CHAPTER 10

PLANNING

10-1. Introduction

a. C-E planning is a continuous process. It involves analyzing, allocating, and integrating C-E resources to support requirements. All commanders rely on communications to–

(1) Control elements of their command.
(2) Gather information.
(3) Distribute intelligence.
(4) Coordinate operations.

When you are out of communications, you are out of command!

b. Troposcatter communications planning is guided by the supported commander's priorities. It must be geared to accomplish the mission. The planning demands that all Company planners understand troposcatter radio capabilities and limitations. Further, the Company commanders must see that no details are overlooked.

c. This chapter provides an overview of C-E planning with emphasis on Company planning for troposcatter operations. It briefly discusses the standardized planning procedures and techniques that help to ensure all relevant factors are considered. Reference is made to other publications that provide more detail.

10-2. Troposcatter operations planning

a. Planning for Tropo Company employment is accomplished at TCC(A) and Theater Signal Brigade level. Plans and orders generally will originate at the Signal Brigade's communications system planning element (CSPE). When the Tropo Company is assigned to a composite battalion, the plans will be further developed by the battalion staff. The Tropo Company must advise higher commanders and staff of unit readiness and be involved in higher headquarters planning.

b. Technical operation of the tropo Sections is directed by the organic Technical Control Section (Light) or Operations Section (Heavy). The composite battalion CSCE assists in circuit direction on as near a real-time basis as possible. The CSCE also coordinates with the communications nodal control elements (CNCE) in the area system. FM 24-22 provides a detailed discussion of management and control planning under the C-E Management System (CEMS).

c. There are numerous functions that must be planned within the Tropo Company. Systems plans, diagrams, and circuit orders are prepared in the Company Operation Center primarily by the Company commander and area communications chief or C-E operations chief. Logistics support, unit movements, site preparation and defense, and so forth, are planned by the Company commander and all subordinate leaders. When doing so, they should follow the same sequence of commander and staff planning actions used by higher commanders and their staffs. This sequence, shown in figure 10-1, describes a logical and systematic way to solve problems. The extent to which each step (exclusive of the decision) is performed by the Company commander varies. It can be influenced by the situation and time available. Frequently, many of these steps are carried out concurrently. The initial step involves mission analysis-determining precisely what has to be done before determining how best to accomplish it. This decisionmaking process is described in detail in FM 101-5.

10-3. Plan development and orders

Tropo Company operations require extensive coordination and rapid adjustment to changing situations. Company facilities usually connect with multichannel radio and wire and cable facilities, as well as with each other, light and heavy troposcatter. The use of standardized planning/decisionmaking techniques will provide the detail necessary to achieve these ends. This paragraph provides a brief description of some techniques for Company planners. Reference is made to other publications for details. The best planning results from careful application of common sense to these fundamental planning techniques. C-E planning must be included in Company leader training.

a. Communications-electronics estimate of the situation. C-E planning starts with an estimate of the situation. This is a five-step process. Table 10-1 shows the basic process. At Company level, a mental estimate or informal written estimate is probably enough. The C-E estimate begins when a mission is assigned or deduced. The estimate is continuously updated. FM 24-16 contains a detailed discussion on the preparation of a C-E estimate.

b. Communications-electronics plan.

(1) The C-E plan amplifies the decision in paragraph 5 of the estimate. The C-E planning format is the same format used to develop an operation order (OPORD) and its C-E annex. Refer to table 10-2.

(2) Tropo Company planning involves anticipation of future resource needs. Many resource needs (for example, air transport, bulk fuels, and rations) must be obtained from other units or services. Planning matches what is required with what is available.

