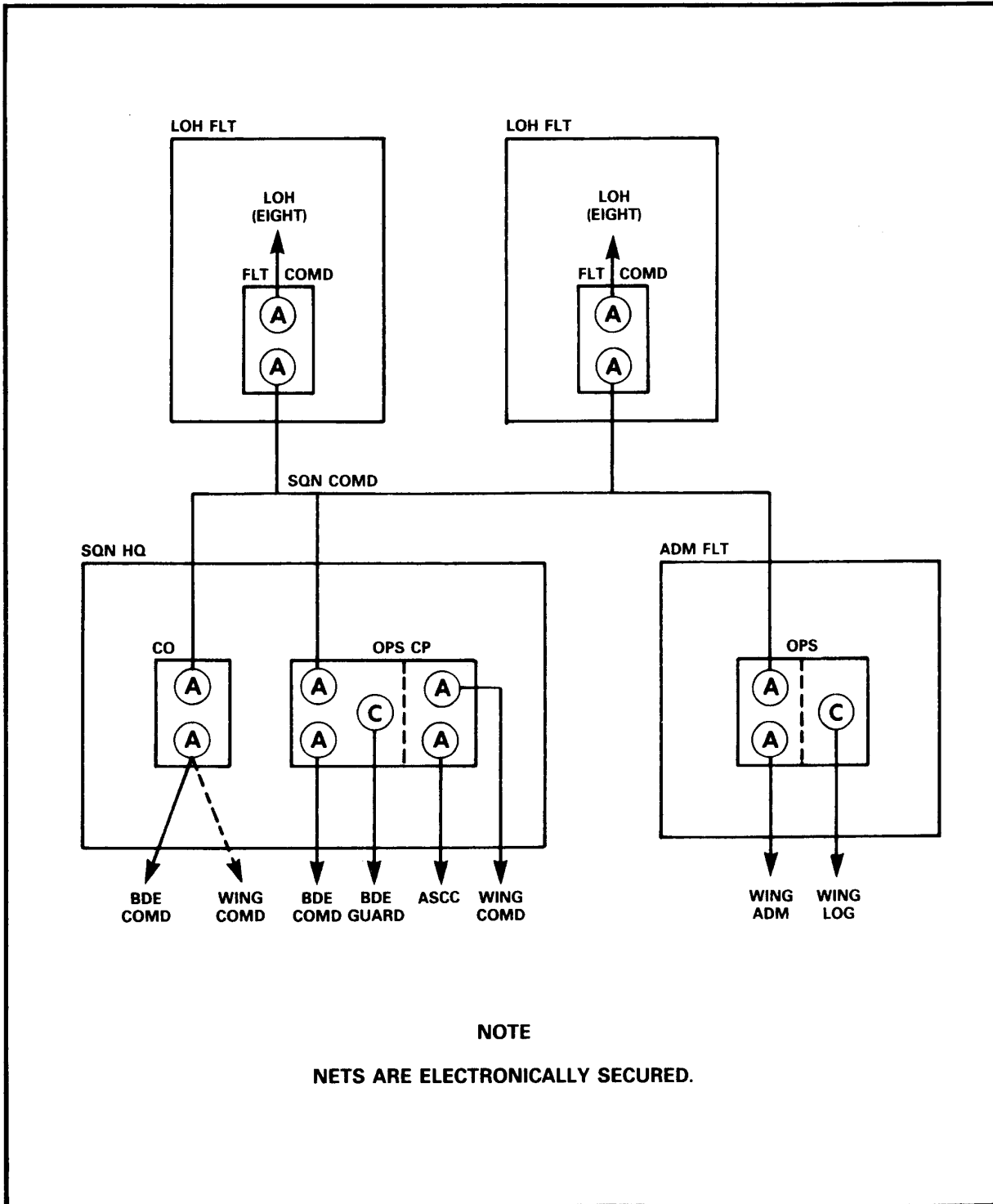
A TYPICAL ENGINEER REGIMENT RADIO NET



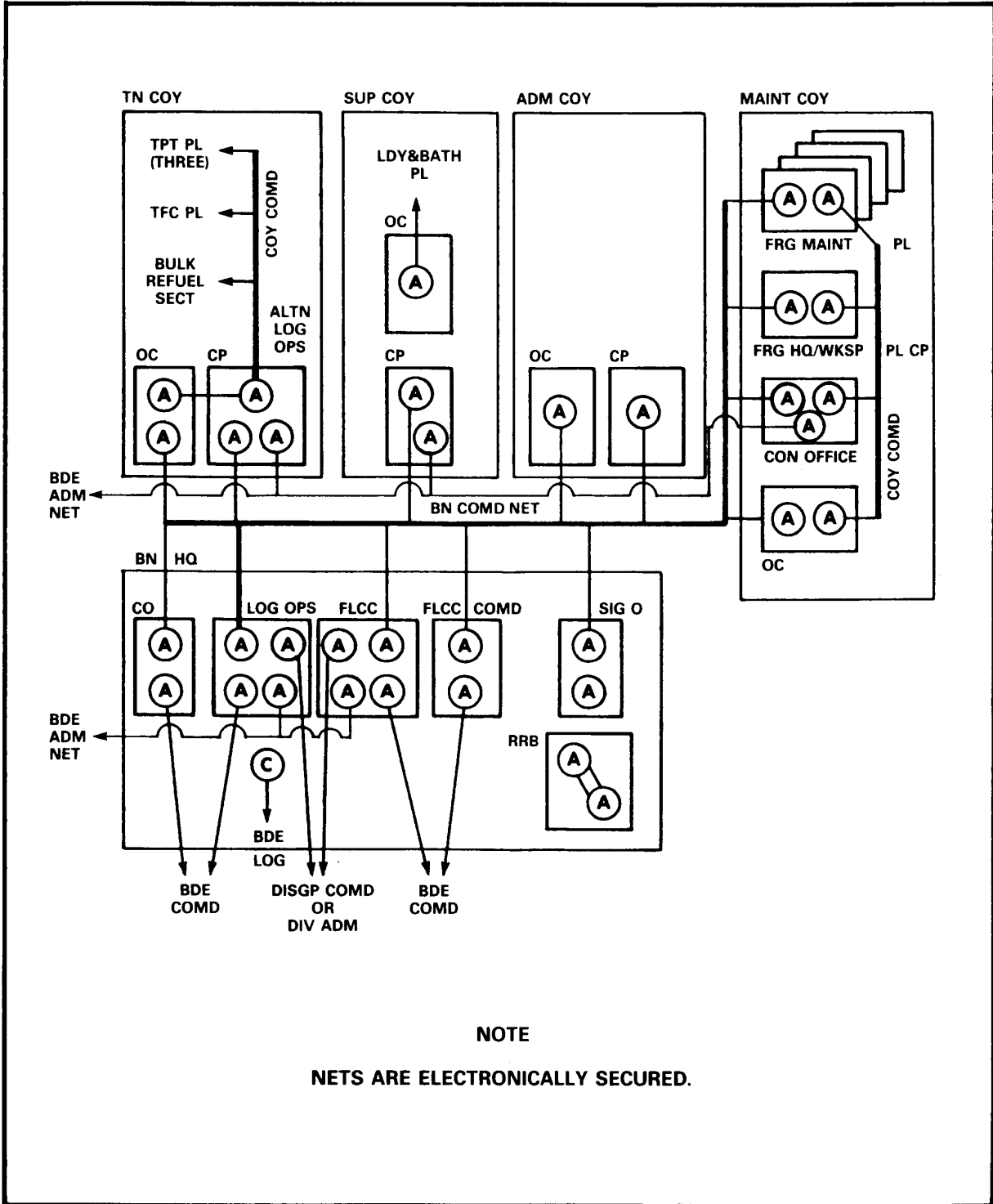
