AD-A057 482 ARINC RESEARCH CORP ANNAPOLIS MD F/G 17/2
BASE COMMUNICATIONS IMPLEMENTATION MANAGEMENT PLAN.(U)
MAY 78 W J HODIN, K J BRAMAN, M M ECKHARDT DAEA18-72-A-0005
UNCLASSIFIED 1079-01-1-1757 NL

1 OF 2
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LEVEL II

Publication 1079-01-1-1757

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AD A057482

BASE COMMUNICATIONS IMPLEMENTATION MANAGEMENT PLAN

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78 08 15 043

Prepared for

HEADQUARTERS
U.S. ARMY COMMUNICATIONS COMMAND
Fort Huachuca, AZ 85613

Under Contract DAEA18-72-A-0005-0012

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 1079-01-0-1757	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Base COmmunications Implementation Management Plan		5. TYPE OF REPORT & PERIOD COVERED
		6. PERFORMING ORG. REPORT NUMBER 1079-01-0-1757
7. AUTHOR(s) W.J. Hodin M.M. Eckhardt K.J. Braman A.N. Winter		8. CONTRACT OR GRANT NUMBER(s) DAEA18-79-A-0005-0010
9. PERFORMING ORGANIZATION NAME AND ADDRESS LIBRARY ARINC RESEARCH CORP. 2551 RIVA ROAD ANNAPOLIS, MD. 21401		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U. S. Army Communications Command Fort Huachua, AZ 85613		12. REPORT DATE MAY 1978 13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) smae as above		15. SECURITY CLASS. (of this report) UNCLASS- UNLIM 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

UNCLASIFIED-Unlimited

DISTRIBUTION STATEMENT A
Approved for public release
Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A management plan for the systmeatic upgrade, commnications services at approximately 400 Army bases i spreserntd. The plan describes procedures for centralized coordination of user requirements and system design to acheive ARMY wide commonality and attendant benefits under the USACC Base Communications Plan. (BASCOP).

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

(5)

(2)

BASE COMMUNICATIONS IMPLEMENTATION MANAGEMENT PLAN,

(9) Final draft rept.

(11) May 1978

(12) 130 p.

Prepared for

HEADQUARTERS
U.S. ARMY COMMUNICATIONS COMMAND
Fort Huachuca, AZ 85613

Under Contract (15) DAEA18-72-A-0005-0012

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DDC
AUG 15 1978
F

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(14) Publication 1979-01-1-1757

490 247

(15)

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– Final Draft –

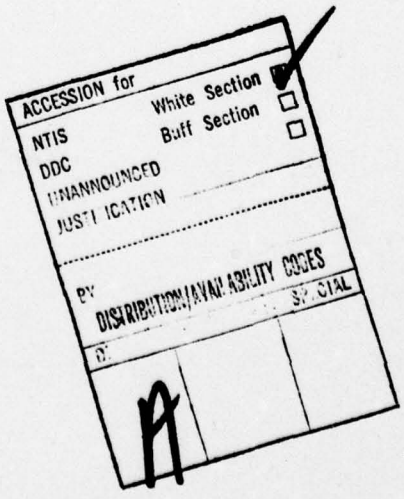
BASE COMMUNICATIONS IMPLEMENTATION MANAGEMENT PLAN

May 1978

HEADQUARTERS
U.S. ARMY COMMUNICATIONS COMMAND
Fort Huachuca, Arizona 85613

ABSTRACT

A management plan for the systematic upgrade of communications services at approximately 400 Army bases is presented. The plan describes procedures for centralized coordination of user requirements and system design to achieve Army-wide commonality and attendant benefits under the USACC Base Communications Plan (BASCOP).



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Section 1
INTRODUCTION

1.1 GENERAL

The U.S. Army Communications Command (USACC) has initiated the Base Communications Plan (BASCOP) to provide improved communication services at reduced overall cost on Army bases. This objective will be accomplished through systematic replacement of obsolete equipment with reliable, advanced-technology equipment (e.g., electronic digital switching systems and wideband digital distribution systems) capable of providing fully integrated inter/intra-base communications systems. Figure 1-1 illustrates the approach to and the outline of the upgrade process as presented in the indicated sections of this document.

1.2 PURPOSE

This document, when approved, shall establish and define procedures to be followed in the definition of communication requirements, network engineering, equipment selection, life cycle configuration management, and equipment installation at each Army base world-wide. As such, this document prescribes the format, descriptive data, content, and organizational responsibilities for development and publication of a Site Telecommunications Plan for each Army base. Due to manpower/resource constraints, development of the Site Telecommunications Plan and documentation will be in accordance with the BASCOP upgrade cycle derived from the ATCOGS (see ref. 8, page 1-3).

1.3 SCOPE

The information contained herein is directive in nature and is applicable to all Army activities responsible (either directly or indirectly) for advance planning, programming, funding, engineering, procurement, installation, and activation of facilities and equipment that fall under the purview of BASCOP. It shall be encompassing for all communications systems, equipment, and services required for base communications at the prescribed Army installations, whether Government owned or commercially leased.

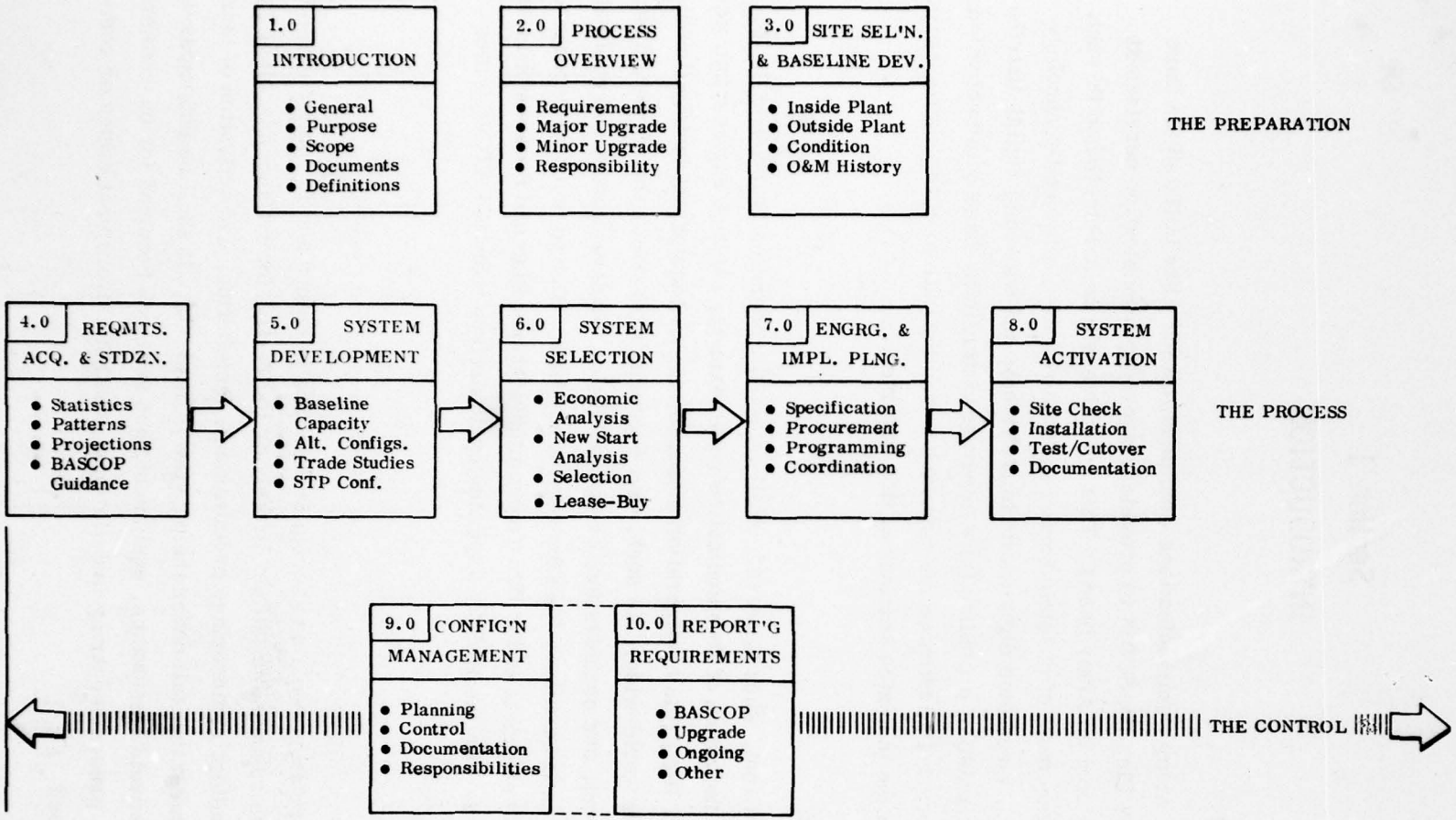


Figure 1-1. Upgrade Process Control Document Summary

1.4 APPLICABLE DOCUMENTS

1. AR 11-28, Economic Analysis and Program Evaluation for Resource Management
2. AR 70-32, Work Breakdown Structure for Defense Material Items
3. AR 70-37, Configuration Management and USACC Supplement I thereto
4. AR 105-22, Telecommunications Requirements Planning, Developing, and Processing
5. AR 235-5, Management of Resources — Commercial and Industrial-Type Functions
6. AR 350-XXX, New Equipment Training and USACC Supplement I thereto
7. AR 415-15, Military Construction, Army (MCA) Program Development
8. Army Telecommunications Combat and General Support 5 Year Plan (ATCOGS)
9. HQ USACC Base Communications Plan (BASCOP), September 1977 and Supplement thereto
10. CCR 105-12, Communications-Electronics System/Project Management/ Implementation
11. CCR 105-13, Communications-Electronics Mission Order (CEMO) System
12. CCR 105-14, USACC Telecommunications Traffic Management
13. CCR 415-2, Construction of Real Property Facilities

1.5 DEFINITIONS

Specialized terms, abbreviations, and definitions applicable to this program are listed below.

a. Aerial cable. Cable installed above ground on poles or similar overhead structures.

b. Base Communications Implementation Management Plan. The directive document defining the management policies and concepts, responsibilities, procedures, and documentation to be utilized in the implementation of the BASCOP.

c. Base Communications Officer. That individual at each Army installation responsible for communications services, e.g., the Post Signal Officer.

d. Base Communications Plan (BASCOP). The plan for Army-wide replacement and upgrade of existing communications systems and/or facilities at approximately 400 Army bases in CONUS and overseas over a 20-year period.

e. Buried distribution wire. Commonly referred to as "buried drop wire", it is generally used for distribution of circuits, service entrance wiring, etc. Installation is by direct burial, normally 6 to 18 inches deep by any method. While the use of buried distribution wire may be specified by the engineering activity, its requisition and installation is a function of the post communications operations and maintenance activity.

f. Cable multiple sheet. A drawing, prepared by the engineering activity, that displays the cable pair counts and pair assignments for each cable leg and terminal, and identifies those cable segments and terminations that have cable pair counts in multiple with other cable segments and terminations in the same cable sheath.

g. Carrier, cable or open wire. The equipment used to increase the number of voice paths between two points by multiplexing each voice path for transmission at a different frequency and demuxing back to voice frequency at the receiving end.

h. Coaxial cable. A special form of single or multiconductor, shielded cable with constant impedance over its length, and designed for radio frequency (RF) transmission.

i. Commercially leased system. Systems or equipment owned, operated, and maintained by a commercial enterprise, and where periodic recurring charges for the service are paid by the using activity.

j. Demuxing (or demultiplexing). The process of breaking a previously multiplexed RF signal back down into separate voice frequencies.

k. Drop wire. Paired wire, usually 17 gauge and normally aerial, which connects the end telephone instrument to the outside cable or open wire plant.

l. Fill table. The data depicted in tabular format on the outside plant schematic drawing. The top line shows the cable size, pairs presently in use, and percentage of the total available pairs presently in use; the second lines shows the change during the current fiscal year, and the third, fourth, and fifth lines show the change for each succeeding year in the 3-year forecast period. (The first two entries appear above the cable line, the others below it.) These data are usually referred to as cable fill data.

m. Firmware. Software in fixed or wired-in storage, as in "read-only memory".

n. Fundamental plan. Essentially a layout of the base which is developed from the Base Master Plan. Depicts the location of all pertinent Military Construction, Army (MCA) items and the main cable routes of the base telephone system in relation to streets, buildings, and service areas. Functions as a key map for the outside plant schematic drawing.

o. Government owned system. Systems or equipment owned by the Government, whether operated and/or maintained by the Government or a private firm under contract thereto.

p. House cable. The main risers and horizontal cables and terminals within a building. Also, those cables extending from a riser cable or floor cross-connect to various house cable terminals. House cables are those permanently installed cables that become a part of the communications-electronics plant-in-place records. Key system cables and station wiring extending beyond the cable terminals are the responsibility of local operation and maintenance units.

q. Inside plant. For the purpose of separation of areas within BASCOP, the inside plant is defined as including the equipment (or horizontal) side of the main distributing frame (MDF), and all equipments inward from that point to include dial central office (DCO) equipment, private automatic branch exchange (PABX), switchboard, etc., and cabling.

r. Main distributing frame. The item of equipment where the inside plant cables are terminated on the horizontal side of the frame and the outside plant distribution cables are terminated on the vertical side of the frame. The inside plant and the outside plant are connected at this point via semi-permanently installed cross-connects or jumper wires.

s. Multiplex equipment. The equipment necessary to take several audio signals and transmit all of them simultaneously on a single RF path.

t. Outside plant. Includes the base communications system cable plant extending from the vertical side of the main distributing frame outward to each of the end instrument locations. For purposes of this document, outside wiring from the cable terminal to the end instrument and the end instrument itself are not included.

u. Outside plant schematic. A nonscaled pictorial representation of the outside cable plant, displaying detailed cable and fill data. Data include cable size and type; gauge; length; existing and future cable fill; general routing; buildings serviced; proposed cable changes, additions, removals, and rearrangements; and the fiscal year of the change.

v. Plant-in-place records. For purposes of this document, these records are the documents, lists, and drawings as identified in Appendix A that describe the communications systems equipments and supporting structures of a capital nature, e.g., inside plant and outside plant of the base.

w. Site Telecommunications Plan. The single document for each Army installation that depicts all validated requirements and describes the detailed engineering, funding, procurement, installation, scheduling, and supporting structures for all BASCOP-associated tasks.

x. Site Telecommunications Program Conference. An annual meeting convened at each of the Army bases covered by BASCOP for the purpose of initial development and subsequent updating of the referenced Site Telecommunications Plan.

y. Software. As used in BASCOP, software means the computer programs and all related documentation required for operation and control in the base communications systems, e.g., in software-controlled, advanced solid-state electronic switching systems.

z. Standardization. Standardization of equipments for BASCOP will be accomplished through the use of a common family of equipments and a single vendor for each Army base. Army-wide standardization will be accomplished

to the extent possible under competitive procurement regulations, through repetitive procurements using the same basic technical specifications. The technical specifications for each subsystem, i.e., DCO, PABX, remote switching unit, concentrators, etc., will include a separate sheet(s) to identify the site-peculiar features.

aa. Supporting structure map. A nonscaled pictorial representation displaying existing and proposed main conduit runs, distribution and entrance ducts, manholes, and poles, as necessary to distribute the outside plant cable system to all areas of the post.

bb. Underground cable. Cable installed below ground in permanent subway systems, such as manholes or conduit, duct, or utilidor structures.

Section 2

PROCESS OVERVIEW

This document supports the objectives of BASCOP by providing detailed information concerning the conduct and management of Army base communications upgrades, as well as the required procedures to retain the upgrade in a controlled configuration. The initial upgrade at a given base is expected to be more extensive than succeeding future upgrades and/or modifications of that base's communications architecture, i.e., the equipment system configuration of the plant-in-place. The magnitude of the required Army-wide communications upgrade has been reflected in the BASCOP approach that first addresses the Army bases with the most critical needs, and then schedules less urgent upgrades for later times.

The BASCOP upgrade process for the upgrade requirements/architecture developments is illustrated in Figure 2-1. This process will be followed in those cases where AR 11-28 and 235-5 dictate the application of Economic and New Start analyses. Economic analysis determines the Government-preferred upgrade configuration based on life cycle cost criteria and assessments of the alternative candidates, e.g., comparisons of BASCOP upgrade costs versus the ongoing high-maintenance costs of extending "as is" configurations to meet the new requirements. New Start analysis compares the Government-preferred upgrade configuration against the best commercial/Telco alternative to meet the requirements.

The comparative candidate development and selection is represented by the two flow branches in Figure 2-1. Beginning with the selection of a given candidate base by USACC, the flow of activities as illustrated will proceed as rapidly as the individual steps can be accomplished. Section 9 of this document discusses the expected schedule times for each of the activities involved and indicates a current estimate of some 30 months for a typical major BASCOP upgrade. It is expected that as experience is gained in the BASCOP process, the time cycle will be shortened.

For base upgrades of a routine character, e.g., where the base has already experienced a BASCOP upgrade and Economic and New Start comparative analyses are not required, the process may be much simpler, as shown in Figure 2-2. Where

the routine sequence illustrated in that figure is applicable, the schedule factors indicate an overall period of some 15 months. In any upgrade, emergency procedures can be employed where necessary to realize even more rapid processing (Section 9 provides details).

The principal organizations involved in the conduct and performance of the indicated activities of the upgrade processes are depicted in Figure 2-3. The specific, detailed responsibilities of the organizations are described in Section 9, both in matrix tabulations and explanatory text subsections. Configuration management of the activities performed by the organizations for the upgrade process applies not only to the implementation steps but also to the continuing, post-upgrade activities. The documentation in Section 9 describing the BASCOP configuration management reflects its roles and requirements and is consistent with the policy of AR 70-37 and USACC Supplement I thereto. Examples of the supporting documentation to establish visibility of the original or reference baseline configuration at each base are provided in Appendix A.

The BASCOP operations and maintenance (O&M) concept and its application in the upgrade process are discussed in Appendix B.

Section 3

SITE SELECTION AND BASELINE DEVELOPMENT

The initial activity in the base communications upgrade process is the selection of the specific Army installations to be upgraded. Cognizant Base Communications Officers at the selected Army installations are responsible for conducting preliminary base activities, to include the establishment and/or update of the documentation of baseline plant-in-place configurations. Related requirements include tests to ascertain the condition of the plant-in-place and assessment of the O&M records. Results of these preliminary studies and documentations are collected in the Site Telecommunications Plan File by the process illustrated in Figure 3-1. This data base will be utilized as the supporting data for the ATCOGS input.

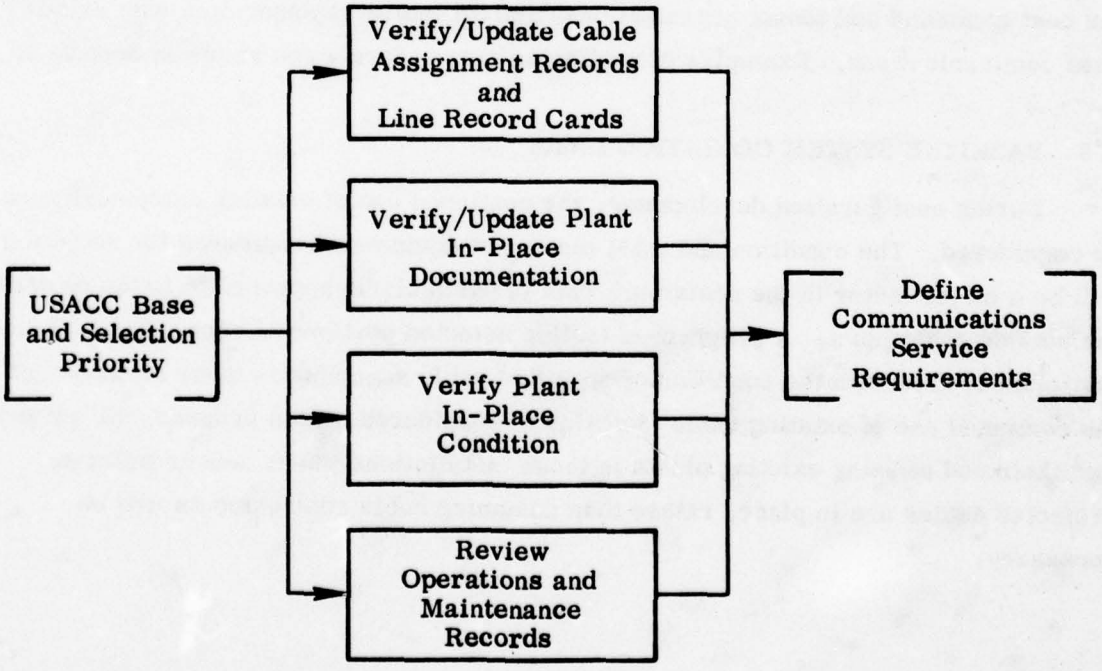


Figure 3-1. Site Selection and Baseline Development

3.1 SITE SELECTION PROCESS

The magnitude and complexity of upgrading base communications at all of the bases encompassed by BASCOP precludes simultaneous implementation. Accordingly, it will be necessary to prioritize the order in which the sites are incorporated into BASCOP. This determination will be made by Headquarters, USACC.

3.2 PLANT-IN-PLACE CONFIGURATION BASELINE

The effort involved in determination of the existing communications network at a particular base will depend largely upon the state of the base plant-in-place documentation. If the documentation contains major gaps or is severely out of date, a great deal of effort must be expended to define and document the current system. The validity of all documentation will be evaluated through field checks. It is imperative that all documentation be brought up to date prior to completion of system definition. Appendix A provides detailed information on such documentation requirements.

For those installations or bases for which no plant-in-place records exist, such records must be developed. In addition, other documentation such as cable assignment records and line record cards will be verified and updated where necessary. Accomplishment of these tasks will entail an extensive on-site survey of all users, including the host command and tenant organizations, and all facilities associated with existing base communications. Examples of applicable survey forms are shown in Section 4.

3.3 BASELINE SYSTEM CONDITION DATA

During configuration development, the continued use of existing equipment must be considered. The condition and O&M history of equipment considered for retention will be a major factor in the decision. This is particularly appropriate in the case of the outside cable plant. A program of testing selected portions of such plants will be instituted to ascertain the condition of specified cable segments in those areas where the continued use of existing cable facilities is considered. This program will promote the likelihood of using existing plants in those installations where new or water-protected cables are in place, rather than assuming cable replacements will be necessary.

3.4 HISTORICAL MAINTENANCE DATA

The maintenance records of the communications facilities will be examined and a maintenance summary prepared as described in Appendix B. The maintenance data will provide insight to engineering personnel considering re-use versus replacement of existing plant components, as well as contributing to the Economic Analysis assessments required by AR 11-28 to determine the preferred communications upgrade alternative.

An analysis of the maintenance history of the various components of the system will yield indicators of their age, condition, and reliability, and of changes with time (deterioration) since installation. This information will be a useful input in the decision process of retention versus replacement of existing plant-in-place.

Section 4
REQUIREMENTS ACQUISITION AND STANDARDIZATION

This section discusses the factors involved in developing and defining the basic communications service requirements, and establishes the methodology to be followed to assure that all essential requirements are recognized, evaluated, and validated in a consistent manner for all Army bases. As each base is encompassed by BASCOP, the methods and procedures outlined herein will take effect. The process is illustrated in Figure 4-1.