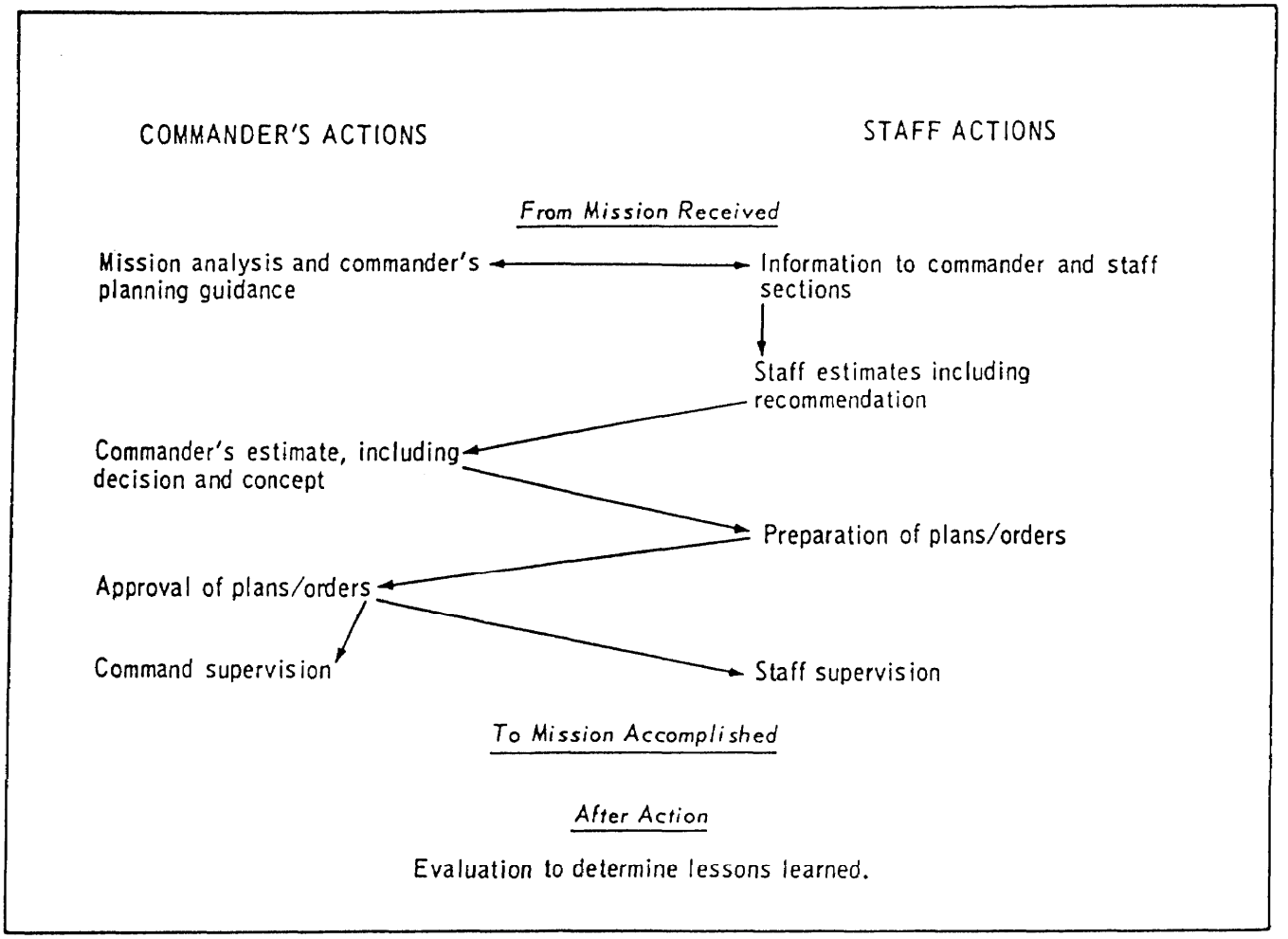

Figure 10-1. Commander and Staff Planning Actions.

If requirements cannot be met, either requirements must be reduced or more resources must reobtained. For detailed discussion on considerations for developing C-E plans, see FM11-23, FM 24-l, and FM 24-16.

(3) Weather, terrain, and the enemy are routine considerations in the estimate process. Unusual terrain and extreme climatic conditions have a significant effect upon troposcatter systems. Detailed information about operations in special climatic environments is found in the FM 90-series and FM 24-21. NBC warfare also presents unique circumstances. The NBC environment is introduced in Chapter 12 and discussed in detail in FM 3-100.

c. Classes of signal unit orders. Orders fall into two general classes: routine and combat.

(1) *Routine orders.* Routine orders cover administrative matters. The distance between elements of the Tropo Company makes control difficult. For this reason, the Company commander must make maximum use of SOPs and instructions. These documents have the authority of combat orders.