A TYPICAL INFANTRY BATTALION RADIO NET



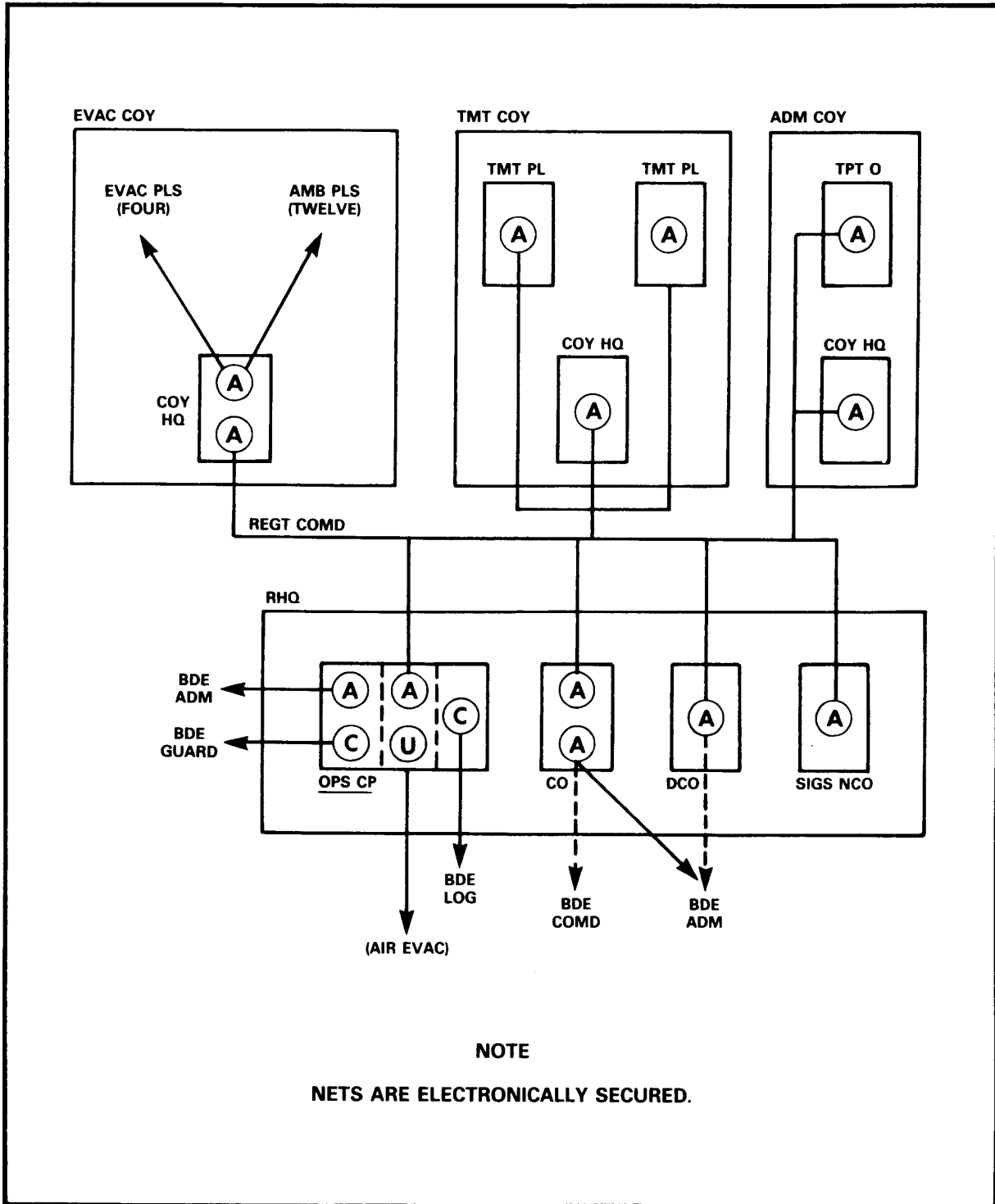
A TYPICAL HELICOPTER SQUADRON RADIO NET



A TYPICAL SERVICE BATTALION RADIO NET



A TYPICAL FIELD AMBULANCE RADIO NET



A TYPICAL MILITARY POLICE PLATOON RADIO NET