4.1 REQUIREMENT ACQUISITION

Initial efforts begin with development of data used in the preparation of the Site Telecommunications Plan for each Army base. The cognizant Base Communications Officer updates 1) the various user requirements records, to include near-term projections; and 2) the communications traffic statistics, including calling rates and traffic patterns for all base activities. These inputs are submitted to the engineering activity, after command validation, for analysis and formalization.

4.2 REQUIREMENT STANDARDIZATION

A major objective of BASCOP is to promote commonality of communications network configurations and equipments for similar service requirements Army-wide, within the parameters of applicable procurement regulations. A key step toward this objective is the standardization of communications services requirements terminology into a given format. This definition of requirements in a common terminology permits force-wide correlation and evaluation for top-level command review. Needs for the various kinds of communications services must be assembled across all installations for assessing the impact of Command-wide decisions. Likewise, resolution of common requirements must be standardized so that the benefits of simplified logistic support can be realized for the Army bases. The beneficial adaptation of advanced technology (equipments and techniques) requires centralized planning and harmonization to promote integrated logistics. Figure 4-1 illustrates the BASCOP approach to the tasks of collecting, integrating, and formalizing communications requirements for each base upgrade.

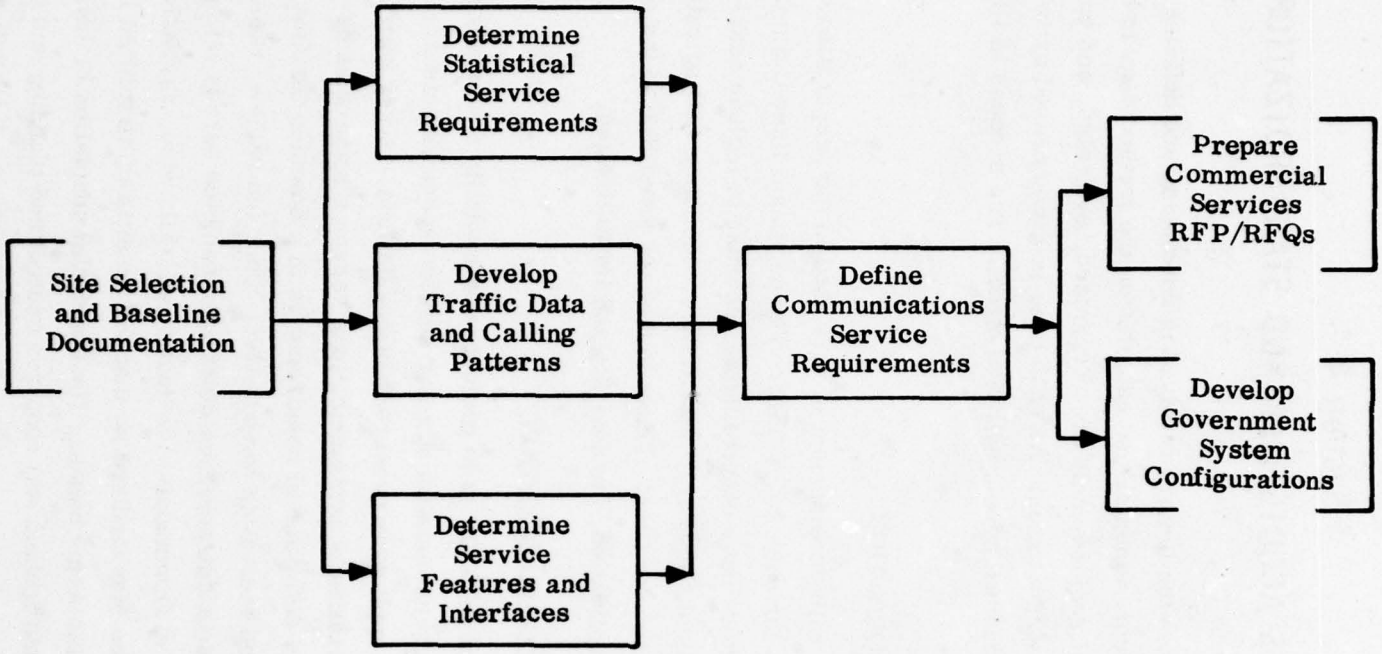


Figure 4-1. Requirements Acquisition and Standardization

4.3 BASE USER REVIEW

The Base User Review is conducted to ensure that proper consideration is given by the Base Communications Officer to all users on the base. The various host and tenant organizations will be surveyed to verify their current communications service requirements, and the extent or degree to which these service needs are being met. Figures 4-2 and 4-3 are examples of the survey forms prepared by the users and communications personnel to establish calling patterns and service feature requirements. It should be noted that the use of these forms is a required operation necessary in the development of the initial upgraded system configuration.

Future traffic data will be collected routinely by the switching equipment and serve as the basis for adjustments in grade-of-service and trunking quantities. In addition, the near-term (nominally 3-year) projected requirements will be established by location, using the directions contained in Appendix A. Statistical projections will be repeated routinely on a periodic basis. These projections will indicate the existing and future cable pair and instrument requirements on a given base by specific building number. An organization designator is tied to the building number to indicate planned relocations of organizational locations that will impact future service requirements.

4.4 COMMUNICATIONS TRAFFIC STATISTICS

A traffic survey will be necessary to verify the adequacy of the telephone and other service facilities within the base network configuration. The origins, destinations, and patterns of call or message traffic flows are important considerations in determining the optimum locations for the switching centers, system nodes, distribution equipments, and trunks. The rates of service usage by the various user organizations likewise are critical statistics leading to initial trunk sizing. The switching equipment technical specifications will include the capability to automatically gather and print these types of traffic statistics when the initial BASCOP configuration is established. These traffic statistics and a synopsis of the analysis will become a part of the Site Telecommunications Plan for each base, and assure the validity of earlier assumptions based on the Subscriber Survey Form, Figure 4-2.

SUBSCRIBER SURVEY FORM

LOCATION: _____ DATE: _____

TELEPHONE NO.: _____ SUBSCRIBER: _____

1. List up to ten (10) most frequently called numbers and average number of calls to each per week.

	TELEPHONE #	AVERAGE CALLS PER WEEK
(1)	_____	_____
(2)	_____	_____
(3)	_____	_____
(4)	_____	_____
(5)	_____	_____
(6)	_____	_____
(7)	_____	_____
(8)	_____	_____
(9)	_____	_____
(10)	_____	_____

2. For Key System/PABX Subscribers Only: List average number of Internal Calls per week.

3. List average number of "Off-Base Calls" (AUTOVON, WATS, Trunks to Commercial Exchange, etc.) per week.

4. Service Adequacy

   Is present service adequate?

   1. Telephone
   2. Data Transmission

   In what areas is service deficient?

   1. Too few instruments
   2. Too few lines (Internal/External/DCS)
   3. Interference/Poor Connections/Data Errors
   4. Directory Errors

Figure 4-2. Subscriber Survey Form

USER SERVICE FEATURE FORM

BASE: _____ DATE: _____

ORGANIZATION: _____ COMPLETED BY: _____

I. Service Features

A. Indicate which of the following telephone services are currently in use or would be used if available. Estimate actual or anticipated usage where applicable.

1. Priority
2. Intercept
3. Broadcast/Conferencing
4. Precedence/Security Verification
5. Exclusive Access
6. Restricted Outgoing Service
7. Callback on Busy
8. Automated Dialing
9. Paging/Dictation Interface
10. Call Forwarding
11. Other

B. Which DCS services are in use? Estimate usage.

1. AUTOVON
2. AUTODIN
3. AUTOSEVOCOM

C. What special services are in use? Estimate usage.

1. FAX, CCTV, other wideband
2. Sensor Data/Telemetry (Analog/Digital)
3. Data Processing/Computer Interface
4. Other (explain)

II. Future Requirements

A. Anticipated Growth

1. Current number of personnel
2. Estimated number of personnel in 3 years/10 years

Figure 4-3. User Service Feature Form (Sheet 1 of 2)

USER SERVICE FEATURE FORM (Continued)

3. Expected growth pattern

   a. Constant

   b. Variable (indicate levels at 6 month intervals for 3 years)

B. Service Features – Indicate which of the service needs listed in Part I will change over the next 3 years. Provide estimated dates. Also provide 10-year forecasts.

III. Comments – Use this space to expand upon answers to the above questions or to offer additional comments relative to the proposed telephone system upgrade.

Figure 4-3. (Sheet 2 of 2)

Section 5
SYSTEM CONFIGURATION DEVELOPMENT

The primary objective of BASCOP is to provide improved communications services at reduced overall cost for all Army bases. The improved services must fully satisfy the true communications requirements and they must be implemented in the most cost-effective manner in the context of the existing communications system. This section presents the considerations and outlines the procedures involved in the synthesis and selection of an upgraded network configuration.

5.1 PROCEDURE OVERVIEW

The procedure that will be followed for the development of the Government-preferred base communication system is depicted in the flow diagram of Figure 5-1. The analysis begins with the input of validated user requirements and concludes with the identification of a selected upgrade configuration and finalization of the Site Telecommunications Plan. The process includes the development of standardized requirement drawings as specified in Appendix A, the formulation of alternative candidate networks, and the evaluation and ranking of the alternatives.

The user requirements that will drive the configuration development will be reviewed for possible application of appropriate safety factors to allow for unplanned contingencies. Such factors will be developed and applied according to experience and best engineering judgment. Safety factors will be applied only to those portions of the requirements that impact the sizing of network elements known to have high modification costs. Network elements of a modular form, with low modification costs, will be assumed to have high adaptability to unanticipated growth, and therefore will not require the risk-reducing application of safety factors.

The network configurations developed will be defined so as to satisfy user requirements of the latest date for which they are predicted and validated. The configurations will therefore represent the ultimate network at the completion of the upgrade process rather than interim solutions. The implementation phasing and budgetary schedules will not be used as configuration selection criteria.

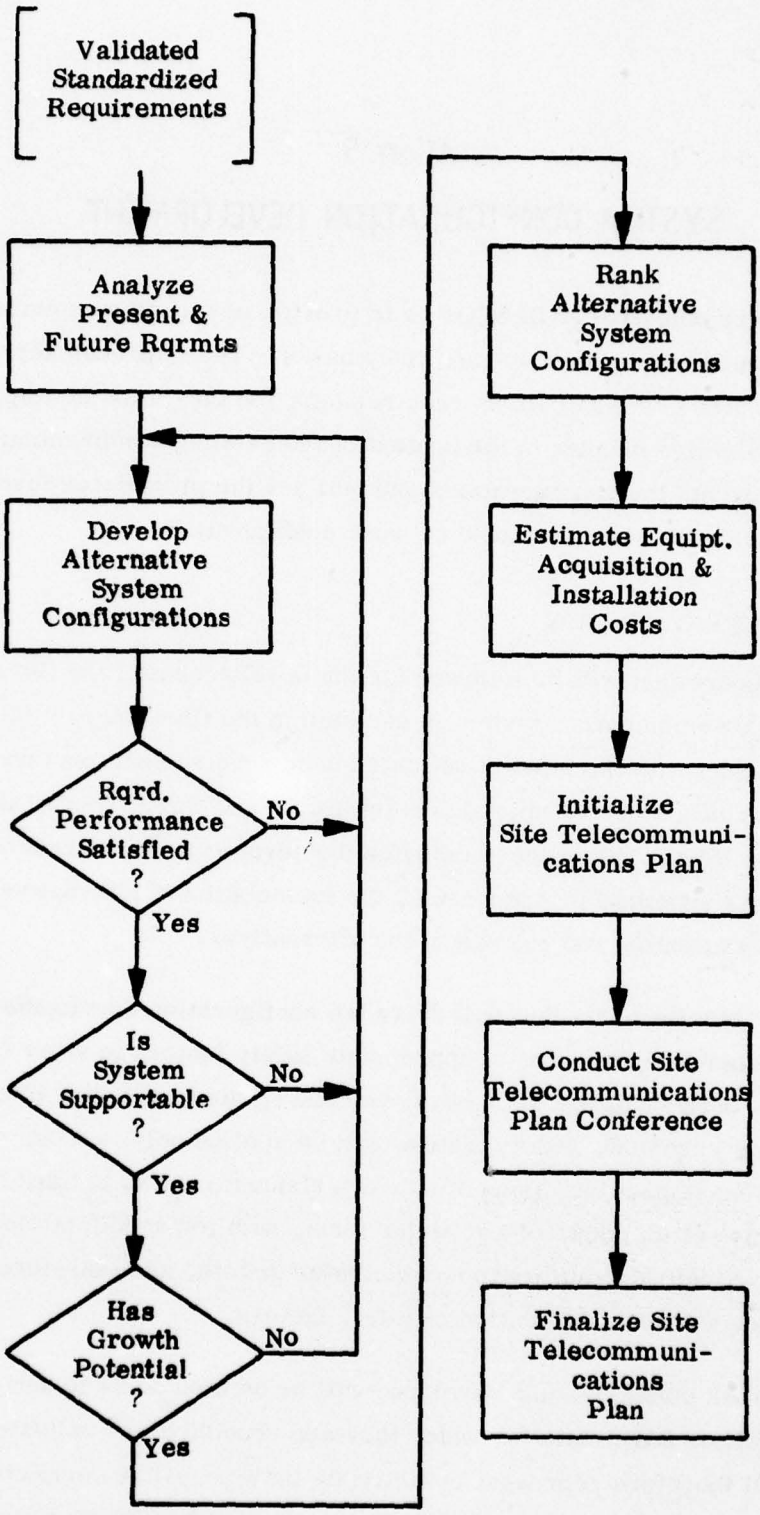


Figure 5-1. Government Preferred System Development Procedure

Configuration alternatives will be developed to maximize standardization of the equipment types and system structures throughout the Army. During the evaluation and ranking of the alternatives, more detailed design and assessment tools will be used to refine the alternatives and accommodate unique aspects of individual sites. This process will make maximum use of BASCOP policy and guidelines to converge rapidly on a manageable set of alternatives while still allowing sufficient flexibility for refinement.

5.2 BASELINE SYSTEM CAPABILITY ANALYSIS

An analysis will determine the capability of the baseline system to meet the validated present and projected requirements, in order to estimate the extent of the plant upgrade to be considered in the configuration planning. The preparation of the drawings identified in Appendix A will serve to display the validated requirements in a standardized format and provide preliminary indications of the magnitude of the upgrade. An important aspect of this analysis is the determination of which portions of the existing outside plants may be considered for retention. Those existing segments being considered for retention in the upgraded configuration will be analyzed in light of O&M historical data, age, type, and interoperability. Testing may be accomplished on those segments that are still candidates for continued use in the upgraded network to verify that the maintenance efforts required to keep them operational will be minimal, i.e., at acceptable levels of cost.

The performance capability of the existing network will be generally compared with the ultimate user requirements to indicate areas of deficiency, to estimate the severity of such deficiencies, and to identify the limiting characteristics of the existing network. Based upon this assessment and the results of the baseline network survey and tests, a determination will be made as to whether a single or limited number of changes to the baseline would provide sufficient service improvement and cost reduction. Consistent with the guidelines and objectives of BASCOP, this determination will be made by considering cost-effective applications of new technology and applicable O&M cost reduction.

Initially, it is anticipated that the majority of bases will require relatively extensive upgrades, since the communications installations are typically late in their service lifetimes and obsolete from the standpoint of performance and are operation and maintenance intensive.

5.3 ALTERNATIVE SYSTEMS DEVELOPMENT

The determination of available communications hardware and technology is the initial task to be performed. This survey will encompass those items already in the Army inventory and those commercially available for the site in question. The survey will include the gathering of hardware and software cost data applicable to the upgraded site.

During this initial compilation of data on available hardware, an initial screening will eliminate items of doubtful producibility, excessive cost, not supplied by a reliable vendor, and not representing sufficient advance in the state of the art. The level of technology of a proposed configuration will be consistent with that of similar commercial systems and with the general trend of industry. Unproven technologies will be avoided to enhance confidence in the reliability and operability of the proposed configuration.

The development of alternative plans for the upgrading of the telephone plant will involve a detailed system design effort that will yield one or more candidate configurations utilizing hardware items consistent with the planned BASCOP architecture. The level of definition of these candidate systems will be such that performance parameter values required for capabilities assessment, and unique to each configuration, can be determined. Configurations will be developed in conformance with the guidelines and policies of BASCOP in order to promote commonality among systems.

5.3.1 Switching

The most significant step in the development of the base communication system configuration is the establishment of a switching scheme. The BASCOP philosophy dictates the use of a central digital switching facility (Dial Central Office, DCO) with remote, slaved switching units located in areas of subscriber concentration. The technical aspects of distributed digital switching systems, and of the various generic types of remote switching equipment, are discussed in BASCOP, Vol. II, Section 6.5b.

Within this general scheme, considerable latitude is possible in the application and placement of remote switching equipment at a given upgrade site.

The type of remote switching to be used will be determined by the size of the subscriber concentrations as indicated in Appendix A on the Fundamental Plan and Form 1 (HQ CEEIA CCC-CED FM 90-1), and the subscriber calling pattern characteristics as indicated by the completed Subscriber Survey Form (Figure 4-2). In general, groups of more than 400 lines will be most economically served by separate Private Automatic Branch Exchanges (PABXs), and small concentrations by remote switching units (RSUs) or by direct connection to the main DCO switch (BASCOP, Vol. II, Sec. 6.5b(2)(c)).

The problem of determining exactly what constitutes a subscriber concentration is likely to be complex, and alternative definitions will be treated as separate candidates where such questions arise. Subscriber concentrations on a by-building basis are candidates for subscriber concentrator (CXR) terminals. RSU candidates covering wide geographic areas will be considered as users of loop concentrator/multiplexers, which are essentially distributed RSUs. The determination of remote switch types and placement will generally be an iterative process, with performance tradeoffs and effectiveness used to rank and eliminate alternatives. At this stage, these trades can be generic in nature, based upon comparisons of cable footage available or the required types and numbers of switching units. Since the types of switching units used depend chiefly upon the number of lines served, high-level trades will be performed using numbers of subscribers per group as a ranking factor.

Figure 5-2 is a flow diagram of the general process of developing the switching scheme. In the procedure illustrated, however, the quantified data can only be used as a guide. The wide variety in base configurations, environments, local or regional cost factors, and available equipment precludes the development of rigid criteria for system layout, and the subdivision of the base into subscriber groups is seldom a well-defined process.

The Fundamental Plan will be examined to identify obvious groupings. In general, physical boundaries (i.e., geographic separations) will be used as the grouping criterion due to their correlation to cost trades. Where all subscribers are located in a concentrated area, the major subdivision may be the entire base; functional subdivisions may be made if the number of lines is extremely large. Subscriber

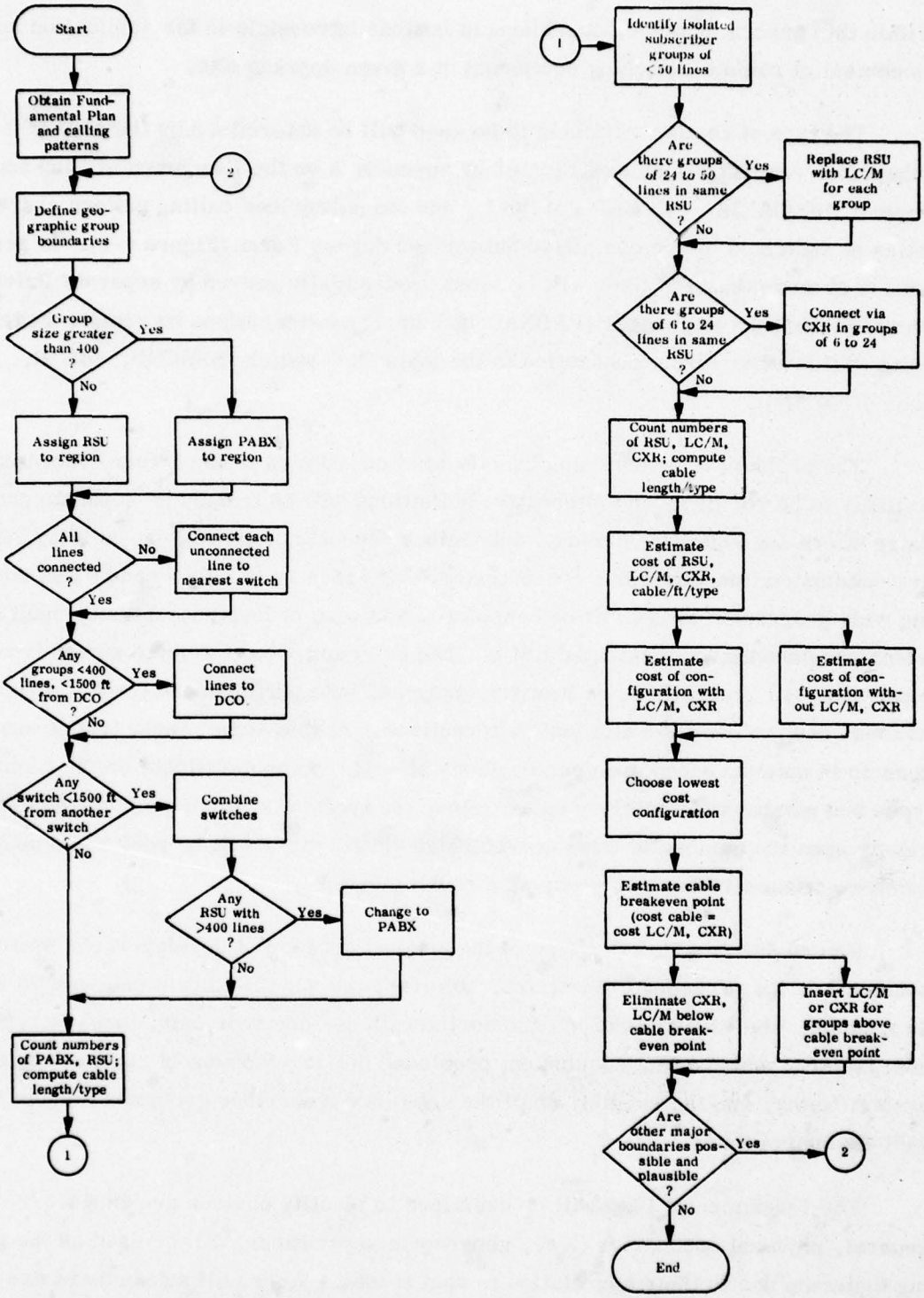


Figure 5-2. Functional Flow, Switching Scheme Development Guide

calling paterns (as indicated on the Subscriber Survey Form, Figure 4-2) and communities of interest will be analyzed. Subscriber groups who call each other frequently will be placed in the same major subdivision in accordance with the number of lines to be served. In subscriber concentrations where calling pattern data indicate a large number of subscriber calls are made off-post or to other on-post areas, the Subscriber Survey Form will provide the basis for trunk sizing between the subscriber switching center and the base DCO.

Where geographic separations contain relatively few lines, a decision will be made whether to place a remote switching unit or line concentrator/multiplexer in the area or to route the lines directly to an adjacent switch. The choice will depend upon the number of lines to be routed and the distance to the nearest switch.