(a) Standing operating procedures. SOPs contain instructions which lend themselves to a definite or standardized procedure. In particular, the operation of C-E equipment, facilities, and systems requires SOPs. Other SOPs are prepared as required. Uniform practices established by SOPs promote understanding and teamwork and minimize confusion and error. FM 24-16 suggests subjects for signal unit SOPs.

(b) C-E operating instructions. CEOI provide the guidance communications users need to operate most command and control communications. The primary feature of the CEOI is the capability to change call signs, suffixes, and frequencies at least every 24 hours. The command CEOI is the only authorized document from which to extract call signs and frequencies. FM 24-16 should be consulted for a detailed description of the CEOI and how to use it.

(c) Allied and joint publications. A series of international agreements and procedures govern the operation of C-E systems in support of combined operations. Under certain circumstances, there may be memorandums of agreement or memorandums of understanding with a host nation. Other agreements and procedures are Allied Communications Publications

TABLE 10-1
FORMAT FOR THE ESTIMATE OF THE SITUATION

ESTIMATE OF THE SITUATION (See FM 24-16, app B, for an example of a C-E estimate.)

1. MISSION
   Know the problem.
2. THE SITUATION AND COURSES OF ACTION
   Assemble all the facts that bear on the problem.
   Consider difficulties that could adversely affect mission accomplishment.
   Determine possible solutions.
3. ANALYSIS OF OPPOSING COURSES OF ACTION
   Analyze each possible solution to determine advantages and disadvantages
4. COMPARISON OF OWN COURSES OF ACTION
   Compare possible solutions.
   Select solution that best solves the problem.
5. DECISION (OR RECOMMENDATION)
   Transcribe the selected solution into a decision (if it is the commander's estimate) or recommendation (if it is the staff's estimate).

(ACPs) and International Standardization Agreements (STANAGs). Joint Army, Navy, Air Force Publications (JANAPs) are a series of service agreements governing communications procedures in joint operations. The instructions in JANAPs agree with those in allied publications, and all take precedence over conflicting provisions of Army publications (AR 310-2). Appendix A lists pertinent ACPs, STANAGs, and JANAPs.

(2) *Combat orders.* Combat type orders pertain to operations in the field. They are used to direct, control, and/or govern the use of C-E assets. Detailed discussions of signal unit orders, procedures, and instructions are found in FM 24-16. Combat-type orders express the commander's concept of the operation. They convey instructions to subordinate commanders and must be clear, complete, and concise. Tropo Company officers and NCOs should make a practice of issuing instructions in the appropriate order format. There are three common types of combat orders.

(a) Warning order. A warning order gives advance notice of an operation or an order that is to follow. It contains as much information as is available at the time and is usually issued orally.

(b) Operation order. OPORDs detail coordinated actions necessary to carry out the commander's concept. They follow the standard five-paragraph format shown in Table 10-2. Company OPORDs can usually be issued orally.

(c) Fragmentary order (FRAGO). FRAGOs are essential for contingency and other quick-reaction changes to plans, such as command post (CP) and troposcatter site relocation, enemy jamming, or intrusions. They often can be issued orally and follow the OPORD format.

TABLE 10-2
FORMAT FOR A SIGNAL UNIT OPERATION ORDER

OPERATION ORDER (See FM 24-16, app C, for an example of a signal unit OPORD; also see app D for an example of a C-E annex.)

1. SITUATION
   a. Enemy forces (location, strengths, capabilities, activity).
   b. Friendly forces (task organization, locations, signal support).
   c. Attachments and detachments (units attached or detached and effective time).
2. MISSION (clear, concise statement of battalion or company mission).
3. EXECUTION
   a. Concept of operation (types and phasing of communications support).
   b. Tasks for subordinate units (specific tasks for subordinate signal units).
   c. Coordinating instructions (information common to two or more units concerning signal centers, C-E systems, messenger, wire, radio, and so forth).
4. SERVICE SUPPORT (information pertaining to rations, medical support, transportation, and other combat support matters).
5. COMMAND AND SIGNAL
   a. Command (location of command post).
   b. Signal (CEOI number in effect, reference to applicable C-E annex or SOP).