If maintenance data and test results indicate that existing cables can be used for direct routing, then this will be considered as a viable alternative. Smaller groups of subscribers will be connected to the switches via subscriber concentrators. The choice between the subscriber concentrator and direct wire depends upon the distance, number of lines, availability of existing cables, and calling rates and patterns. Where the major subdivisions are arbitrary or where unusual distributions exist, the entire process, or some subset of the process, will be repeated for alternative geographical arrangements.

For each upgrade site, the specific decision criteria must be examined to ensure that the following considerations do not result in different quantitative values for the "breakpoints":

a. Local costs
b. Equipment availability
c. Existing configuration conditions
d. Modification constraints
e. Environmental factors
f. Transportation costs
g. Operational constraints

The impact of these considerations on the following cost trades will be determined:

a. RSU vs PABX as a function of subscriber grouping and calling patterns
b. RSU or line concentrator/multiplexer (LC/M) vs. DCO connection, as a function of distance to DCO.

c. Separate vs. combined switches, as a function of distance between switches

d. RSU vs. LC/M, as functions of group size and distance to switch.

In most cases it is anticipated that a relatively quick survey will be sufficient to identify any unusual site considerations that will significantly alter the decision criteria. When such considerations are identified, a thorough local survey will be performed to redefine the decision "breakpoints" prior to applying the process shown in Figure 5-2.

5.3.2 Equipment Types and Locations

The base communications network switching scheme as determined by detailed analysis of the Fundamental Plan, Form 1, the Subscriber Survey Form, and the User Service Feature Form, establishes the Inside Plant requirements and roughly indicates the desired equipment locations. A detailed survey will be conducted to determine specific equipment locations. Maximum consideration will be given to the use of existing facilities. In nearly all cases the DCO will utilize an existing central office facility. For configurations requiring facilities for remote switching equipment, the required space will first be sought in existing buildings. Facility requirements will be defined together with the most appropriate location for each item. Equipment will be located so as to minimize the total length of subscriber loops. In general, this will be accomplished by colocating the switch with the densest subscriber concentration served.

Overall cost reduction on an Army-wide basis can best be achieved by minimizing O&M expenditures through installation of modern, reliable equipments and maximizing the standardization of the communications networks. For this reason, standard performance specifications have been prepared for DCO and PABX equipment, remote switching units, concentrators, and T-carrier units. These specifications define the characteristics of the equipment to be procured. Each technical specification will contain a separate page or pages identifying site-peculiar requirements, such as numbers of subscriber lines, trunk quantities and signaling characteristics, and feature requirements. Within the limitations of procurement regulations, maximum standardization will be achieved through repetitive procurement throughout the life cycle of BASCOP using the same technical performance specifications for each procurement cycle.

5.3.3 Cable Types and Layout

For each base, the specific communications cable-distribution network will be established and displayed on the Fundamental Plan and the Outside Plant Schematic

Drawing, as shown in Appendix A. Cable replacement requirements will be analyzed using the information provided in the Fundamental Plan, on Form 1, from switching size/location layout data, and from plant-in-place records.

It may be assumed that the cable distribution system will follow the existing pathways in the majority of the cases since most subscriber locations will be unchanged from the existing configurations. Subscriber loops will be either analog or digital, dependent upon end-location equipments; may use T-screened or twisted-pair jelly-filled cable. Where applicable, subscriber PCM carriers will be used. All inter-switch trunking on-post will be digital and will utilize T-screened, jelly-filled cable with PCM carrier.

5.3.4 Supporting Structures and Facilities

Changes to supporting structure pathways may be necessary wherever major cable replacements are undertaken. The changes may be due to the need for new pathways, or the upgrade may provide a convenient time to replace inappropriate or obsolete supporting structures. The use of PCM carrier will greatly reduce the bulk of the cable plant. The Supporting Structure Drawing as shown in Appendix A will be prepared outlining the existing configuration of the supporting structures for the cable distribution system. Analysis of this drawing in conjunction with the switching layout and the requirements documents submitted by the base will indicate the need for modification or addition to the existing supporting structures.

Facility modifications necessary for the installation of new equipment will be identified during the site survey conducted to determine switching equipment locations. These modifications will generally consist of installation of cable trays, power wiring, and equipment mounting supports or brackets; and changes to the heating/cooling system. When all supporting structure requirements have been identified, facility specifications will be prepared and a site concurrence letter forwarded as specified in CCR 415-2.

5.4 SUPPORTABILITY EVALUATION

The supportability of each candidate system will be examined to assess the factors of maintainability, logistics, and adaptability to accommodate subscriber changes.

5.4.1 Maintainability

To optimize its maintenance aspects, the communications system will be designed to incorporate:

a. Real-time traffic reports to aid in identification of defective trunks or design
b. Highly reliable components, to minimize the frequency of maintenance actions
c. Self diagnostics and testing of switches
d. Full range of DC and transmission testing functions incorporated into all DCO, PABX, RSU, and line concentrators
e. Key system feature implementation by DCO or PABX processor capability
f. Use of T-screened, filled cable for all buried or underground cable
g. Card replacement on site, card repair at contractor depot
h. Software management by contractor with full change control via the configuration control process.

The description of each alternative will be reviewed to ensure that all of the above features have been incorporated. Revisions will be made if necessary to add them to any deficient configurations.

5.4.2 System Flexibility

The communications requirements of a typical Army base are dynamic. Equipment reallocation, number changes, and addition of service and types of service are anticipated throughout the life of the systems. System flexibility should therefore be an important consideration since it relates to cost of equipment additions, moves, number changes, and station feature changes.

System growth capacity should be provided for in all system specifications. Space will be provided for physical growth (facilities, supporting structures) as well as for capacity growth (equipment and distribution). Compatibility with technology trends for beneficial adaptation of advanced equipment is a BASCOP guideline that can result in significant new growth potential capabilities.

5.5 INITIAL PREPARATION OF SITE TELECOMMUNICATIONS PLAN

Development of the requirements as submitted by the using activities, and formalizing these requirements using the drawings and processes outlined herein,

have led to the establishment of the optimum communications network. The drawings contained in Appendix A prepared in accordance with the instructions will provide a visual display of the effort necessary to support the total base communications network. Review of these drawings in conjunction with the baseline plant-in-place records provides the technical information necessary to prepare the BASCOP requirements/ resource data, Form 2 in Appendix A. The blocks on Form 2 relating to estimated costs and installation man-hours are completed after the technical data required by the form is established. Compilation of the formalized requirements data, the drawings, and Form 2 completes the initial preparation of the Site Telecommunications Plan.

5.6 SITE TELECOMMUNICATIONS CONFERENCE

The Site Telecommunications Conference will be convened on-site on an annual basis. Approximately 30 to 60 days after receipt of new requirements data, the engineering activity will formally propose in writing to the host Base Communications Officer, through appropriate channels, a suggested meeting date. The purpose of the meeting will be to review each of the validated requirements and the operational requirement date, and to assure that the engineering approach and schedule as outlined on Form 2 satisfy the stated requirements.

The Base Communications Officer will coordinate the location and roster of attendees and advise the engineering activity in writing of the acceptability of the meeting date or propose an alternate date. In either case, the response will be forwarded 30 days prior to the meeting and will specify the exact date, time, and location of the conference.

The Host Command representative at the Site Telecommunications Conference will identify new requirements and specify any existing programs that can be eliminated as a result of changing requirements. Required operational dates for each new requirement will be established by the Host Command representative, and operational dates for those items previously identified in the Site Telecommunications Plan will be reviewed and adjusted as required.

The Facility Engineer representative at the Site Telecommunications Conference will review the Base Master Plan and provide information concerning the status of all MCA and O&M projects planned and in progress for that base. Required information will be in the general form of funding, approval and scheduling type.

The engineering activity representative will provide information on the engineering approach for each of those items identified from the requirements documents submitted prior to the meeting. Status information on the engineering/installation or procurement work packages in progress will be reviewed, and slippages in facility support dates identified and equipment installation dates adjusted accordingly.

Minutes of the conference will be prepared by Base Communications Officer and will record the new or changed requirements and specify schedule changes and any agreements reached during the discussion. The conference minutes, signed by the Host Command representative, the Base Communications Officer, the appropriate Signal Command representative, and the engineering activity representative, will serve as the certification that all known requirements have been considered and are validated. A copy of the minutes will become a part of the Site Telecommunications Plan.

5.7 FINALIZATION OF THE SITE TELECOMMUNICATIONS PLAN

By incorporating the formalized minutes of Site Telecommunications Conference and any changes agreed to by the attendees at the conference, the Site Telecommunications Plan is finalized and ready for distribution for review and approval by higher headquarters. Provisions for revision and update of the Site Telecommunications Plan on a regular, periodic basis, have been made to assure its validity as a planning document. These provisions are discussed further in Section 9.

Section 6
ECONOMIC AND NEW START ANALYSES

The basic premise of the BASCOP philosophy is that significant cost savings can be realized through reduction of O&M expenditures. The validity of this premise will be tested through Economic Analysis under the provisions of AR 11-28. The Economic Analysis will provide a detailed comparison of the life-cycle costs of the BASCOP configuration at each Army base versus the LCC of the rehabilitation necessary to make the existing "as is" communications network responsive to the identical requirements. The outcome of this analysis effort will establish the Government-preferred network configuration. This Government-preferred configuration will then be tested against the best commercial proposal for this application under the auspices of AR 235-5 to assure that maximum value is obtained per dollar spent in upgrading each base communications system, i.e., New Start Analysis.

6.1 ECONOMIC ANALYSIS

The initial test of the cost-reduction capabilities will be to compare the life cycle cost associated with a BASCOP upgrade versus that of upgrading the existing communications network to provide the required services. O&M historical data gathered during the requirements development phase, as well as equipment age and condition, will be included in costing the continued use of the existing system. Significant one-time investment costs will be incurred in new implementations, but major reductions in annual O&M costs will result.

An example of such cost analysis is contained in the Base Communications Plan, Vol. II. The analysis will consider and compare such factors as discussed in the following paragraphs for each of the system configurations.

6.1.1 Nonrecurring Costs

Nonrecurring costs are one-time investment costs and will be separated into inside and outside plant categories. With the assumption of acquisition and

installation under a "turnkey" engineer, furnish and install (EF&I) contract, the following nonrecurring costs will be included in the acquisition cost:

a. Equipment
b. Software
c. Initial personnel training
d. Initial Test, Measurement and Diagnostic Equipment (TMDE)
e. Engineering
f. Technical documentation
g. Facility modification

The "turnkey" acquisition costs will be estimated using appropriate costing factors as determined by the USACC Comptroller.

6.1.2 Recurring Costs

The recurring costs of operation and maintenance will be computed for each candidate system under consideration. The cost factors to be included in the computation are:

a. Operating labor
b. Maintenance labor
c. Administrative costs
d. Spares replacement and shipping
e. TMDE maintenance
f. Replacement personnel training

6.1.2.1 Personnel Costs

The costs associated with the first two (a, b) of the foregoing items, and a portion of the third (c) in the "recurring costs" category, are personnel-related costs.

A listing of the personnel required for operation, administration, and maintenance of each candidate system, by grade, will be compiled by USACC. The cost of the personnel in the compiled list will be determined in accordance with AR 11-28 as discussed below.

6.1.2.1.1 Civilian Personnel Services. The cost of civilian personnel paid at annual rates will be gross pay in current pay tables, the overhead loading factor, and the Government's contribution for civilian retirement, disability, health and life insurance, and (where applicable) social security programs. These contributions should be determined by multiplying the gross pay by the appropriate factor for retirement and disability (see Federal Personnel Manual Supplement 831-1), health insurance (see FMS Supplement 870-1), and life insurance (see FPM Supplement 890.1).

If labor costs are determined on the basis of direct hours applied, the civilian pay rate should be increased to reflect the Government contribution for retirement, disability, health and life insurance (see previous paragraph), and an allowance for sick leave taken and for annual holidays and other paid-leave accruals.

6.1.2.1.2 Military Personnel Services. The cost of military personnel will be computed using standard rates established by DoD for costing military personnel services. These standard by-grade rates are a composite of military basic pay, incentive and special pay, and certain other expenses and allowances (paid from the Military Personnel, Army appropriation); refer to AR 37-108.

In addition, these costs will be adjusted to reflect the Government contribution for retirement and certain other personnel costs by multiplying the gross pay by the approved percentage factors.

6.1.2.1.3 Other Personnel Costs. The sum of personnel costs that pertain to performance of the function under consideration, and which are not included under para. 6.1.2.1.1 and 6.1.2.1.2 above (e.g., travel, per diem, moving expenses, personnel training) will be calculated.

6.1.2.2 Nonpersonnel Costs

Nonpersonnel portions of administration costs will be estimated by determining the actual nonpersonnel costs of the baseline system, taken from the RCS-CSCFA-218 reports, and reducing them proportionately to the personnel costs for each alternative considered.

Annual spares replacement and shipping costs will be estimated as 9 percent of the original hardware acquisition cost. Annual TMDE maintenance costs will be estimated as 10 percent of the original TMDE acquisition cost.

6.1.3 Cost Effectiveness Tradeoffs

Following the performance, supportability, and cost analyses described above, the results will be combined to support a cost-effectiveness ranking of the alternative configurations. The criteria for ranking the alternatives will be in accordance with AR 11-28, as follows:

a. For equal effectiveness and unequal costs, the lower-cost alternative will be selected.

b. For equal cost and unequal effectiveness, the more effective alternative will be selected.

c. For unequal cost and unequal effectiveness, the alternative offering the greatest marginal effectiveness for marginal cost will be selected.

Measures of effectiveness will be developed by the engineering activity. These measures will allow quantitative comparison of overall performance of the alternatives. They will be expanded in scope as necessary to encompass additional types of communication service incorporated into the base communication upgrade program. Typically, measures of effectiveness will reflect not only the inherent performance characteristics of the network, but also an indication of how the network will perform under the predicted peak and normal traffic conditions. Several measures of effectiveness may be combined by summation after applying weighting factors. This approach will become especially useful as the upgrade program is expanded to include a variety of communication services.

6.1.4 Network Configuration Selection

The optimum network configuration will be selected solely on the basis of the Economic Analysis, assuming that each is able to satisfy the command-validated service requirements. The selected network configuration will become the Government-preferred configuration as the most cost-effective selection. Future activities will revolve around this selected configuration as discussed below.

6.2 NEW START ANALYSIS

Upon completion of the Government in-house effort to identify the most cost effective, long-term method of meeting the Army's communications service needs,

the selected Government network configuration will be subjected to a comparative analysis with private industry proposals in accordance with AR 235-5.

6.2.1 Request for Proposal (RFP)

When the initial base communications service requirements (all the communications on the base) are identified as previously discussed, a determination will be made under the provisions of AR 235-5 concerning the necessity of soliciting private industry for proposals on the cost of leasing the communications services. A decision to solicit industry will initiate the engineering activity to formalize the communications service requirements into a Statement of Work which, when processed, will request private industry to submit cost and technical proposals for use in comparison with the Government-preferred network configuration.

The service requirements, as formalized in the RFP, will be identical to the service requirements the Government uses to establish its preferred network configuration. The identical service requirement for private industry and the Government will serve as the basis for competitive comparison.

6.2.2 RFP Evaluation

Proposals received from industry will be individually judged for technical responsiveness and cost. The responsive proposals will be ranked and the best of them subjected to a comparative analysis versus the Government-preferred network.

6.2.3 Comparative Analysis and Decision

Cost and performance characteristics for the candidate private industry system and the Government-preferred network will be evaluated using such factors as identified in Section 6.1 above. Should the industry proposal prove to be the most cost effective, the succeeding contractual arrangements for the leased service will incorporate the requirement for the lessee to prepare and submit the Site Telecommunications Plan as outlined herein. For subsequent upgrades, the lessee has a continuing responsibility to update and distribute plant-in-place records.

Section 7

ENGINEERING AND IMPLEMENTATION PLANNING

Upgrade implementation, for purposes of this document, begins when a New Start analysis leads to the selection of Government-preferred network and the decision for the Government to buy and install a specific communications system. This section discusses the technical and logistics tasks involved in the upgrade procurements and engineering implementation planning. Figure 7-1 shows the overall sequence of these tasks.

7.1 PROCUREMENT

The procurement cycle for the in-house upgrade program consists of all tasks necessary to prepare requests for proposal or quotation for delivery of the required equipments and/or services, including the Government evaluation of each response; and the subsequent selection of the vendor.

7.1.1 RFP/RFQ Preparation

Specifications for the major equipment subsystems, i.e., DCOs, PABXs, carrier components, etc., have been prepared for repetitive procurement throughout the life cycle of BASCOP. The specifications will be used for all BASCOP procurements to assure functional standardization. Differences in equipment sizes and features in the various procurement actions will be accommodated, for example, through the use of a matrix attached to the basic specification which will identify the site-peculiar requirements while retaining the basic equipment identity. Using the equipment technical specifications as a base, the request for proposal or quotation is assembled. This activity includes the definition of the materials and/or services to be procured, identification of contract deliverable items, Government cost estimates, and preparation of delivery plans and schedules.

The items to be procured will include but not be limited to central office equipment, PABXs, remote switching equipment, cabling and carrier terminal equipment, possible subscriber instruments, installation materials (e.g., wire, terminal boards, patch panels), construction materials for supporting structures, test equipment, training, and training documentation.

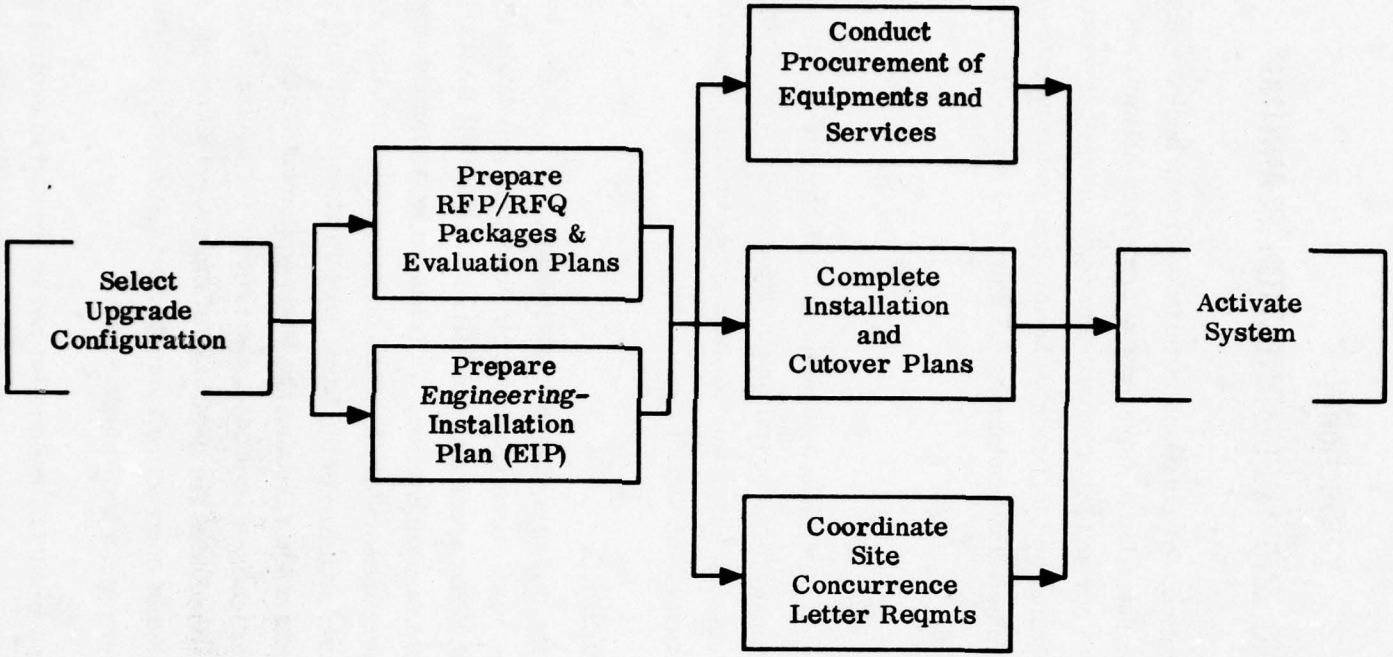


Figure 7-1. Engineering and Implementation

Most contractors will provide various levels of training services if requested. Accordingly, training and training documentation must be specified. Delivery plans and schedules must be developed. Finally, response requirements must be specified. These should include the date by which response is required, the extent to which contractor modification of the procurement requirements will be accepted, and requirements for the documentation and justification of such exceptions.

7.1.2 Proposal Evaluation

The Government will develop a Proposal Evaluation Plan in accordance with applicable ASPRs to assure that each proposal is considered individually and fairly. Portions of the evaluation plan may be incorporated into each RFP/RFQ, advising prospective vendors of those areas on which their submission will be rated. Evaluation panels will be convened to review and rank each proposal in the areas of technical responsiveness, managerial competence, and cost. The selection of the vendor will be made by the Procurement Contracting Officer based on the inputs and comparative rankings of contractor proposals by the panels.

7.2 INSTALLATION ENGINEERING

The timely satisfaction of those base communications requirements validated in the Site Telecommunications Plan necessitates the development of installation instructions and drawings for the installer, site concurrence letters specifying the supporting structure requirements, identification of schedule commitments and necessary documentation, cutover plans, etc. All of these items will be incorporated into the Site Telecommunications Plan. Development and preparation of installation documentation may be accomplished either by a contractor for government approval or by Government technical personnel.

7.2.1 Engineering-Installation Plan

The Engineering-Installation Plan (EIP) will consist of a detailed bill of material, drawings, and instructions in sufficient detail to assure that the installer understands what equipment is to be installed, where, and how; and shall specify wiring options, mounting details, equipment connectivity, and interface details. An EIP shall be developed for each of the validated requirements as shown on Form #2, and shall be incorporated into the Base Communications Plan.

7.2.2 Site Concurrence Letter

A Site Concurrence Letter will be prepared for each of the Form #2 requirements contained in the Site Telecommunications Plan where facility modifications or additions are addressed. This letter shall document the requirements for facility space to house new equipment, and specify in detail the requirements for additional, new, or modified supporting structures and the required operational dates for facilities and supporting structures.

The letter will solicit concurrence of the participating commands and agencies for the site location configuration of the electronic facilities, real property facilities, and responsibilities for implementing actions. When concurred in by the participating commands and agencies, the Site Concurrence Letter constitutes agreement on the required facilities modification or addition, and will be incorporated into the Site Telecommunications Plan.

7.2.3 Cutover Plan

A Cutover Plan will be developed specifying the systems and/or circuits to be cut into the new system for each installation activity where service will or may be impacted. For those cutovers where service will not be interrupted, a plan may not be necessary. Typically, the Cutover Plan will contain locations, dates, and times for the affected service. This information will be coordinated in advance with the using activity. This plan, when required, will be incorporated into the Site Telecommunications Plan as part of the engineering package.

Section 8
SYSTEM ACTIVATION

Activation of the components that comprise the Base Communications System will be performed in accordance with the schedules contained in the Site Telecommunications Plan. The activation will be performed on an incremental basis, with each requirement as specified in the Site Telecommunications Plan treated as a separate entity with its own activity schedule. (This does not preclude the possibility that two or more requirements will have identical schedules.)

Activities included in the overall system activation process include a preinstallation inspection and survey, physical installation of equipment and/or cable components, equipment activation, checkout and testing, cutover, training, removal of old equipment, and finalization of as-installed documentation. These activities are illustrated in Figure 8-1 and discussed in the following paragraphs.

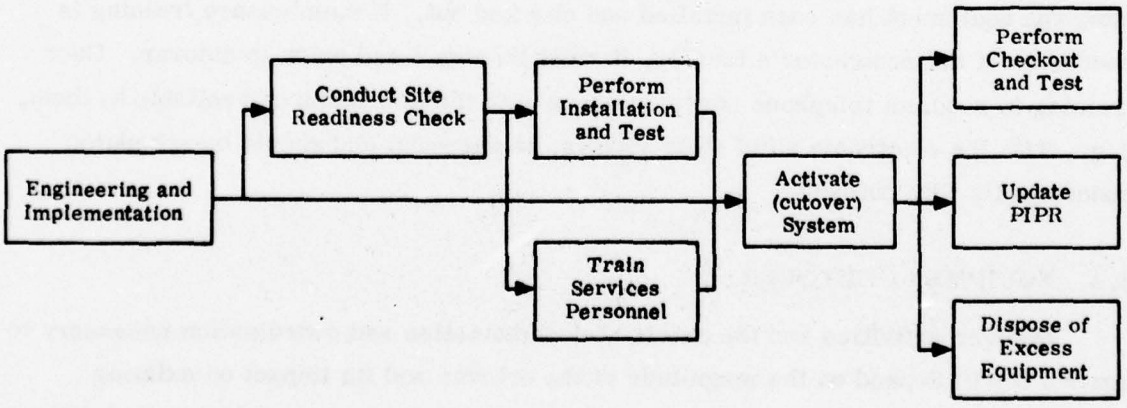


Figure 8-1. System Activation

8.1 PREINSTALLATION INSPECTION AND SURVEY

A preinstallation survey will be performed by installation personnel immediately prior to the installation start date. The equipment will be subjected to a complete inventory to ascertain that all items on the bill of material are on-site and in an installable condition.

A survey of the facilities and supporting structures will be performed at this time to assure that all required construction has been completed and the facilities are ready to accept the installation. Discrepancies noted during either the inspection or facilities survey will constitute justification to delay the installation start date until such deficiencies are corrected.

8.2 EQUIPMENT INSTALLATION

Installation activities will include positioning and mounting of equipment; cabling and wiring of equipment, patch panels, switchboards, and distribution frames; installation, splicing, and termination of outside plant cabling; installation of end instruments; testing as necessary; and other related activities. Instructions detailing the installation activities will be found in the EIP, supplemented with manufacturer instructions shipped with the equipment.

8.3 NEW EQUIPMENT TRAINING

New equipment maintenance training on-site is usually conducted immediately after the equipment has been installed and checked out. If maintenance training is conducted at the contractor's facility, it must be completed prior to cutover. User training to acquaint telephone services users with the new features available to them, e.g., with the electronic solid state PABXs, is essential and should be scheduled concurrently with cutover.

8.4 EQUIPMENT CUTOVER

Cutover activities and the extent of documentation and coordination necessary to control it will depend on the magnitude of the cutover and its impact on existing service. Smaller outside plant cutovers to new cable systems may be handled with no interruption to service and requiring little or no coordination with the user. On the other hand, cutover such as to a new PABX where subscribers were previously tied into the DCO may have a significant impact and therefore require a complete

document specifying the scheduled activities. A cutover of this magnitude will require development of a detailed cutover plan and close coordination between installers and the using activity. The decision concerning the necessity for a cutover plan will be made by the project engineer during the preparation of the EIP.

8.5 CHECKOUT AND TEST

After service cutover has been accomplished and all initial difficulties resolved, the system operation should be monitored to assess user satisfaction and to verify that all performance specifications are met. The experience thus gained may be useful in the performance of future upgrade actions at the same or a different base.

If performance is below standard, data will be required to identify the sources of trouble and to substantiate warranty claims. The checkout process is intended to verify that each system component properly performs all its intended functions and that the system as a whole is ready for operation.

All equipment and system self-diagnostics will be exercised both with and without induced or simulated failures. Proper operation and activation of backup equipment, including the transition to emergency power, will be verified. All equipment and system functions will be performed and all operating procedures verified. Finally, the entire system will be operated for an extended time to check for abnormal heating effects or performance degradation.

The resultant test data will be maintained for future reference. Formal test plans and procedures will be developed to verify all facets of the operation. Quality assurance personnel will be on-site during installation to assure that the installation conforms to the specifications. An independent element of the installation activity will prepare and implement a Quality Assurance Program. The purpose of the Quality Assurance Program is to assure compliance with all performance parameters.

8.6 EQUIPMENT REMOVAL

Equipment that has been cut out of service, either because its function has been relocated to new equipment or because the service is no longer required, will be removed and disposed of in accordance with prevailing procedures.

8.7 AS-INSTALLED DOCUMENTATION

The final step in the installation/checkout process is the finalization of plant-in-place records. Existing plant-in-place records will be revised as a routine part of the EIP development. These revised drawings may be further modified during actual installation.

The modifications made on-site during the installation will be "redlined" on the plant-in-place records. Redlined copies will remain on site for the user, and two copies will be forwarded to the engineering activity where the drafting section will incorporate the redline changes into the plant-in-place records and make distribution of the finalized drawings. These drawings form a critical part of the baseline data to be maintained in the USACEEIA Engineering Documentation System (EDS), and are to be changed/updated only as additional Configuration Management Board-approved changes occur. The site will not modify any portion of the installed system baseline without CM Board approval, using official Form 2/Engineering Change Proposal documentation. (Number assignments, station rearrangements, terminal pair assignments, or add-on type activities are excluded.)

Section 9
CONFIGURATION MANAGEMENT

The magnitude and complexities involved in undertaking the Base Communications Program requires the development and implementation of a configuration management approach. Configuration management as used herein is an all-encompassing term that:

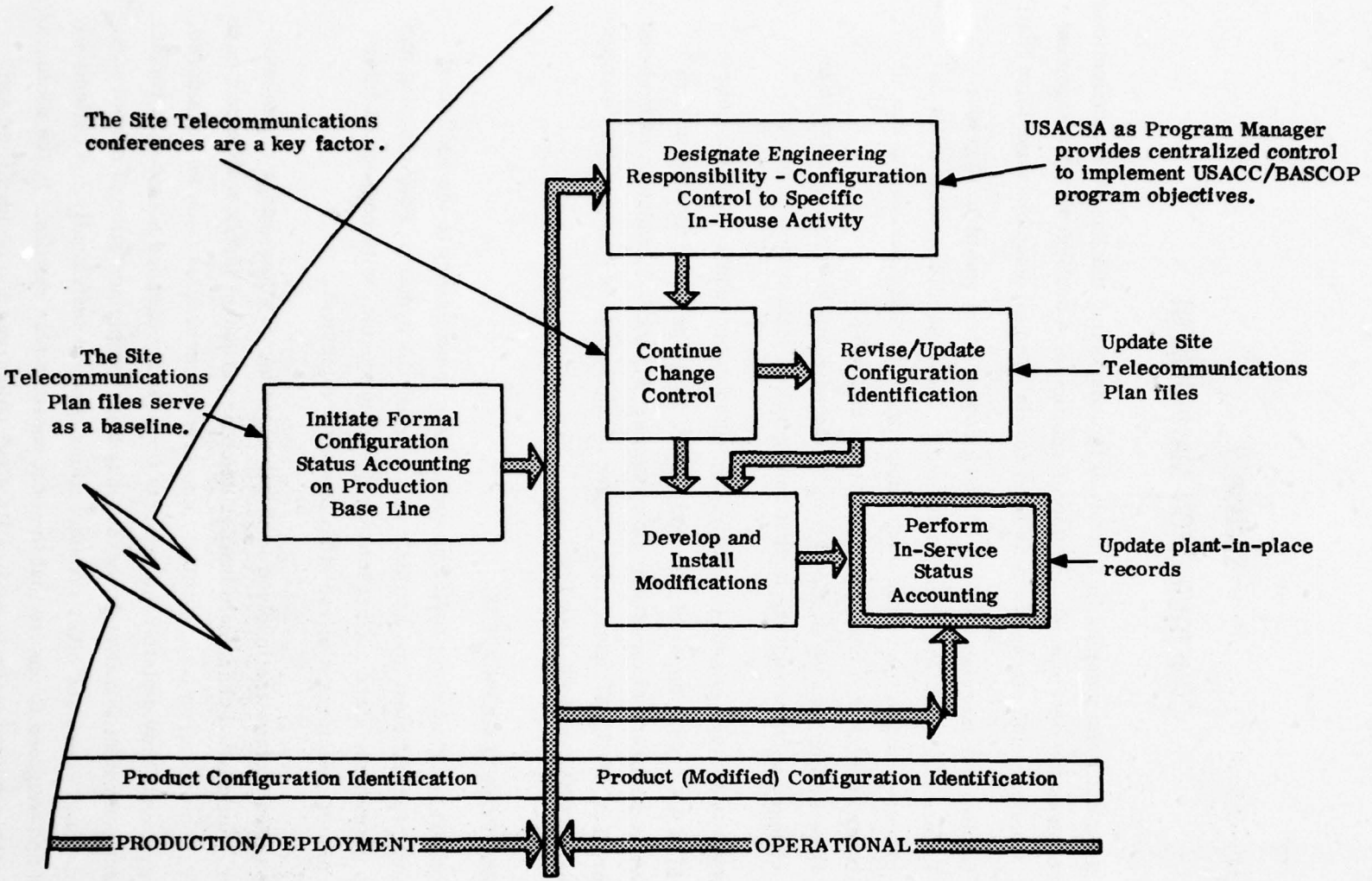
a. Implies the exercise of decision and guidance for a complete upgrade;
b. Refers to the control of the engineering, documentation and installation process, and to the management planning, budgeting, scheduling and all other aspects of a base communications upgrade;
c. Directs maintenance of the system in the as-installed configuration to be changed only through the formal configuration management process.

Configuration management will be implemented in accordance with the policy (para. 1-5) of AR 70-37, dated 28 February 1977, as it applies to the operational phase of Army communication-electronic systems. Figure 9-1, which is reproduced from Figure 1 of AR 70-37, shows the manner of application of configuration management in the BASCOP upgrade process.

9.1 WORK PLANNING PROCESS

A long-range plan with provisions for updates is necessary to the continuing maintenance of an efficient and adequate communications system. Poor planning can lead to an improperly sized or inefficiently designed system, with consequent future costs to remedy deficiencies or maintain unneeded equipment.

Numerous factors are involved in the development of a long-range communications plan. Anticipated changes in base function or personnel levels will impact base communications requirements. Military construction schedules must be considered. Technology trends may dictate requirements for new or upgraded services to replace obsolescent equipment. Budget forecasts may affect implementation of communications upgrades. These and other considerations must be individually and collectively evaluated and weighted to ensure that the best possible plan results. In the context of this plan, the required tasks to realize BASCOP objectives can be identified and programmed.



(Excerpt from Figure 1, System Program Configuration Management Phasing, AR 70-37)

Figure 9-1. AR 70-37 Configuration Management Application in Base Upgrades

The following paragraphs present information on a functional Work Breakdown Structure (WBS) and the tasks associated with the WBS elements. This information is general in nature, quite comprehensive, and must be tailored to each upgrade project. For example, some tasks may require significant levels of effort in cases of major upgrades of the larger Army bases, e.g., Validate Cost Estimates and Prepare Budgets. In minor upgrades of small bases, these and other tasks may serve merely as checklist reminders and involve little effort.

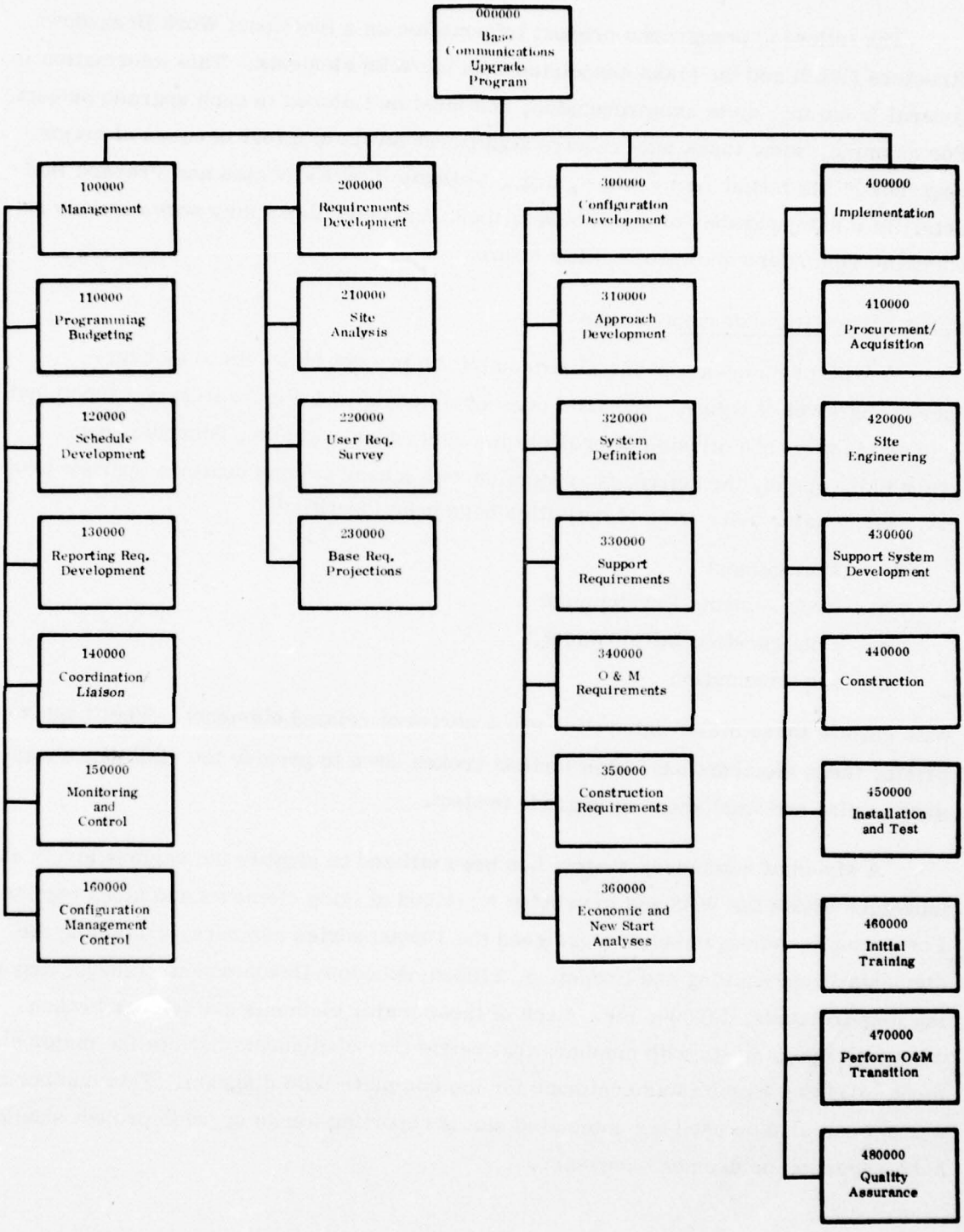
9.1.1 Work Breakdown Structure

A WBS provides a top-down breakout of the project elements to an ever-increasing level of detail. The WBS presented herein (see Figure 9-2) is a functionally oriented family tree division of project elements which organize, describe, and graphically display the activities associated with a base communications upgrade project. Four major categories of activities have been identified:

a. Management
b. Requirements Development
c. Configuration Development
d. Implementation

With each of these major categories are a series of related elements. Where appropriate, these elements have been further broken down to provide the visibility necessary to plan and implement an upgrade project.

A six-digit numbering system has been utilized to identify the various levels of indenture within the WBS and to provide a method of tying elements and tasks together. For example, Management was assigned the 100000 series numbers, containing the elements Programming and Budgeting, 110000; Schedule Development, 120000; Reporting Requirements, 130000; etc. Each of these major elements are further broken down into subelements with numbers that relate the subelements back to the major elements. This approach was continued for the complete WBS diagram. This numbering system can also be used for automated status reporting for an upgrade project should such reporting be deemed necessary.



For further WBS breakdown, see:

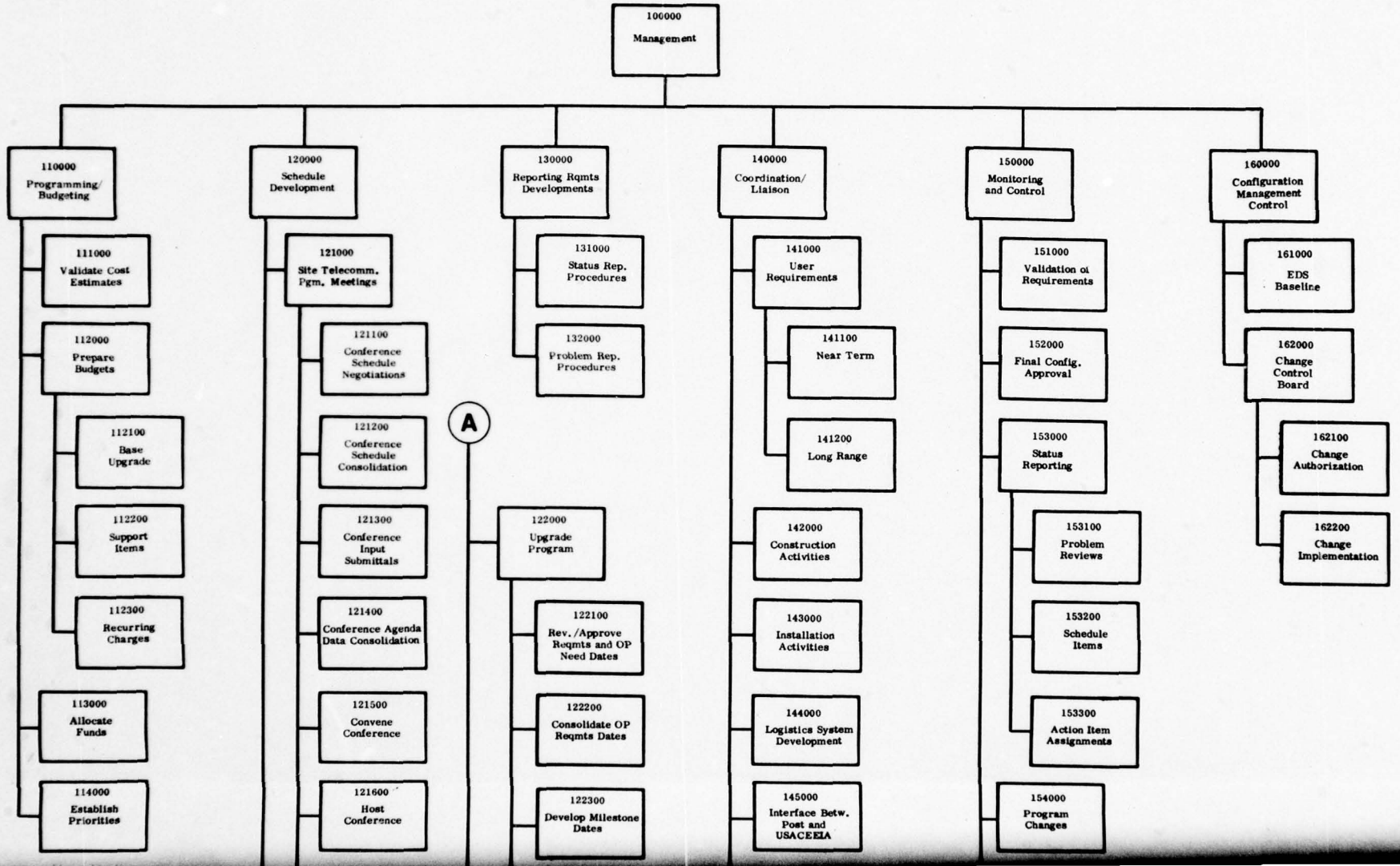
Figure 9-1A (100000 Series Elements)

Figure 9-1B (200000 Series Elements)

Figure 9-1C (300000 Series Elements)

Figure 9-1D (400000 Series Elements)

Figure 9-2. Work Breakdown Structure for Base Communications Upgrade Program


100000
Management
110000
Programming/ Budgeting
111000
Validate Cost Estimates
112000
Prepare Budgets
112100
Base Upgrade
112200
Support Items
112300
Recurring Charges
113000
Allocate Funds
114000
Establish Priorities
120000
Schedule Development
121000
Site Telecomm. Pgm. Meetings
121100
Conference Schedule Negotiations
121200
Conference Schedule Consolidation
121300
Conference Input Submittals
121400
Conference Agenda Data Consolidation
121500
Convene Conference
121600
Host Conference
A
122000
Upgrade Program
122100
Rev./Approve Reqmts and OP Need Dates
122200
Consolidate OP Reqmts Dates
122300
Develop Milestone Dates
130000
Reporting Rqmts Developments
131000
Status Rep. Procedures
132000
Problem Rep. Procedures
140000
Coordination/ Liaison
141000
User Requirements
141100
Near Term
141200
Long Range
142000
Construction Activities
143000
Installation Activities
144000
Logistics System Development
145000
Interface Betw. Post and USACEEIA
150000
Monitoring and Control
151000
Validation of Requirements
152000
Final Config. Approval
153000
Status Reporting
153100
Problem Reviews
153200
Schedule Items
153300
Action Item Assignments
154000
Program Changes
160000
Configuration Management Control
161000
EDS Baseline
162000
Change Control Board
162100
Change Authorization
162200
Change Implementation