10-4. Records and reports

Accurate C-E records and reports are a necessity. They provide commander and staff with impartial and factual data about a unit's operations. Troposcatter operations records and reports are established by the Company Operations Center and Battalion CSCE. FM 24-16 discusses records and reports that pertain to signal operations, supply and maintenance, and unit readiness. Examples of many records and reports are also shown in FM 24-16, Appendix G.

10-5. Site planning

a. Troposcatter radio systems design and general location of sites are in the OPORD. The exact location must be selected and the system configured on the ground. Site planning is usually carried out at the platoon level. In many cases, the troposcatter section or team chief must do the site plan. The plan must consider communications requirements, logistics support, protection of resources, and the electronic threat. Light and heavy troposcatter terminals may also be collocated.

b. Planning considerations for troposcatter transmission paths differ from LOS paths due to the mode

of propagation. Troposcatter terminals should be sited on high ground whenever possible. A relatively flat hilltop location with good drainage is usually the most desirable site. Troposcatter site elevation is important because troposcatter path loss is highly dependent on the angle the antennas at each end of the path make with the horizon. Alternative site diagrams should be prepared for various antenna, generator, and shelter configurations. Coordination with engineers may be necessary for site preparation. See FM 24-21 for information on troposcatter siting, system operating techniques, and path engineering. Also see the microwave and troposcatter systems engineering data (information Sheet 1102) prepared by the Signal Center at Fort Gordon, GA.

10-6. Movement planning

Under AirLand Battle doctrine, a signal unit cannot expect to stay in one place very long, even at EAC. Supported units and CPs will be displacing. Troposcatter terminal sections will be constantly planning, installing, and moving facilities. Sometimes this must be done without Company level support. Sections must be able to set up, tear down, and reestablish communications faster than ever before. The Tropo Company commander should be aware of these mobility objectives and emphasize movement training. Constant coordination with supported headquarters planners is required for timely displacement.

a. Road marches.

(1) A primary concern is rapid movement of troposcatter elements in support of tactical operations. Road march planning must often be accomplished hastily. It consists of concurrently determining requirements, analyzing capabilities, and establishing priorities. Success or failure of a major mission may depend on the ability to move rapidly and reestablish necessary communications. The preparation of unit movement SOPs and movement training will help in achieving proficiency in road marching. Proper driver and preventive maintenance training also contributes to the quick and safe movement of the unit.

(2) The following routine items should be included in Company movement SOP:

(a) Loading plans.
(b) Composition of march units.
(c) Control measures.
(d) Rates of march.
(e) Time intervals and distances.
(f) Timing and duration of halts.
(g) Tasks during halts.
(h) Organization of reconnoiter parties.
(i) Security measures.
(j) Reporting instructions.
(k) Location of CP.
(l) Communications.

(3) Training must be conducted to test and check load plans, improve SOPs, and maintain operational efficiency. Integrate occupation of assembly areas and road marches into other types of training whenever possible. See FM 55-30 for details on motor transport operations.

b. Command post displacement. Signal personnel must be particularly proficient during CP displacement. Two methods of displacement are generally used: phased and total. In each case, site planning must be accomplished. FM 24-1 contains information concerning CP displacement during combat.

(1) *Phased Displacement.* In this method, minimum essential communications are installed at the new site. This provides communications for the first CP elements that displace. Continuity of operations is maintained as elements phase out of the old location and build up in the new area.

(2) *Total displacement.* In this method, operations close out at the main CP at a designated time, and all elements move at once. An alternate CP is established for command and control until the main CP has displaced and has sufficient communications.

c. Air, water, and rail movement.

(1) Tropo Company deployment to a theater may involve one or all three of these types of movement. Support of rapid deployment forces will require air movement. Higher headquarters coordinates with appropriate units (Air Force, TAACOM, and so forth) and plans for the specific types of movement. The Company must have basic plans and SOPs for movement by air, sea, or rail. Designated unit personnel should be trained in air-loading procedures. Rail movement is often a Company responsibility. Coordination with movement experts is mandatory. This ensures that all unique aspects of the C-E equipment/unit are addressed.

(2) Specific plans for known operations must be developed in advance. This avoids confusion at the air, sea, or rail embarkation point. Units moving into such ports must be prepared to sustain themselves. Delays can occur and rations and supplies may not be available. Safety, SOPs, and unit training are essential, See AR 55-355, Chapter 214, for additional information on movement planning.