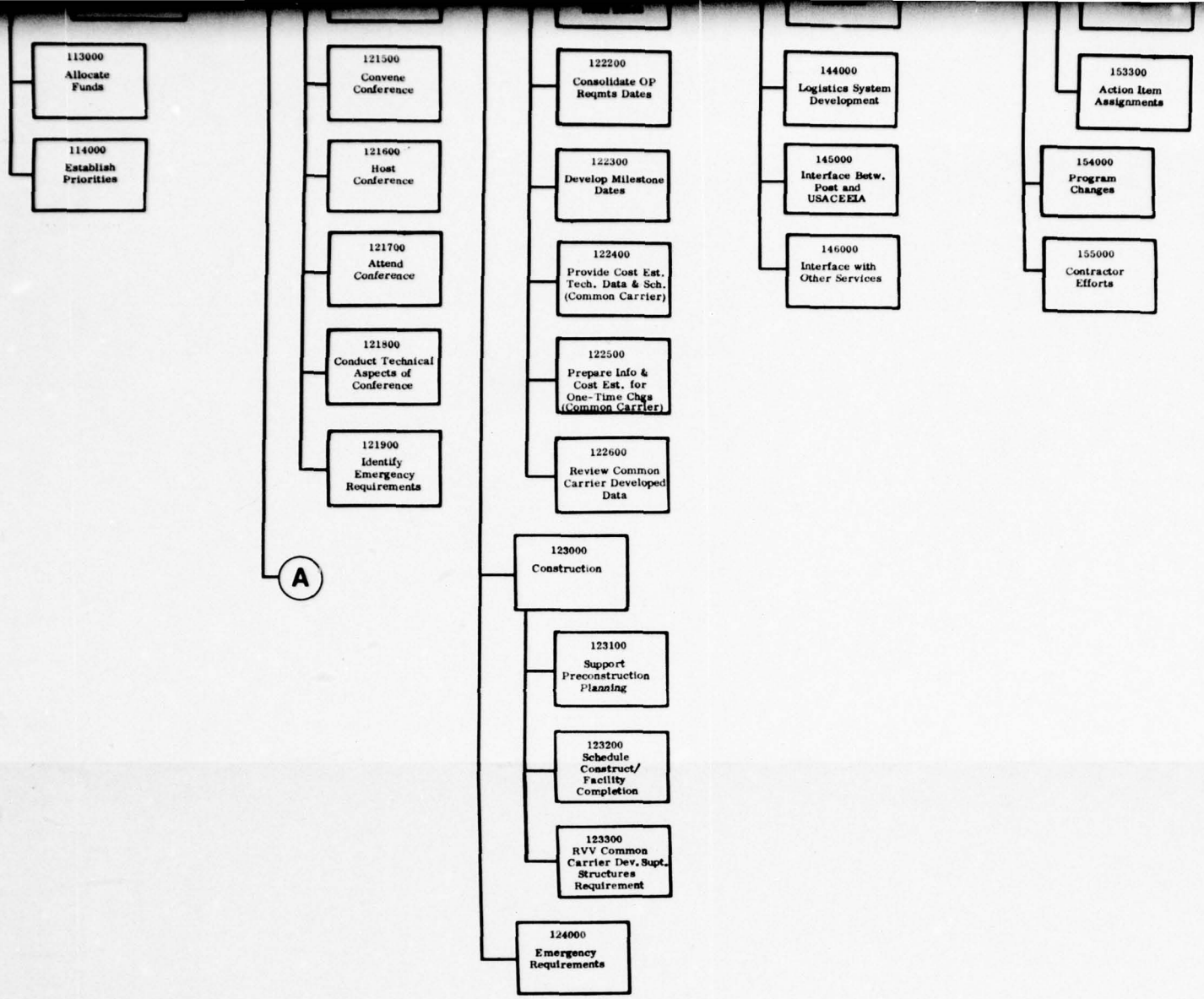


Figure 9-2A. WBS 100000 Series Elements

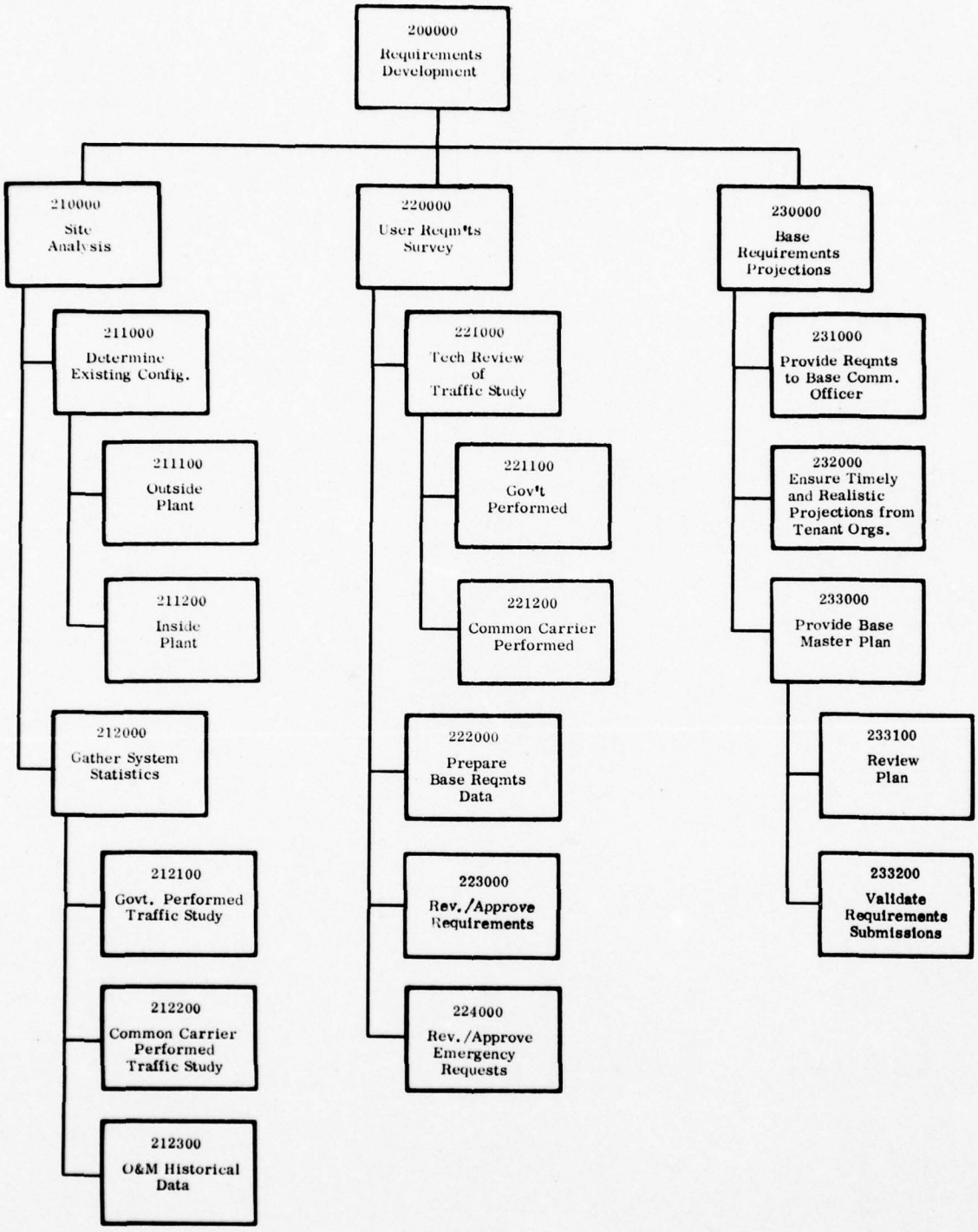
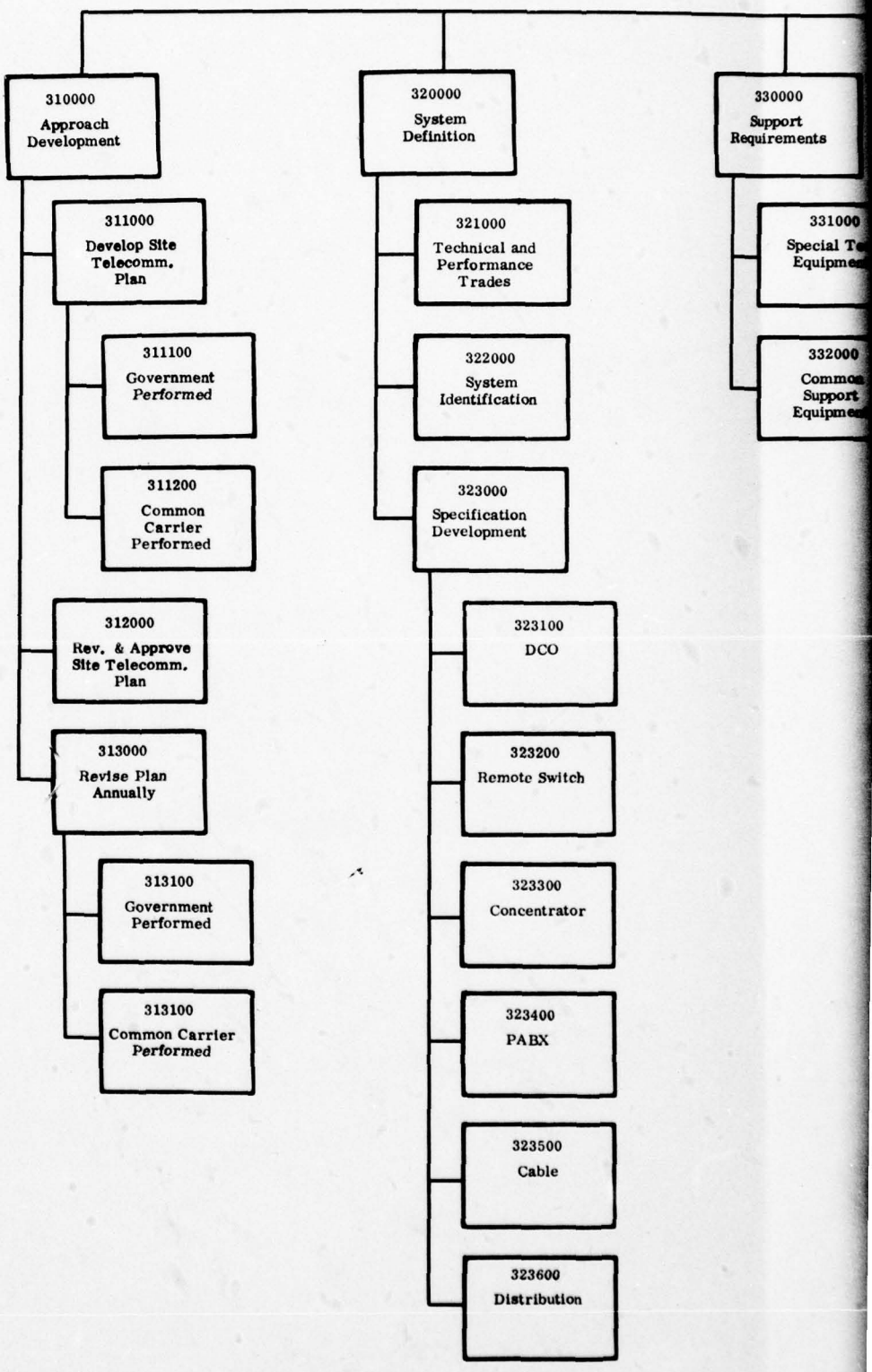


Figure 9-2B. WBS 200000 Series Elements


310000
Approach Development
311000
Develop Site Telecomm. Plan
311100
Government Performed
311200
Common Carrier Performed
312000
Rev. & Approve Site Telecomm. Plan
313000
Revise Plan Annually
313100
Government Performed
313100
Common Carrier Performed
320000
System Definition
321000
Technical and Performance Trades
322000
System Identification
323000
Specification Development
323100
DCO
323200
Remote Switch
323300
Concentrator
323400
PABX
323500
Cable
323600
Distribution
330000
Support Requirements
331000
Special Te
Equipmen
332000
Common
Support
Equipmen

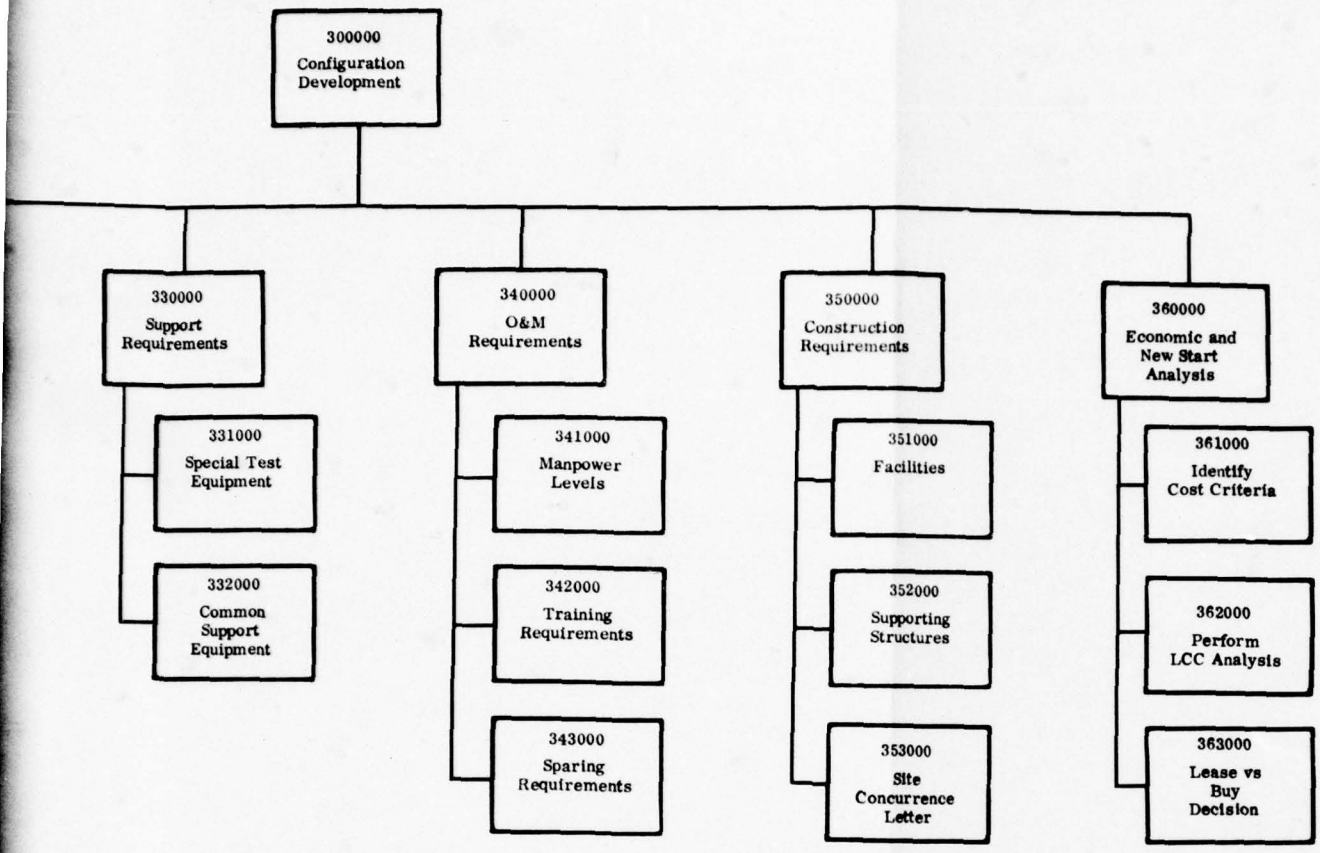
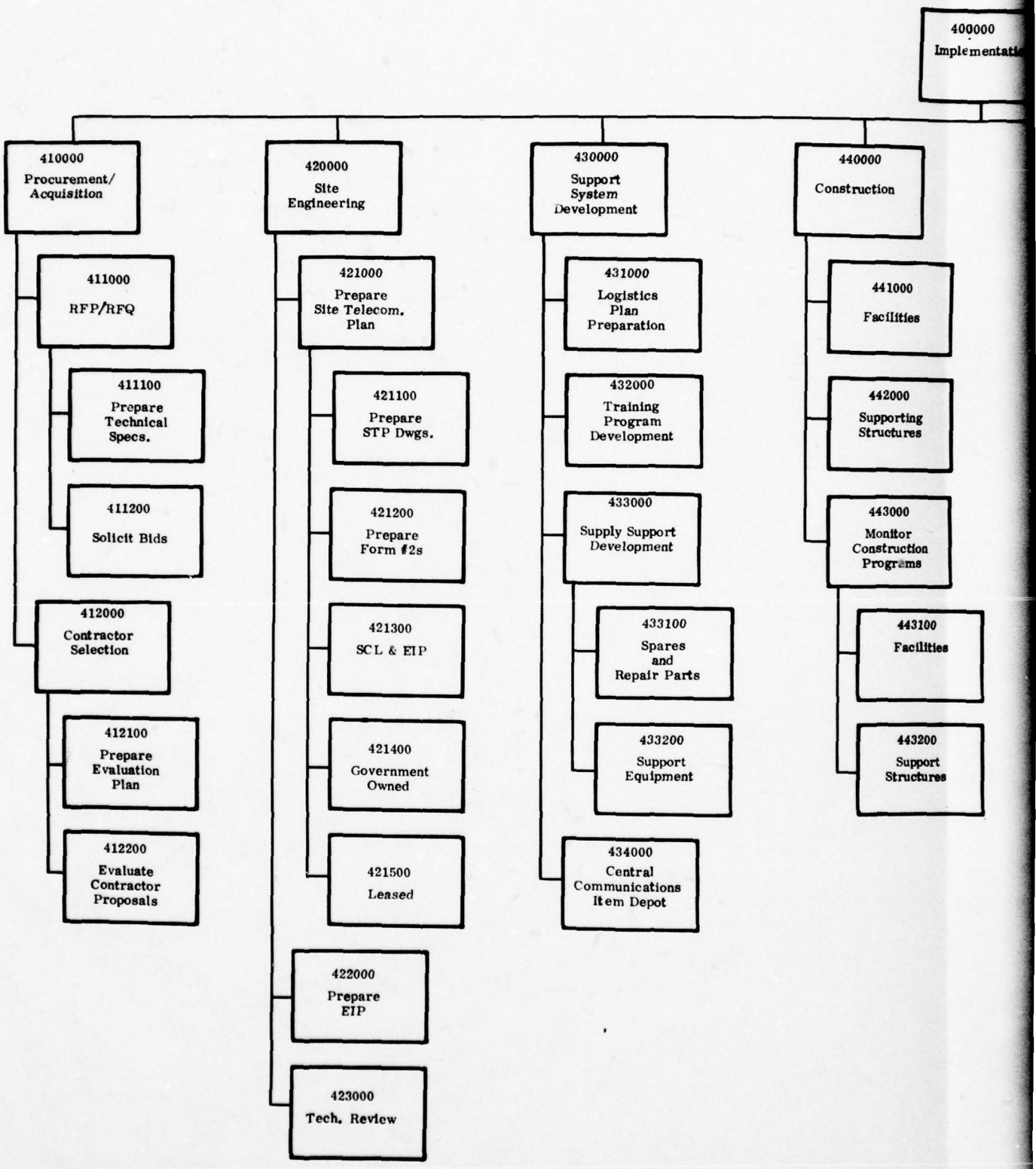


Figure 9-2C. WBS 300000 Series Elements


400000
Implementati
410000
Procurement/
Acquisition
411000
RFP/RFQ
411100
Prepare
Technical
Specs.
411200
Solicit Bids
412000
Contractor
Selection
412100
Prepare
Evaluation
Plan
412200
Evaluate
Contractor
Proposals
420000
Site
Engineering
421000
Prepare
Site Telecom.
Plan
421100
Prepare
STP Dwgs.
421200
Prepare
Form #2s
421300
SCL & EIP
421400
Government
Owned
421500
Leased
422000
Prepare
EIP
423000
Tech. Review
430000
Support
System
Development
431000
Logistics
Plan
Preparation
432000
Training
Program
Development
433000
Supply Support
Development
433100
Spares
and
Repair Parts
433200
Support
Equipment
434000
Central
Communications
Item Depot
440000
Construction
441000
Facilities
442000
Supporting
Structures
443000
Monitor
Construction
Programs
443100
Facilities
443200
Support
Structures

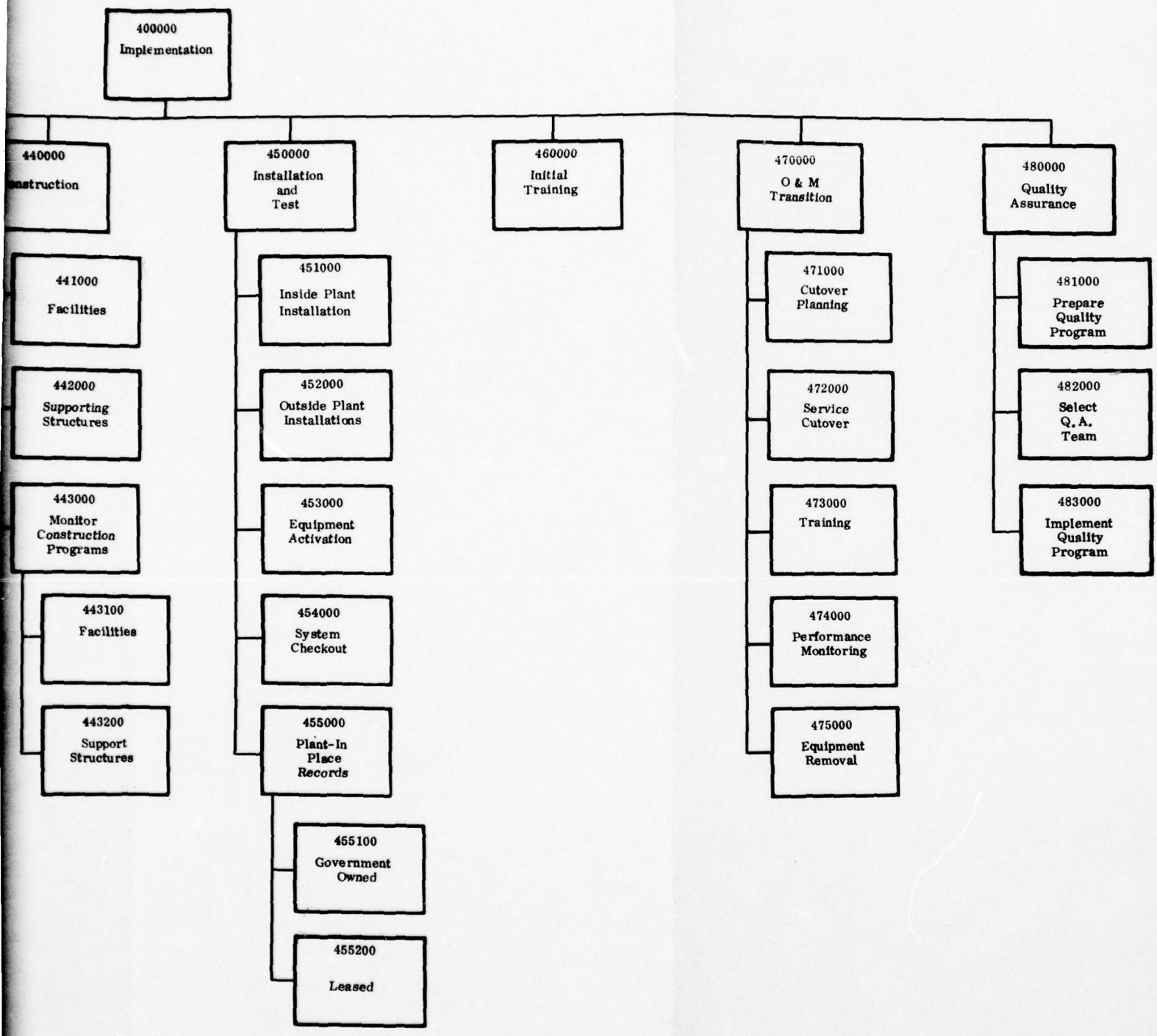


Figure 9-2D. WBS 400000 Series Elements

9.1.2 Responsibility Matrix

A narrative statement of the responsibilities of each of the various organizations involved in a base communications upgrade (WBS activities) is provided in Section 9.7. This portion (Section 9.1.2) of the document presents in matrix format the tasks associated with the WBS elements and identifies the responsibilities for their performance in accordance with the information contained in the above-referenced paragraph. The Responsibility Matrix (Figure 9-3) shows the organizations responsible for accomplishing the tasks associated with the WBS elements. The matrix is coded in the following manner:

Code	Type of Responsibility Assigned	Definition
A	Approve	Responsible for review and approval of information/data developed under the WBS element.
I	Information/Data	Responsible for the preparation/development of information/data required as inputs for the accomplishment of the WBS element.
G	Guidance	Responsible for providing advice and/or instructions concerning the technical/managerial aspects of the WBS element.
M	Management	Responsible for performing managerial functions associated with the WBS element.
P	Primary Action	Responsible for executing and/or reporting progress on or completion of the WBS element.
R	Review	Responsible for performing a review of information/data associated with the WBS element (no approval authority).
S	Support	Responsible for the timely provision of expertise to the primary action designee for the accomplishment of the WBS element.

A – Approve
I – Information Data
G – Guidance
M – Management
P – Primary Action
R – Review
S – Support

WBS Item Number	Title	Department of the Army	USACC	USACEEIA	USACSA	Host Command	Base Commander	Base Communications Officer	Post Facilities Engineer	Tenant Organizations	Common Carrier
111000	Validate Cost Estimates		P	S	S			S			
112000	Prepare Budgets	G	P								
112100	Base Communications Upgrade		A	P	M						
112200	Support Items		P								
112300	Recurring Charges		A			P					
113000	Allocate Funds for Upgrade	A	P		M						
114000	Establish Upgrade Priorities		P			I					
121000	Schedule Site Telecommunications Meetings										
121100	Negotiate Tentative Conference Schedules		A	P							
121200	Consolidate Conference Schedules		P								
121300	Submit Conference Inputs			I	M	R	R	P			
121400	Consolidate Conference Agenda Data			P							
121500	Convene Conference						P				
121600	Host Conference						P				
121700	Attend Conference			I		I	S	I	I	S	S
121800	Conduct Technical Aspects of Conference			P							
121900	Identify Emergency Requirements		A		M	P		S			
122000	Schedule Upgrade Program										
122100	Review and Approve Requirements and Operational Need Dates		A		M	P					
122200	Consolidate Operational Requirements Dates			P	M						
122300	Develop Milestone Dates for:										
	a) Detailed Engineering			I	P						
	b) Equipment and Material Procurement			I	P						
122400	Provide Technical Data, Cost Estimates and Schedules (Common Carrier)		A	R	M						P
122500	Prepare Information and Cost Estimates for One-Time Charges (Common Carrier)		A	R	M						P
122600	Conduct Technical Review of Common Carrier Developed Data		A	P	M						
123000	Schedule Construction										
123100	Support Preconstruction Planning		P	S					R		
123200	Schedule Completion Requirements for Support Structures/Facilities		P	S	M				R		
123300	Conduct Review of Common Carrier Developed Supporting Structure/MCP Requirements		A	R	M						
124000	Adjust Schedules to Meet Approved Emergency Requirements		A	S	P			I			
131000	Develop Status Reporting Procedures										
	a) Identify Reporting Requirements		A		P						
	b) Prepare Reporting Procedures		A	I	P						
132000	Develop Problem Reporting Procedures		A		P						
140000	Perform Coordination and Liaison for:										
141000	Consolidation of User Requirements										
141100	Near Term		A	P	M						
141200	Long Range		A	P	M						
142000	Tracking Construction Programs		P						S		
143000	Monitoring Installation Efforts			P							
144000	Logistic System Development		A		P						
145000	Interface Between Base and USACEEIA							P			
146000	Interface with Other Services				P						

Figure 9-3. Responsibility Matrix, Base Communications Upgrade Program (Sheet 1 of 4)

A – Approve
I – Information/Data
G – Guidance
M – Management
P – Primary Action
R – Review
S – Support

WBS Item Number	Title	Department of the Army	USACC	USACEEIA	USACSA	Host Command	Base Commander	Base Communications Officer	Post Facilities Engineer	Tenant Organizations	Common Carrier
150000	Monitor and Control:										
151000	Requirements Validation		A		M	P					
152000	Final Configuration Approval		A	I	M						
153000	Status Reporting										
153100	Problem Reviews		A		P						
153200	Schedule Items		A		P	S					
153300	Action Item Assignments		A	I	P	S		S	S		
154000	Program Changes		P	S	M						
155000	Contractor Efforts			S	P						
160000	Implement Configuration Management Control Discipline		P	S	S			S			
161000	Establish EDS Baseline		P	S	S			S			
162000	Change Control Board										
162100	Change Authorization										
162200	Change Implementation										
211000	Perform Site Analysis and Determine Existing Configuration of:										
211100	Outside Plant			S				P	S		
211200	Inside Plant			S				P	S		
212000	Gather System Statistics and Prepare Report										
212100	Government Performed Traffic Study			P		S		S			
212200	Common Carrier Performed Traffic Study			R				S			P
212300	O&M Historical Data		P					I			
220000	Develop User Requirements										
221000	Conduct Technical Review of Traffic Study										
221100	Government Performed			P				S			
221200	Common Carrier Performed			P/A				S			
222000	Prepare Base Requirements Data				M	A		P	S	S	S
223000	Review and Approve Requirements		P	I	M						
224000	Review and Approve Emergency Requests		P	I	M						
230000	Develop Base Requirements Projections										
231000	Provide Requirements to Base Comm. Officer								P		
232000	Ensure Tenant Organizations Provide Timely and Realistic Projections							P		I	
233000	Provide Base Master Plan			R					P		
233100	Review Base Master Plan			P							
233200	Validate Requirements Submissions										
311000	Develop Site Telecommunications Plan										
311100	Government Performed Upgrades		A	P							
311200	Common-Carrier Performed Upgrades		A	R							P
312000	Review and Approve Site Telecommunications Plan										
313000	Revise Plan Annually										
313100	Government Performed Upgrades		A	P		S		I	I		
313200	Common-Carrier Performed Upgrades		A	R				I	I		P
321000	Perform Technical and Performance Tradeoff Studies		A	P	M						
322000	Identify System Requirements		R	P	M						
323000	Prepare Subsystem Specifications										
323100	DCO		R	P	M						
323200	Remote Switch		R	P	M						
323300	Concentrator		R	P	M						
323400	PABX		R	P	M						
323500	Cable		R	P	M						
323600	Distribution		R	P	M						

Figure 9-3. (Sheet 2 of 4)

A – Approve
I – Information/Data
G – Guidance
M – Management
P – Primary Action
R – Review
S – Support

WBS Item Number	Title	Department of the Army	USACC	USACEEIA	USACSA	Host Command	Base Commander	Base Communications Officer	Post Facilities Engineer	Tenant Organizations	Common Carrier
331000	Identify Special Test Equipment			P	M						
332000	Identify Common Support Equipment				P						
341000	Identify O&M Manpower Levels		P								
342000	Establish Training Requirements		P								
343000	Determine Spares Requirements		P		M						
351000	Identify Facilities Construction Requirements		R	P	M	R		I			
352000	Identify Supporting Structures Requirements		A	P	M		R	I			
353000	Site Concurrence Letter		R	P			A	I	I		
360000	Economic and New Start Analysis										
361000	Identify Cost Criteria		P	I				I			I
362000	Perform LCC Cost Analysis		P	I				I			I
363000	Make Lease Vs Buy Decision	A	P	I							
411000	RFP/RFQ										
411100	Prepare Technical Specs		A	P	M						
411200	Solicit Bids				P						
412000	Select Contractors				P						
412100	Prepare Evaluation Plan			S	P						
412200	Evaluate Contractor Proposals			S	P						
421000	Prepare STP			P				I	I		
421100	Prepare STP Drgs			P				I	I		
421200	Prepare Form 2s (or 3s)			P				I			
421300	SCL and EIP		R	P				R			
421400	Government Owned		A	P							
421500	Leased		A	R							P
422000	Prepare EIP			P							
423000	Conduct Tech. Review of Detailed Engineering/Installation Information					R		R			
431000	Develop Logistic Support Plan		P		M						
432000	Develop Training Program		P		M						
433000	Provide Supply Support										
433100	Spares and Repair Parts				P						
433200	Support Equipment				P						
434000	Provide Communication Items Depot				P						
441000	Perform Facilities Construction			I	P				R		
442000	Perform Support Structures Construction			I	P				R		
443000	Monitor Construction Programs										
443100	Facilities		P						S		
443200	Support Structures		P						S		

Figure 9-3. (Sheet 3 of 4)

A – Approve
I – Information/Data
G – Guidance
M – Management
P – Primary Action
R – Review
S – Support

WBS Item Number	Title	Department of the Army	USACC	USACEEIA	USACSA	Host Command	Base Commander	Base Communications Officer	Post Facilities Engineer	Tenant Organizations	Common Carrier
451000	Perform Inside Plant Installations			P	M						
452000	Perform Outside Plant Installations			P	M						
453000	Activate Equipment			P	M						
454000	Perform System Checkout			P							
455000	Provide Plant-in-Place Records										
455100	Government Owned			P							
455200	Leased			A							P
471000	Perform Cutover Planning			P	M			S			
472000	Provide Service Cutover			P	M			S			
473000	Provide Training		P								
474000	Implement Performance Monitoring							P			
475000	Perform Equipment Removal			P							
480000	Quality Assurance			P	M						
481000	Prepare Quality Assurance Program			P	M						
482000	Select Quality Assurance Team			P							
483000	Implement Quality Assurance Program			P	M						

Figure 9-3. (Sheet 4 of 4)

In a few cases the organization responsible for performing the primary action is also responsible for managing that task. In those instances where management is not the responsibility of the primary actionee, it has been so indicated on the matrix.

9.2 MANAGEMENT CONTROL PROCESS

Policy and guidance for the overall upgrade program is provided in the BASCOP Volume II. In that plan the following management responsibilities are identified:

a. USACC performs programming and budgeting for upgrade projects, and develops O&M force structures and budgets.
b. USACSA is Project Manager for the communications system upgrades.

USACEEIA will perform the technical tasks necessary to satisfy command-stated requirements under the Base Communications Upgrade Program, e.g., they will manage and report on those functions associated with engineering, installation, test and checkout, and operational cutover. In addition, the engineering activity will hold membership on the CM control boards at the appropriate level.

9.2.1 Budgeting

A number of Army Regulations in the 37 series (e.g., AR 37-15, Budget Development and Review) address budgeting and accounting procedures for Army programs. Adherence to these documents is essential to ensure the availability of funds for communications upgrade projects. Basically, four different types of funds may be required: those necessary for the base communications upgrade, for operations and maintenance of the communications plant, for supporting structures and allied support, and as covered under Military Construction Programs where facilities are involved.

USACC's responsibilities in the area of budgeting are to:

a. Budget for the base upgrade programs
b. Establish upgrade priorities
c. Allocate resources
d. Approve emergency requests and reallocate resources for implementation of emergency actions
e. Review budget requirements submitted by the O&M commands and incorporate these requirements into the overall USACC budget requests.

f. Budget for and manage funds covering all supporting structures and allied support items, as well as for recurring charges for leased facilities, equipment, and services.

Military construction is a unique aspect of the base telephone upgrade. The Post Facilities Engineer coordinates the planning for Military Construction Program items with the Base Communications Officer to assure that facilities are or will be adequate. When new or modified facilities are found necessary, the guidance and direction of AR 415-15, Military Construction, Army (MCA) Program Development, is utilized in budgeting for and obtaining funds for construction. This will be a Corps of Engineers responsibility.

9.2.2 Scheduling

The WBS and Responsibility Matrix present the framework for scheduling the Base Communications Upgrade Program. The tasks identified by these two items must be scheduled for each upgrade project. Figure 9-4 provides a typical top-level schedule. Once a base has been selected for upgrade and the funds approved, a more detailed schedule must be developed. The timeframe for each upgrade may vary, depending upon the size of the base and whether it will be a lease or buy type of project. The timespan for each task may also vary from project to project for the same reasons.

In developing each Site Telecommunications Plan, it is imperative that the most realistic schedule possible be generated so that adequate visibility and control can be provided. Operational requirement dates for each validated communications requirement will be established by the Host Command in conjunction with the Base Communications Officer. Using the operational date as a guide, the engineering activity will develop the incremental milestone dates for the accomplishment of detailed engineering and equipment/material procurement, construction of supporting structures and/or facilities, and establishment of installation/cutover dates.

The lead time for special communications requirements not requiring Economic and New Start Analyses can be shortened by submission and validation of an emergency requirement. In the event such a requirement is approved by HQ USACC, the tasking from HQ USACC will identify to the subelements (i.e., the engineering, procurement, and installation activities) which routine requirements may be slipped to allow the appropriate allocation of resources to the emergency request. It should be noted, however, that emergency requirement action is not a substitute for proper planning.

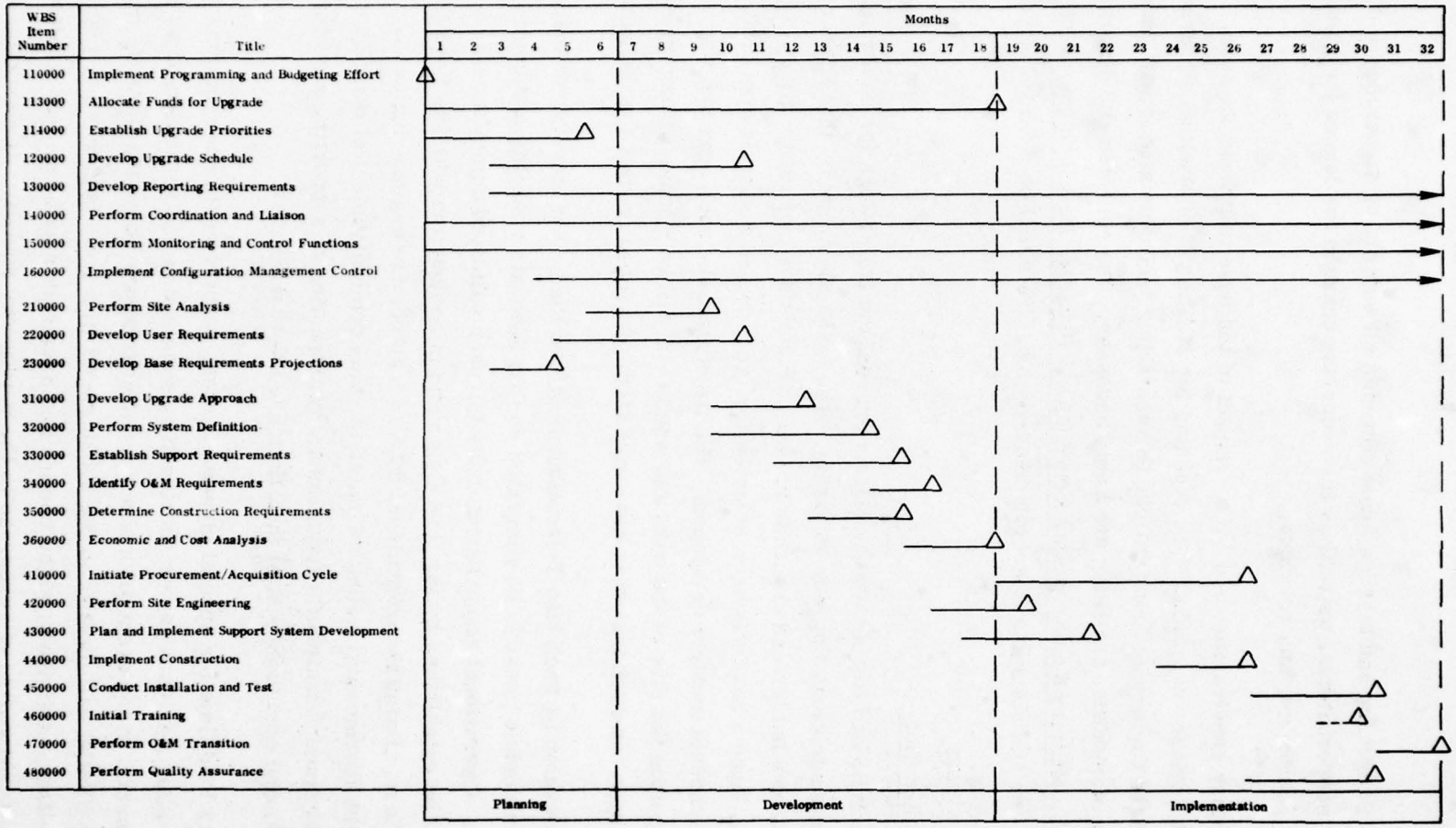


Figure 9-4. Typical Top-Level Schedule for Base Communications Major Upgrade Program

In developing Figure 9-4, it was assumed that programming and budgeting had already been accomplished and that funds will be or are available in the fiscal year in which the project will be initiated. The reason for this assumption was based on the fact that funds for an upgrade project must be requested at least one year prior to their approval by Congress as part of the overall Army budget. Another factor considered was upgrade priorities – funds may be allocated and reallocated based on the urgency of one upgrade versus another.

9.3 CONFIGURATION CONTROL AND BASELINE DOCUMENTATION

Configuration control is a method used to track the design process through its progressive definition from concept to operational hardware. From the point that a baseline design is designated, all changes to hardware and software are controlled and must be approved by the appropriate CM control board(s) before implementation. The purpose of configuration control is to retain system integrity, maintain system operational characteristics, and minimize changes.

For the Base Communications Upgrade Program, two aspects of configuration control are involved. In the first case, commercially available equipment with commercial documentation will be used whenever possible. In this instance the equipment and technical literature are under the direct control of the manufacturer who will provide the detailed documentation associated with his equipment. In the second case, configuration control must be maintained over the site-peculiar details of the installation, such as floor plans, equipment deployment, supporting services, and software documentation. In this instance the Government is responsible and must implement configuration control procedures for the site. For a base upgrade, the entire site must be considered as a single entity when implementing configuration management.

9.3.1 Site Telecommunications Plan

The management concept that has been applied in BASCOP is to use the Site Telecommunications Plan as the single document for the planning and control of all phases of program implementation. A Site Telecommunications Plan will be developed as prescribed herein for each base under BASCOP. As the controlling program document, that plan will:

a. Provide a graphic portrayal of each of the Host Command-submitted requirements for validation purposes.

b. Program and schedule all actions necessary to meet the required operational dates for each requirement during the projected lifespan of BASCOP.

c. Initiate the properly time-phased preparation for procurement and delivery of installation equipments and materials.

d. Document specific facilities and supporting structures to be provided by the base in support of validated communications requirements.

e. Serve as the programming document for the engineering/installation workload.

f. Apply dynamic configuration management concepts throughout the planning, engineering, procurement, installation, and operational phases for each task.

g. Specify the engineering, equipment selection, procurement, and installation/cutover details used in satisfying each of the validated requirements.

h. Specify estimated funding requirements by fiscal year for each of the validated requirements.

i. Provide specific inputs to refine and update the ATCOGS 5-Year Plan on a regular basis.

j. Serve as the primary source of technical data for the preparation of the Subsystem Project Plan submitted to the Department of the Army for 4630.1 action.

The guidance contained herein shall apply to the development and publication of the Site Telecommunications Plan, whether the communications plant-in-place is Government owned or commercially leased.

9.3.2 Specifications

Specifications will be utilized to identify and describe the operating characteristics of a unit, equipment, or system. They will define the technical parameters within which the hardware must operate. For the BASCOP, specifications will be extremely important in that functionally standardized modular combinations of hardware and software, as well as procedures, will be delineated to achieve mission-essential performance. They will be the controlling documents for the acquisition of base communications upgrade equipment and automated features associated therewith.

9.4 PLAN DEVELOPMENT

A Site Telecommunications Plan will be developed and maintained for each Army base covered by BASCOP. As indicated in the Responsibility Matrix (see Figure 9-3), USACEEIA has primary responsibility for the preparation and implementation of each plan. The plan is the vehicle for consolidating project requirements, scheduling and controlling the project, and monitoring its status. Each plan will be different in that no two base upgrades will be identical. However, these plans will provide the basis for the following actions:

a. Preparation and submission of justification and impact statements for all major inside-plant equipment additions or changes, e.g., ATCOGS inputs.
b. Development of the engineering/procurement actions required to satisfy each of the validated requirements specified in the Site Telecommunications Plan.
c. Preparation and submission of an annual material forecast for programmed requirements for budget and procurement purposes.
d. Preparation and submission of an annual communications-electronics installation schedule.
e. Preparation and submission of budgetary requirements for facilities by the cognizant Facilities Engineering Office.

Information concerning the contents of a Site Telecommunications Plan is provided in Section 9.6.

9.5 COMMUNICATIONS SERVICES

Typical communications services that may be encountered in a base communications network are noted below. Other systems not specifically identified herein may be included as requirements dictate.

9.5.1 Base Telephone System

The base telephone system provides the major framework for the base communications network. Nearly all communications services interface in some way with the telephone system, either directly or by shared use of the switching and transmission media. The needs of these services must be considered when evaluating the adequacy of the telephone system layout.

9.5.2 Data Transmission

Most bases have some requirement for data processing, and thus for a means of data transmittal. This is conveniently accomplished over the telephone lines, either by dedicated lines for high volume users or by dial-up lines using ordinary telephones with coupling devices. The usage of dedicated lines must be justified on an economic basis. The interface characteristics of all types of coupling devices and data terminals on base must be determined, and potential conflicts with the upgraded telephone system identified.

9.5.3 Mobile Radio Services

Mobile radio services are frequently used for base security and hospital communication. Security uses are largely confined to voice communication for police and firefighting purposes. Medical uses may consist of data transmission from portable monitoring equipment as well as voice communication with ambulance crews. All of these facilities may be required to interface with the base telephone system.

9.5.4 Hospital Communication Services

In addition to the telephone system, hospital communications include intercom, paging, nurse call, television, and data services. The data services may include terminals for access to computerized data bases, patient monitoring devices, and base stations for use with mobile facilities. Some or all of these services may be required to interface with the telephone system.

In addition, most hospital communications require continuous availability. Therefore, redundant equipment and emergency backup services must be provided to ensure against loss of vital communications.

9.5.5 Airfield Communications

Airfield communications include air and ground traffic control, information services (e.g., weather), and other air-to-ground and air-to-air radio communications (e.g., NAVAIDs). Information services may be distributed over telephone lines. Again, high reliability is required.

9.5.6 Intrusion Detection

Intrusion detection systems usually consist of sensor and closed-circuit television (CCTV) networks. Data from these systems may be routed over telephone lines to centralized monitoring and control stations.

9.5.7 Wideband Services

Wideband services, such as television and facsimile, will eventually be incorporated into BASCOP. Although these services are generally incompatible with the telephone transmission system, it may prove advantageous for them to share physical facilities (i.e., buildings, supporting structures), which should then be sized accordingly.

9.5.8 Digital Data Distribution System

Some bases require a high-speed digital data distribution system, which can be integrated with the telephone system. As with other data transmittal systems, dedicated or dial-up lines may be used. In general, user interfaces will be compatible with the digital switching and transmission methods employed by the upgraded telephone system.

9.6 CONTENTS OF PLAN

In order for the Site Telecommunications Plan to serve as the single document for the timely resolution of the communications problems, it must cover all facets of the system upgrade in considerable detail. The Site Telecommunications Plan will initially be published in five sections outlining information pertaining to the validation, funding, and scheduling of each requirement contained therein. The plan will be updated on a periodic basis to assure that new or changed requirements are included in the long-range planning cycle, and that the date to assess installed communications systems effectiveness are continually available for assessment of programming, priority, and scheduling (ATCOGS).

The detailed engineering/installation/procurement work packages that result from each validated requirement will be incorporated into the plan as addendums at the time the work package is completed. The plan will thus serve to document validated requirements, scheduling, cost estimates, engineering/installation/procurement details, and project status on a continuing basis. The document sections are discussed below.

9.6.1 Section I. General Information

Section I, General Information, will contain the following elements:

a. Narrative – Provides general information such as name, location, and description of the base, post, camp, or station; central office size, type of equipment, and assignments; main distributing frame fill and forecasts; and yearly Site Telecommunications Plan cost summary.

b. Action Summary – Presents a detailed summary of those actions which are the responsibility of the engineering activity, the procurement/supply activity, the Base Communications Officer, and the Post Facilities Engineer.

c. Base Communications Program Conference Correspondence – Includes copies of authenticated minutes of the BASCOP conference and other pertinent correspondence such as approved site-concurrence letters.

d. Base Requirements Date (Form 1) – Form 1 will be prepared for all existing and future buildings and structures on the base. This form, prepared by cable number and corresponding to the base cable assignment records, will indicate the following information for each building: the existing line requirements, the line requirements at the end of the current fiscal year, and the line requirements for each of the following 3 fiscal years (additions and/or deletions). A typical Form 1 is shown in Appendix A.

9.6.2 Section II. Outside Plant

Elements of Section II, Outside Plant, are:

a. Narrative – Provides a review of all approved engineering/installation/procurement work packages; all work packages for which approval is pending; and all requirements or work packages which have been completed, deleted, or cancelled since the preparation of the last Site Telecommunications Plan. Also includes any other data pertaining to anticipated methods of satisfying validated outside plant requirements.

b. Outside Plant Summary – Summarizes the number of new engineering/installation work packages assigned to satisfy requirements resulting from the most recent Site Telecommunications Plan conference.

c. Comments and Recommendations — Provides clarification of items discussed at the STP conference which did not result in a validated requirement. Recommendations and survey results, if a survey was conducted, are recorded.

d. Outside Plant Cost Summary – Projects estimated costs for outside plant requirements for the current and 3 succeeding fiscal years.

e. Base Communications Programming (Form 2 or 3) – Major equipment and material items, installation man-hours, and estimated costs will be summarized on Form 2 (see Appendix A). Separate forms identified by a job identification code, will be prepared for each of the validated requirements. Each form will display in general terms the engineering approach/major equipment items to be utilized in satisfying the requirement. Form 3 is used to show requirements for commercial/lease services.

9.6.3 Section III. Inside Plant

Section III, Inside Plant, will contain the following elements:

a. Narrative – Presents a review of approved engineering/installation packages pending implementation; requirement items validated since the last Site Telecommunications Plan; engineering/installation packages pending approval; and requirement items completed, deleted, or cancelled.

b. Inside Plant Summary – Provides a brief description of the central office and a review of the most current traffic study.

c. Comments and Recommendations – Documents recommended actions to correct deficiencies noted during the most recent traffic study.

d. Inside Plant Cost Summary – Delineates estimated costs for inside plant requirements projected for the current and three succeeding fiscal years.

e. Traffic Engineering Results Summary (Form 4) – A Form 4 will be included with each Site Telecommunications Plan and will be prepared from the latest traffic study (see Appendix A). The following equipment, or equivalent, will be listed where applicable:

1) Line equipment
2) Line finders
3) Local, intermediate, special, and incoming selectors, links, junctors, etc.
4) Matrix common circuits
5) Commercial trunks (two-way, one-way outgoing, and one-way incoming)
6) AUTOVON trunks (two-way, one-way outgoing, and one-way incoming)
7) Attendant switchboard positions
8) Tieline and special service trunks.

f. Base Communications Programming (Form 2) – The forms will be included in the Site Telecommunications Plan for any new central office requirements.

9.6.4 Section IV. Supporting Structures

Section IV, Supporting Structures, contains the following elements:

a. Narrative – Presents a brief discussion of the work required to provide supporting structures and the funding responsibilities for each of the requirements contained in the Site Telecommunications Plan.
b. Supporting Structures Summary – Provides a breakout of support requirement job identification codes.
c. Supporting Structures Cost Summary – Details estimated costs for supporting structure requirements for the current and succeeding 3 fiscal years.

9.6.5 Section V. Applicable Drawings

The following describes each of the drawings furnished as part of the basic Site Telecommunications Plan. These drawings contain the information required to provide a clear indication of the existing facilities and future requirements of a base. The drawings shall be legible and uncongested, though drawing size is not specified due to the variance in size of the installations covered by BASCOP. Sizes will be selected based on space requirements for display of the required information, but in no case shall the drawing exceed "E" size sheets.

9.6.5.1 Fundamental Plan

The Fundamental Plan (see Appendix A) for each base will be developed from the Base Master Plan and the plant-in-place records. The Fundamental Plan is essentially an overlay of the Base Master Plan, with the central office and main cable routes indicated by a single heavy line. The plan may be divided into convenient service areas on multiple sheets if made necessary by the limitation of the "E" size drawing.

Existing buildings, with identifiers (building number or name), will be indicated by a solid line following the general outline of the structure. Proposed buildings will be indicated by a dashed line in the general outline of the structure, with the fiscal year of the operational requirement shown along with the building identifier. Street, road, and highway names or numbers will also be shown.

9.6.5.2 Outside Plant Schematic

The outside plant schematic (see example, Appendix A) will be developed from the Fundamental Plan, the plant-in-place records, and data collected on Form 1. The drawing will be nonscaled and will show the main feeder cable routes and branch and distribution cables. Cable size, type, gauge, and segment length will be shown for existing and proposed plants. Existing cable will be shown as a solid line and proposed cable as a heavy dashed line. Proposed cable construction will indicate the job identification code and month/year of the required operational date.

Cable fill information, taken from Form 1, will show consolidated fill data for each cable segment. The cable fill data will indicate the existing cable fill and the incremental changes by fiscal year. A consolidated fill between the central office and the first manhole will be shown, and the total fill on the main distributing frame will also be specified.

9.6.5.3 Cable Multiple Sheet

The cable multiple sheet is an optional form and will not always be included in the Site Telecommunications Plan. The drawing is developed from the plant-in-place cable assignment records, and is analyzed in light of the growth requirements displayed on Form 1. The drawing will display the cable size, type, gauge, pair counts, and terminal pair counts for each cable segment and each cable terminal. Cable pairs and terminals in multiple will be clearly identified.

9.6.5.4 Supporting Structure Map

The supporting structure map will be developed from the Base Master Plan and the plant-in-place records. This map will depict:

a. Main cable feeder routes, distribution and entrance ducts, manholes, and pole lines
b. Duct configurations for applicable duct routes
c. Duct segment lengths (between manholes)
d. Pole size, class, type, and span lengths
e. Proposed additions or changes to the supporting structures, indicated by a heavy, dashed line along with the task identification code and fiscal month and year (see example in Appendix A).

9.6.5.5 Combined Drawing

For very small installations the Fundamental Plan, outside plant schematic, and supporting structures map may be combined on one sheet if all the required information can be included.

9.6.5.6 Central Office Equipment Layout

A central office equipment layout sheet (see example in Appendix A) will be prepared showing the location of the existing equipment frames or cabinets. Equipment being installed for which the engineering work package has been prepared will be indicated by a heavy line with the identification code and fiscal month/year arrowed to the work. Proposed equipment will be indicated by a heavy dashed line, with the job identification code and fiscal month/year arrowed to the future equipment.

9.6.5.7 Cable and Trunk Schematic Diagram

The cable and trunk schematic diagram is basically a block diagram showing the connectivity of the central office equipment (see Appendix A). Equipment quantities and cable run designators will be shown.

9.7 PROGRAM RESPONSIBILITIES

The development of a Site Telecommunications Plan as a document that provides for the timely satisfaction of mission-oriented communications requirements necessitates a closely coordinated effort by personnel from several Government agencies and, in the case of leased communications, by the common carrier. The primary responsibility for satisfaction of command-stated requirements under BASCOP resides with USACC. USACEEIA as the developer and publisher of the Site Telecommunications Plan, has responsibility for the design and initial installation of communications equipments and facilities, ongoing system modernizations, relocations, expansions, or reductions based on changes in the base mission. The responsibilities of the various agencies involved in this coordinated effort are as described below.

9.7.1 Government-Owned Telephone Systems

9.7.1.1 USACC

USACC shall be responsible for:

a. Overall base communications upgrade activities
b. Preparation of program CEMO in accordance with CCR 105-13

c. Review and approval of the Site Telecommunications Plan.

d. Performance of Economic Analysis in accordance with AR 11-28 and New Start Analysis per AR 235-5, and make lease-vs.-buy decisions.

e. Provisions of funds for the implementation of those activities associated with the engineering, procurement, and installation of communications equipment and material necessary to satisfy the validated requirements specified in the Site Telecommunications Plan as approved during ATCOGS review activities.

f. Review and approval of all requests for emergency requirement action, and establishment of the priority hierarchy for the purpose of identifying those actions which may be slipped in order to allocate the required resources to the emergency requirement.

g. Development and implementation of logistics, personnel, and training concepts and programs.

h. Implementation, by charter of the configuration management control boards at all levels (HQs & Signal Commands) for management of base communications and changes thereto.

9.7.1.2 USACEEIA

USACEEIA shall be responsible for:

a. Development, preparation, publication, and distribution of the Site Telecommunications Plan based on Host Command-approved requirements finalized at the Site Telecommunications Program conference.

b. Development of detailed engineering/installation work packages for each of the validated requirements in the Site Telecommunications Plan.

c. Conduct of periodic traffic studies on the communications system, and preparation of a formal study report for inclusion in the Site Telecommunications Plan.

d. Provisions of technical information, cost estimates, and schedules to the Host Command, detailing the supporting structures and/or military construction program items necessary to support the installation of communications equipment resulting from the validation of Command-submitted requirements.

e. Review of all pertinent data to be included on the Site Telecommunications Program conference agenda.

f. Preparation of consolidated data in approved format for presentation at the Site Telecommunications Program conference.

g. Conduct of the technical portion of the Site Telecommunications Program conference.

h. Incorporation of command-approved communication requirement submissions into the Site Telecommunications Plan.

i. Negotiation of tentative Site Telecommunications Program conference schedules with the Army bases involved during the first month of each calendar year, and forwarding this information to USACC for publication.

j. Initial preparation of statement of work, RFP/RFQ contract deliverable requirements list (CDRL items, and independent Government cost estimates (IGCE) for those validated requirements to be satisfied contractually.

k. Review and monitoring of contractor efforts and deliverables for the validated requirements to be satisfied contractually.

l. Membership on the appropriate CM control board.

m. Development and maintenance of current plant-in-place records.

9.7.1.3 USACSA

USACSA as Program Manager for BASCOP shall be responsible for:

a. Integration of each BASCOP site into the USACC configuration management and control process.

b. Procurement of all items of equipment and material listed on the engineering/installation work package bill of materials (BOM) for each of the validated requirements.

c. Assurance that common or frequently used communications items may be obtained on a "quick reaction" basis for the timely satisfaction of USACC-approved emergency-action requirements.

9.7.1.4 Host Command

The Host Command shall be responsible for:

a. Provision of a knowledgeable representative at the Site Telecommunications Program conference.

b. Establishment and implementation of a program of continuous review of existing communications facilities.

c. Assuring that all base and tenant organizations are aware of the necessity for timely and realistic projections of requirements to be included in the Site Telecommunications Plan.

d. Review and validation of all requirements and operational-need dates from the base prior to submission for inclusion in the Site Telecommunications Plan.

e. Budgeting and management of all funds relating to the recurring charges for commercially leased facilities, circuits, and/or services covered by the Site Telecommunications Plan.

9.7.1.5 Base Commander

The Base Commander shall be responsible for:

a. Assuring that all new or changed requirements intended for presentation at the Site Telecommunications Program conference have been reviewed and approved prior to the conference.

b. Arranging for the facilities for the Site Telecommunications Program conference, hosting the conference, and recording and formalizing the conference minutes.

9.7.1.6 Base Communications Officer

The Base Communications Officer shall be responsible for:

a. Acting as the single point of contact for coordinating communications requirements between the post agencies, tenant organizations, Host Command, and engineering activity.

b. Acquisition, preparation, and submission of all inputs to USACEEIA, e.g., the Base Master Plan, cable assignment records, Forms 2, 3, and 4, and current MCP and O&M projects, 30 to 60 days prior to the Site Telecommunications Program conference.

c. Advising the engineering activity of delinquent completion dates for supporting structures that affect equipment installation schedule dates.

9.7.1.7 Post Facilities Engineer

The Post Facilities Engineer shall be responsible for:

a. Assuring that a copy of the Base Master Plan is available to the Base Communications Officer a minimum of 45 days prior to the Site Telecommunications Program conference.

b. Assuring that a copy of the Base Master Plan is available at the Site Telecommunications Program conference, and that a facilities engineering representative in attendance at the conference can designate the approved construction projects as well as the approved and funded construction items.

c. Provision of timely assistance to the Base Communications Officer by supplying current drawings of electrical distribution systems, aerial pole line records, and supporting structures for power and communications manholes and conduit or ducts.

d. Assurance that preconstruction planning for military construction program items is coordinated with the Base Communications Officer during the design state to assure consideration of building spaces for communications equipment, conduit, etc.

9.7.1.8 Tenant Organizations

Tenant organizations shall be responsible for:

a. Provision of future communications requirements to the Base Communications Officer a minimum of 45 days prior to the Site Telecommunications Program conference, or as they become known.

b. Providing, on an as-required basis to the Site Telecommunications Program conference, a representative cognizant of mission-oriented communications requirements.

9.7.2 Commercially Leased Telephone System

The long-range planning and documentation necessary to implement and manage the base communications program involving commercially leased telephone systems for an Army base is identical to that required for a Government-owned system; however, the responsibilities change as indicated below.

9.7.2.1 USACC

USACC shall be responsible for:

a. Decisions under AR 235-5 to lease services from private industry.

b. Negotiating the leased-communications contract with the contractor.

c. Provision of O&MA funds for leased services.

9.7.2.2 USACEEIA

USACEEIA shall be responsible for:

a. Negotiation of tentative Site Telecommunications Program conference schedules with the Army bases involved during the first month of each calendar year, and forwarding this information to USACC for publication.
b. Review of all pertinent data that will be included on the Site Telecommunications Program conference agenda.
c. Conduct of the technical portion of the Site Telecommunications Program conference.
d. Technical review of the common-carrier-developed traffic study results and conclusions.
e. Review and approval of the common-carrier-developed Site Telecommunications Plan.
f. Technical review of common-carrier-provided information and cost estimates detailing the supporting structure and/or military construction program items necessary to support the installation of communications equipment resulting from the validation of Command-submitted requirements.
g. Technical review of the common-carrier-prepared detailed engineering/installation work packages.

9.7.2.3 Host Command

The Host Command shall be responsible for:

a. Provision of a knowledgeable representative at the Site Telecommunications Program conference.
b. Establishment and maintenance of a program of continuous review of the existing communications facilities.
c. Assuring that all base and tenant organizations are aware of the necessity for timely and realistic projections of requirements to be included in the Site Telecommunications Plan.
d. Review and validation of all requirements and operational need dates from the base prior to submission for inclusion in the Site Telecommunications Plan.
e. Budgeting and management of all funds relating to the recurring charges for all commercially leased facilities and services.

9.7.2.4 Base Commander

The Base Commander shall be responsible for:

a. Assuring that all new or changed requirements intended for presentation at the Site Telecommunication Program conference have been reviewed and approved prior to the conference.
b. Arranging for the facilities for the Site Telecommunications Program conference, hosting the conference, and recording and formalizing the conference minutes.

9.7.2.5 Base Communications Officer

The Base Communications Officer shall be responsible for:

a. Acting as a single point of contact for purposes of effecting coordination between the post agencies, tenant organizations, the Host Command, the common carrier, and USACEEIA.
b. Submission of all inputs to USACEEIA (i.e., Base Master Plan, cable assignment records, Forms 1, 2, and 3, and current MCP and O&M projects) at least 30 days prior to the Base Communications Program conference.
c. Advising USACEEIA and the common carrier of delinquent completion dates for supporting structures that affect equipment installation schedule dates.

9.7.2.6 Post Facilities Engineer

The Post Facilities Engineer shall be responsible for:

a. Assuring that a copy of the Base Master Plan is available to the Base Communications Officer a minimum of 45 days prior to the Site Telecommunications Program conference.
b. Assuring that a copy of the Base Master Plan is available at the Site Telecommunications Program conference, and that a facilities engineering representative in attendance at the conference can designate the approved construction projects as well as the approved and funded construction items.
c. Provision of timely assistance to the Base Communications Officer by supplying current drawings of electrical distribution systems, aerial pole line records, and supporting structures for power and communications manholes and conduits or ducts.

d. Assurance that preconstruction planning for military construction program items are coordinated with the Base Communications Officer during the design state to assure consideration of building spaces for communications equipment, conduits, etc.

9.7.2.7 Tenant Organization

Tenant organizations shall be responsible for:

a. Provision of future communications requirements to the Base Communications Officer a minimum of 45 days prior to the Site Telecommunications Program conference or as they become known.
b. Providing, on an as-required basis to the Site Telecommunications Program conference, a representative cognizant of mission-oriented communications requirements.

9.7.2.8 Common Carrier

The common carrier shall be responsible for:

a. Having cognizant personnel in attendance at the Site Telecommunications Program conference.
b. Development, publication, and submittal of the Site Telecommunications Plan for Government review and approval.
c. Conducting periodic traffic studies and formalization of the study report for incorporation into the Site Telecommunications Plan.
d. Provision of technical information, cost estimates, and schedules to the Host Command, detailing the supporting structures and/or military construction program items necessary to support the installation of communications equipments resulting from the validation of Command-submitted requirements.
e. Development and presentation of detailed information and cost estimates for one-time charges for each of the validated requirements in the Site Telecommunications Plan.
f. Preparation, maintenance and distribution of current plant-in-place records.
g. Timely provision of the equipment and services as outlined in the Site Telecommunications Plan.

9.8 BASE MASTER PLAN

The Base Master Plan consists of one or more drawings depicting the existing base configuration and showing the ultimate development of the base through each of the developmental stages. This plan is one of the primary tools used in the long-range planning for mission-oriented communications systems and the development of the Site Telecommunications Plan. By clearly depicting and defining the post military construction program, use of the Base Master Plan will serve to identify areas where the communications system is impacted by post construction and will assist in the validation of new communications requirements.

The plan will be submitted at the Site Telecommunications Program conference and reviewed by the conference attendees. All real estate acquisitions and/or changes will be identified on the plan drawings and shall be brought to the attention of the attendees. The Base Master Plan drawings to be presented at the conference shall include as a minimum:

a. Geographic features of the base, post, camp, or station
b. All highways, roads, streets, access roads, alleys, etc., identified by name or number, if assigned
c. Functional areas, including residential and housing areas, hospitals, airfields, motor pools, etc.
d. Post perimeter
e. Areas to be cleared or razed
f. Railroad trackage
g. Communications main feeder routes
h. Post power facilities
i. Airfields, runways, hardstands, taxi strips, and aircraft parking areas
j. Aircraft warning facilities, NAVAIDs, airfield lighting, etc., on and off post
k. Towers and structures
l. Radio, radar, and microwave antennas and facilities
m. Underground facilities:
    1) Steam lines and utilidor/tunnels
    2) Sewer and water mains
    3) Petroleum, oil, and lubricant lines
    4) Gas lines

5) Underground duct or conduit systems

6) Underground power and electrical systems.

9.9 SITE TELECOMMUNICATIONS PLAN UPDATE PROCEDURES

The initial publication of the Site Telecommunications Plan will contain a detailed portrayal of each of the validated requirements submitted by the Host Command and/or the Base Communications Officer. The plan will be reviewed, revised, updated, and republished annually and will accurately reflect new and/or changed requirements. The annual republished plan will incorporate all changes, new items, deletions, and completions and will include all addendums or changes incurred since the last publication. Each new publication will thus serve as a replacement for previous issues of the Site Telecommunications Plan.

In consonance with the time phasing of activities necessary to satisfy each requirement contained in the Site Telecommunications Plan, detailed engineering/installation/procurement packages and site concurrence letters will be developed. These work packages and site concurrence letters will be published and distributed as an addendum to the plan until the activities associated with the requirement are completed.

9.9.1 Site Telecommunications Conference

The Site Telecommunications Program conference will be convened on-site annually. The engineering activity will formally propose a meeting date in writing to the Base Communications Officer approximately 60 days in advance of the meeting. The Base Communications Officer will coordinate the location and roster of attendees and advise the engineering activity in writing of the acceptability of the meeting date or propose an alternate date. In either case the response will be forwarded a minimum of 30 days prior to the meeting, and will contain the exact date, time, and location of the Site Telecommunications Program conference.

9.9.2 Host Command Representative

The Host Command representative will identify new requirements and identify any existing programs that can be eliminated as a result of changing requirements. Required operational dates for each new requirement will be established by the Command representative, and operational dates for those items previously identified in the Site Telecommunications Plan will be reviewed and adjusted as required.

The engineering activity representative will report on the status of engineering/installation or procurement work packages in progress. Slippages in facility support dates covering base-supplied supporting structures will be noted and equipment installation dates adjusted accordingly.

Minutes of the conference will record the new or changed requirements and specify schedule changes and any agreements reached during the discussion. The conference minutes, signed by the Host Command representative, the Base Communications Officer, Signal Command representative, and the engineering activity representative, will serve as certification that all known requirements have been considered and are validated. A copy of the minutes will become a part of the Site Telecommunications Plan.

9.9.3 Major Program Changes

Additions to or deletions from the Site Telecommunications Plan, as a result of unexpected major program changes subsequent to publication of the plan, may be accommodated at any time. Routine requirement changes may be initiated by the Base Commander or Host Command and, upon validation, will be recorded as addendums to the Site Telecommunications Plan. Utilization of this approach is necessary to assure that requirements are considered in a timely manner while eliminating the necessity of publishing a complete new document. The addendum would be incorporated into the plan at the next publication date.

9.9.4 Emergency Requirements

Short lead-time requirements, i.e., those with an operational date of less than 15 months from the time of submission, must be identified and justified as emergency requirements for early implementation. Requirements of this type, whether identified at or between update cycles for the Site Telecommunications Plan, shall be forwarded in writing to HQ USACC for validation of the early implementation requirement. All emergency requirements submitted by the Base Commander or the Host Command must contain the same information as required for submission at the Site Telecommunications Program conference for a routine requirement. In addition, the emergency requirement submission must:

a. Identify the applicable plant-in-place record sheet(s)
b. Reference the Base Master Plan
c. Include the corrected Form 1

d. Provide justification for the emergency requirement, and discuss the impact on the mission if the requirement is not satisfied by early implementation

e. Include other pertinent data that will facilitate evaluation by reviewing agencies.

Section 10
REPORTING REQUIREMENTS

Reporting requirements are basically determined by the management information necessary for the effective administration and control of costs, schedules, manpower, and other resources. In support of its ongoing activities, the Army has developed a comprehensive and broadly applicable reporting system. For BASCOP, however, some new and/or modified reporting requirements are anticipated that will not be met by existing reports and reporting schedules. The purpose of the BASCOP upgrade process is the accomplishment of many individual programs for base reconfigurations under timely, economical, and effective program control. Accordingly, management information needs will involve the unique requirements of each base's reconfiguration program as well as those of the overall BASCOP program for managing the Army-wide upgrade process.

10.1 ARMY BASE UPGRADE REQUIREMENTS

Determination of specific reporting requirements in support of the BASCOP upgrade of a given base will vary from base to base, e.g., a small depot is quite different in size and activities (communications resources and service needs) from a major test or training ground. Consequently as the specific Site Telecommunications Plan for a given Army base is developed, its particular reporting requirements will be identified and defined. As experience in developing and carrying out such plans is gained, it is expected that some standardization of any new forms, contents, and reporting periods will be realized.

10.2 BASCOP PROGRAM REQUIREMENTS

Successful program management requires visibility of all significant program activities at minimal costs in time and effort, i.e., program productivity must not be impaired by excessive reporting requirements. In general, all actual or potential occurrences that affect the program schedule will be reported to the proper level of management. Key program events (milestones) will serve as the means for monitoring and measuring progress. Third or low-level milestones will be reported to the agency

responsible for that task. Second or mid-level milestones will be reported to the organization responsible for coordinating the overall upgrade program. Major or top-level milestones will be reported to the BASCOP program authority, i.e., the Project Manager.

At each level, management will prepare a monthly status report for submission to the next higher level. This report will include all milestones at the reporting level, a summary of all activities performed during the reporting period, a description of the activities to be performed during the subsequent period, a summary of the overall program status, and a detailed description of any problems encountered. This will include a statement of the problem, its actual or potential impact, remedial action taken, and any action required from a different organization or level.

Any changes to the program schedule must be thoroughly justified because of the potential impact on the schedules of other programs and on overall costs. For this reason, all problems that appear likely to impact the program schedule should be reported as soon as detected, not at the end of the reporting period.

10.3 ROUTINE POST-UPGRADE REQUIREMENTS

Following the BASCOP upgrade at a base, the continuing reporting requirements will diminish to those essential to maintenance of the integrity of that base's communications system (configuration) and to the support of the programming of service needs as they change. It is an objective of the BASCOP program to promote centralized configuration management of the Army-wide approach to standardization. Accordingly, the BASCOP Project Manager will require continuing reporting visibility of all changes (actual or planned) in the communications configuration at the base to exercise proper configuration control and initiate any necessary corrective actions.

AD-A057 482 ARINC RESEARCH CORP ANNAPOLIS MD F/G 17/2
BASE COMMUNICATIONS IMPLEMENTATION MANAGEMENT PLAN.(U)
MAY 78 W J HODIN, K J BRAMAN, M M ECKHARDT DAEA18-72-A-0005
UNCLASSIFIED 1079-01-1-1757 NL

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APPENDIX A

EXAMPLE OF SITE TELECOMMUNICATIONS PLAN FILE CONTENTS

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SITE TELECOMMUNICATIONS PLAN

ENGINEERING JOB ORDER NUMBER:

BASE COMMUNICATIONS PROGRAM

BASE NAME AND LOCATION:

Project Engineer:	Symbol
Releasing Engineer:	Symbol

Distribution:

Date of Issue	Copy Number of Copies

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FOREWORD

SECTION I - GENERAL INFORMATION

1. Narrative
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SECTION III - INSIDE PLANT

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2. Inside Plant Summary
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4. Inside Plant Cost Summary
5. Form 4 (Example)

SECTION IV - SUPPORTING STRUCTURES

1. Narrative
2. Supporting Structure Summary
3. Supporting Structure Cost Summary

SECTION V - APPLICABLE DRAWINGS

FOREWORD

The service Requirements for every building and structure, in terms of circuit requirements, are listed on Form 1. When the requirement for a building or structure is changing or will change, that building or structure is identified by name and/or number.

In general, an outside telephone cable plant is engineered to provide a maximum of 75-85 percent fill; all additional requirements will not require changes to the administrative telephone system.

New requirements are assigned job item numbers (as applicable) and are described on Form 2.

An existing and proposed inside plant is shown on the equipment layout drawing and the cable and trunk schematic drawing. Proposed additions are included in the BASCOP material forecast.

Proposed supporting structural additions are described in broad terms in the job sheet narrative (Form 2).

If the installation completion dates are unacceptable to the base or major command, the base or major command can obtain an earlier date by obtaining USACC approval for emergency action by CEEIA.

This Site Telecommunications Plan will be reviewed and completely updated in accordance with the procedures outlined herein. (NOTE: If a change is decided upon between reviews, it should be reported to CEEIA immediately. If action is required before the next scheduled updating, CEEIA will revise the current Site Telecommunications Plan. If not, CEEIA will acknowledge the change but will not revise the Site Telecommunications Plan until the next updating).

The Base Communications Officer and/or the major command representatives must immediately notify the USACEEIA of each change in the required operational dates and of each implementing action target date that cannot be met.

SECTION 1. GENERAL INFORMATION

1. NARRATIVE.

This Site Telecommunications Plan is the primary document for the determination of future communication needs, including expansion or reduction of the outside cable plant, serving the Government-owned/Commercial-leased Central Office at _____. It is a forecast of funds, materials, equipment and supporting structures. It is also the authority for job orders assigned to provide outside and inside plant requirements and provides the breakdown of future material requirements for the Annual Material Forecast (AMF).

a. The survey for the FY thru Site Telecommunications Plan at _____, _____, was conducted _____(date). The Site Telecommunications Program meeting was held _____(date), and all current and future communications requirements discussed.

b. The last Site Telecommunications Plan was approved by _____dated _____.

c. The Site Telecommunications Plan has been updated to reflect current status of items shown in the last Site Telecommunications Plan, items assigned since last Site Telecommunications Plan, and new items developed in this Site Telecommunications Plan.

d. Line forecasts shown on the Form 1, dated _____ have been used to develop this Site Telecommunications Plan.

e. The Form 4 has been made based on a traffic study taken _____ (date).

2. BASE DESCRIPTION

a. The base is located in _____.

b. The Host Command is _____.

c. Major tenant units are _____.

d. The base command is _____.

e. The connecting telephone company is _____

_____.

f. The telephone system is _____ owned and operated by _____.

3. CENTRAL OFFICE DESCRIPTION AND ASSIGNMENTS.

a. The base central office located in Building _____ consists of _____

_____.

b. The present and projected subscriber line assignments for the period covered by this Site Telecommunications Plan are:

CLASS	EXISTING	CURRENT FY	FY	FY	FY
A					
B					
C					
TOTAL	_____	_____	—	—	—

4. MDF AND OUTSIDE PLANT FORECASTS.

a. The central office main distributing frame in Building _____ is _____ mounted. It has _____ each _____ pair protected MDF Verticals plus _____ vertical intermediate distributing frames.

b. A total of _____ pairs of outside telephone cable plants are terminated on _____ MDF verticlas.

c. The existing and forecasted MDF cable pair assignments for this Site Telecommunications Plan:

Existing	Current FY	FY	FY	FY

5. YEARLY SITE TELECOMMUNICATIONS PLAN COST SUMMARY. The estimated costs by fiscal year for new telephone work covered by the sections in this BWCF are:

SECTION	FY		FY		FY	
	PIMA	O&MA	PIMA	O&MA	PIMA	O&MA
II	___	___	___	___	___	___
III	___	___	___	___	___	___
IV	___	___	___	___	___	___
TOTAL FUND COST	___	___	___	___	___	___

NOTE: OMA funds are for supporting structures unless noted for local purchase or leased communications facilities.

6. ACTION SUMMARY.

a. USACEEIA will:

(1) Provide for engineering and installation of job numbers upon approval by MACOM and/or USACC.

(2) Complete and forward approved Form 2 received after publication of this Base Communications Plan that require emergency action.

(3) Review and update this Site Telecommunications Plan at the next Site Telecommunications Plan meeting and include Form 2 for new requirements that do not require emergency action.

(4) Schedule the next Site Telecommunications Plan meeting. Specific dates will be provided by separate correspondence.

(5) Initiate action on previously submitted Site Telecommunications Plan items as shown in the inside plant and outside plant summary sections (II and III).

b. Base Communications Officer will:

(1) Review this Site Telecommunications Plan and notify USACEEIA of any changes, additions or deletions in requirements by the submission of a separate Form 1 for each Site Telecommunications Plan item affected.

(2) Monitor the MCP and O&M line items and initiate Form 1 as each Site Telecommunications Plan item requirement changes.

(3) Insure that telephone communications requirements are identified and developed at Facilities Board (FB) meetings to support the existing and proposed base facilities.

(4) Provide required operational dates (ROD) on all items requiring Form 2 action.

(5) Prepare and submit Forms 1 and/or 3 for all new requirements and all changes in requirements for existing Site Telecommunications Plan items.

c. Base Facilities Engineer will:

(1) Budget for supporting structures for Site Telecommunications Plan items as shown on Form 2 and summarized in Section IV of this document.

(2) Provide supporting structures to support each approved Site Telecommunications Plan items as outlined in the site concurrence letter.

(3) Notify the Base Communications Officer of any new construction or changes to MCP or O&M items which will have an effect on wire communications.

7. **BASCOP MEETING MINUTES (EXAMPLE)**

OUTLINE OF MINUTES

SUBJECT: Minutes of Site Telecommunications Plan Meeting for FY, Alpha, Alaska

TO: Personnel and Agencies Concerned

1. The Site Telecommunications Plan meeting for Alpha was held at 0900 hours, 6 Jul 1972.

2. Personnel present: (Name, rank, organization and office symbols).

3. Organizations invited but not present: (Organization and office symbol).

4. Introduction by chairman.

5. General discussion of purpose and scope of this Site Telecommunications Plan by the USACEEIA representative:

The USACEEIA representative explained the necessity of this meeting and that the Site Telecommunications Plan is designed to show existing inside and outside plant facilities, scheduled expansions or reductions, and anticipated changes to the outside cable plant and the central office telephone equipment. It was further stated that the Site Telecommunications Plan is a three-year plan for initial installation, relocations, expansion or reduction of the base communications system. It is a forecast of required funds, material and supporting structures. When approved by the MACOM and USACC, it is the authority for task programming, preparation of material forecasts and implementation of C-E activities. He further explained any requirements which might develop at a later date may be submitted before the next annual meeting by clearly defining the requirements on Form 1 and/or 3 to be submitted to USACEEIA.

6. Old business.

7. New business.

8. MCP and O&M projects for the next three FY years as presented by the Base Facilities Engineer (See Section IV, attachment 1). (Including additions, reductions, approval level, approval status and estimated costs).

9. Results of survey of condition of existing facilities (inside and outside telephone plant) by USACEEIA representative.

10. Adjournment date and time.

(Suggested signatures)

Base Commander or Representative	USACEEIA Representative
Base Communications Officer	*Commercial Telco Representative
Base Facilities Engineer	NOTE: *For commercial leased bases only

8. BASE REQUIREMENT (FORM 1 EXAMPLES AND GUIDE FOR PREPARING FORM 1)

1. Identify the pages in numerical sequence, starting with "1." Page 1 is the summary sheet.

2. Enter the base site by official name.

3. "Service Area" identifies the separate and distinctive part of the base or site.

4. The date is when the data is compiled.

5. "Building Number of Item" is the structure as identified on the base master plan. All buildings will be listed in numerical sequence.

6. "Building Name" officially describes the structure.

7. "Existing Main PBX Stations" are all main lines or single party service lines existing on date counted.

8. "Existing Other Circuits" include all other services such as TTY, fire, direct, etc., on date counted.

9. "Existing No. of Instruments" includes all phones on lines.

10. "Current FY" Columns will show the forecast growth, if any, by the end of the same FY in which the existing count was taken; that is, the existing and current FY columns represent the same FY.

11. Similarly, for the next three FYs, identify projected requirements changes.

12. "Total Requirement per Building" will show the total at the end of the projected three FY period.

13. On each page, yearly totals are totals for that page only.

14. Form 1 Circuit entries only will be totaled as follows:

    a. Total all colums horizontally with grand total indicated in the far right hand column "Total Requirement per Building."
    b. Total all colums vertically with total of "Main PBX Stations" and Other Circuits indicated in the lower total box under each FY.
    c. Add totals of vertical columns and indicate the grand total in the box (lower right-hand corner) under the "Total Requirement per Building" column.

NOTES:

1. In the case of family housing, treat all housing areas as number of units versus number of associated working lines per area. This procedure will make possible rapid analysis.
2. Comment on any inputs that appear inflated, unjustified, unrealistic.

BASE COMMUNICATIONS PROGRAM REQUIREMENT DATA

Page No.

Base | Service Area: CABLE 01 | Date: 28 Dec 70

Building No. or Item	Building Name	Existing			Current FY			FY		FY		FY		Total Requirement Per Building
		Main PBX Stations	Other Circuits	No. of Instruments	Main PBX Stations	Other Circuits	No. of Instruments	Main PBX Stations	Other Circuits	Main PBX Stations	Other Circuits	Main PBX Stations	Other Circuits	
100	USAR Mortuary	5	0	6										5
103	20th TASS Aerospace	2	0	3	1	0	2							3
104	20th TASS Gnd Radio	1	0	1										1
105	366th MMS Control	1	0	1										1
106	366th CSG	3	0	3	2	0	3							5
108	38 ARRS, Det 7	3	0	4	0	5	6							8
116	20th TASS Mat Control	1	0	2										1
124	20th TASS Unit Supply	2	0	2	0	2	2							4
125	20th TASS Admin	3	0	3	0	1	1	3	0					7
126	20th TASS Intelligence	3	0	3	2	4	6							9
127	20th TASS Operations	6	6	8				4	23			-10	-29	0
128	389th TFS Orderly Rm	3	4	3	1	2	4							10
129	366th TFW Civic Actions	4	0	4										4
130	366th TFW Flt Rcrds	1	0	1										1
132	366th TFW Admin	1	0	1										1
134	20th TASS TACP	4	0	4	1	1	2							6
135	20th TASS TACP	2	0	2	2	0	2							4
136	20th TASS FSO	2	0	2	0	3	3	2	2					9
137	366th Trans RRDG	4	0	6										4
138	366th Supply	6	0	8										6
139	366th Strans Repair Shop	4	0	4	1	0	1							5
140	366th TFW Operations	1	0	2										1
142	390th TFS Operations	8	0	9	0	2	2	2	0			-8	-4	0
143	366th A&E Fire Control	1	0	2										1
144	12ACS Maint Shop	3	2	3	2	2	2							9
145	20th TASS COMNAV	2	0	2	1	0	1							3
146	1972 Comm Center	4	0	4										4
147	366th Trans Orderly Room	4	0	6	1	0	1							5
149	366th Trans Vehicle Maint Office	3	0	4	1	0	1							4
	Family Housing (500)	100	0	110				0	0	0	0	0	0	100
	YEARLY TOTAL	187	12	-	15	22	-	11	25	0	0	-18	-33	
	CUMULATIVE TOTAL	199			37			36		0		-51		221

Remarks	MAIN PBX STATION	OTHER CIRCUITS	TOTAL
EXISTING	289	30	319
CURRENT FY	36	27	63
FY 70	11	25	36
FY 71	--	--	--
FY 72	336	82	418

SECTION II - OUTSIDE PLANT SUMMARY

1. Narrative: The following is a review of all actions, approved and proposed, to satisfy the outside telephone cable plant requirements for ( ), as identified by the base, on Form 1.

a. Approved Outside Plant Tasks Pending Implementation.

(1) Items in the last Site Telecommunications Plan: None

(2) Items approved since the last Site Telecommunications Plan: None

b. Outside Plant Items Pending Approval as a result of this Site Telecommunications Plan: XXXX - Install Cable to Golf Course

XXXX - Relieve Congested Terminals

c. Completed, Deleted or Cancelled Job Numbers:

XXXX - Change Distribution in Cable 01 & 01 - Cancelled

XXXX - Rework MDF/Manholes 1 & 2 - Cancelled

2. OUTSIDE PLANT SUMMARY: Upon completion of the work listed in this Site Telecommunications Plan, the base outside plant will be adequate for the period of this Site Telecommunications Plan.

a. Two (2) new unapproved job numbers have been assigned in this Site Telecommunications Plan for cable support to new mission requirements and new buildings funded for construction as listed below:

JOB NO.	JOB I.D. NO.	TITLE
72-001	XXXX	Install Cable to Golf Course
72-005	XXXX	Relieve Congested Terminals

b. Summary of outside plant items in the minutes of the Site Telecommunications Plan meeting that are not clearly covered by the above job numbers are listed below by paragraph number.

PARA NO.	DISCUSSION
14 b, c & d	No planning can be done on these items until more information is made available as to housing layout and other pair requirements are presented.

3. COMMENTS AND RECOMMENDATIONS: It is recommended that the 14th Scty Gp and Det 3, 25th Comm Co make a comprehensive study of the phone requirements and utilization to insure that proper use is being made of phones in all areas, i.e., bldgs 422, 713, 720 and BCE.

4. OUTSIDE PLANT COST SUMMARY (excluding supporting structures):

a. Current FY - None

b. FY 73 $240.00

c. FY 74 $1350.00

d. FY 74 None

e. Total $1590.00

5. FORMS 2 AND 3 (EXAMPLES)

BASCOP REQUIREMENTS/RESOURCE DATA

Job Identification Code	Facility Type		Date
XXXX			28 Dec 70
Title	**ESD**	**ECD**	**Command**
Buried Cable and MDF Installation	Jan 72	Mar 72	
Base			**ROD** / **ICD**
Delta, Texas			473 / Mar 73
MCP Category Code	**MCP Start Date**	**MCP Compl Date**	
113-113	Jan 72	May 72	

Narrative

This project will provide initial outside telephone cable plant facilities for a new missile training building to be constructed SW of Building 1500. Wire circuits required: 40 admin telephone lines, 8 operational, and 2 alarm.

Justification

Funding approval has been received for the above facility.

Impact

No communications to new building if telephone facilities are not available by June 1973.

Estimated Cost		Man-Hours - O.P.	Man-Hours - I.P.	Man-Hours - Total
Material	Labor			
$1410	$4000	165.7	115.9	281.6

ESTIMATED MATERIAL REQUIREMENTS

BOM/Stock Number	Nomenclature	Unit	Quantity
4154-5805-505-1343	Main Dist Frame TP	ea	1
4357-6145-901-2762	Cable TP DS STAL 51P19	ft	400
4353-6145-880-7057	Cable TP DS STAL 26P19	ft	700
4166-5920-284-7717	Protectors TP 101P (3800)	ea	4
4330-6145-901-4473	Cable TP ABAM 202P22	ft	60
4379-6145-782-0180	Cable TP DS STAL 1212P24	ft	200
3918-5950-253-1616	Coil Assembly 88 Mh 26P	ea	1
DWG. NO.	PIPR SHEET 2		

BASCOP REQUIREMENTS/RESOURCE DATA

Base		Command	Date
Delta, Texas			28 Dec 69
Job Identification Code	**Facility Type**	**FSD**	**Instl Compl Date**
XXXX		Oct 1970	Mar 1971
Req'd Opnl Date	**MCP Category Code**	**MCP Start Date**	**MCP ROD**
Mar 71	NA	NA	NA

Requirements Description

This project will provide additional cable pairs to Headquarters Building. Approximately 120 circuits will be required by FY 371.

Justification

The existing cable is filled and the additional circuits are required to support expansion of the Headquarters Command Center, which is expected to be fully operational in FY 371.

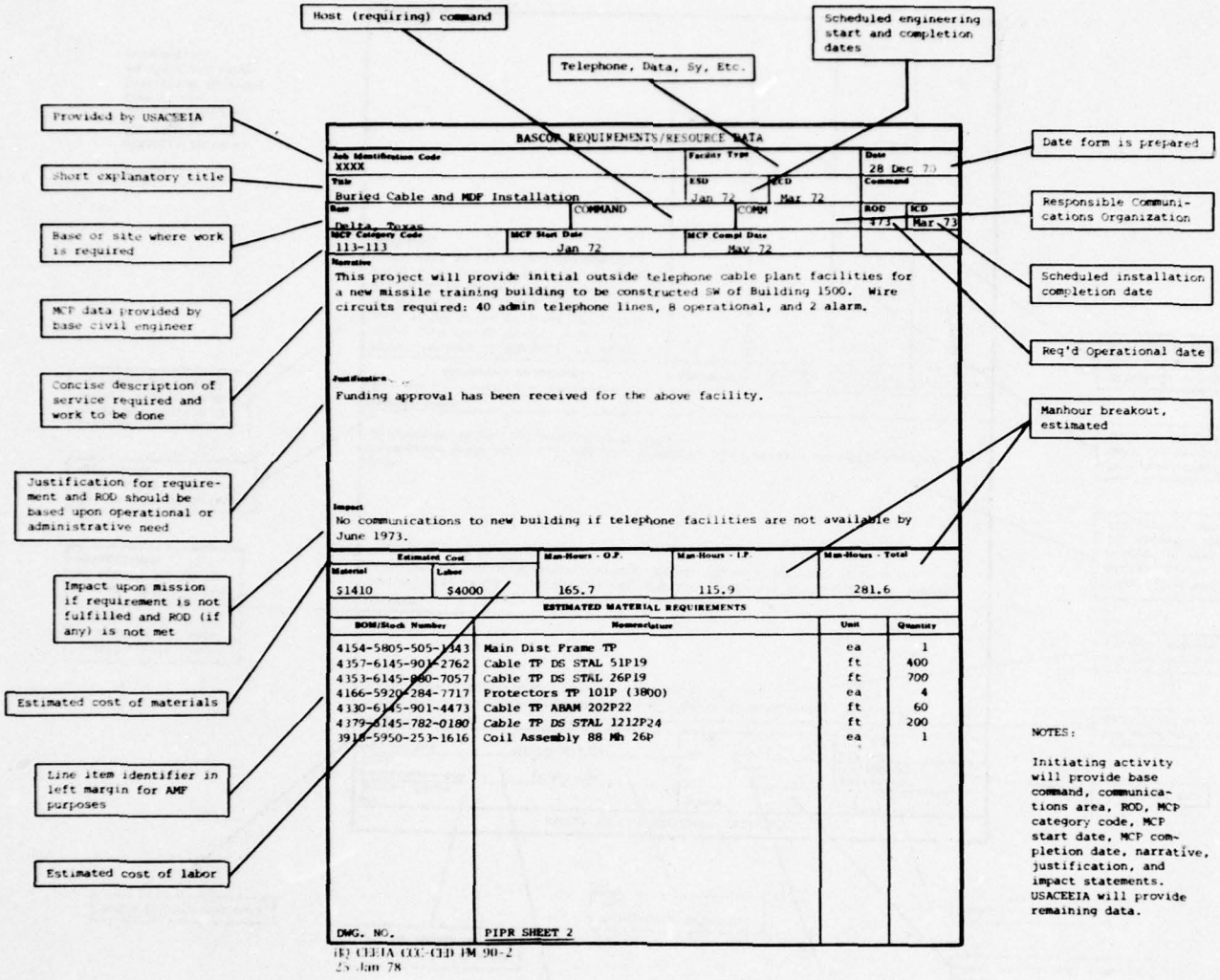
Impact

Inadequate cable pairs will restrict command center mission accomplishment if requirement is not implemented by FY 371.

Termination Liability

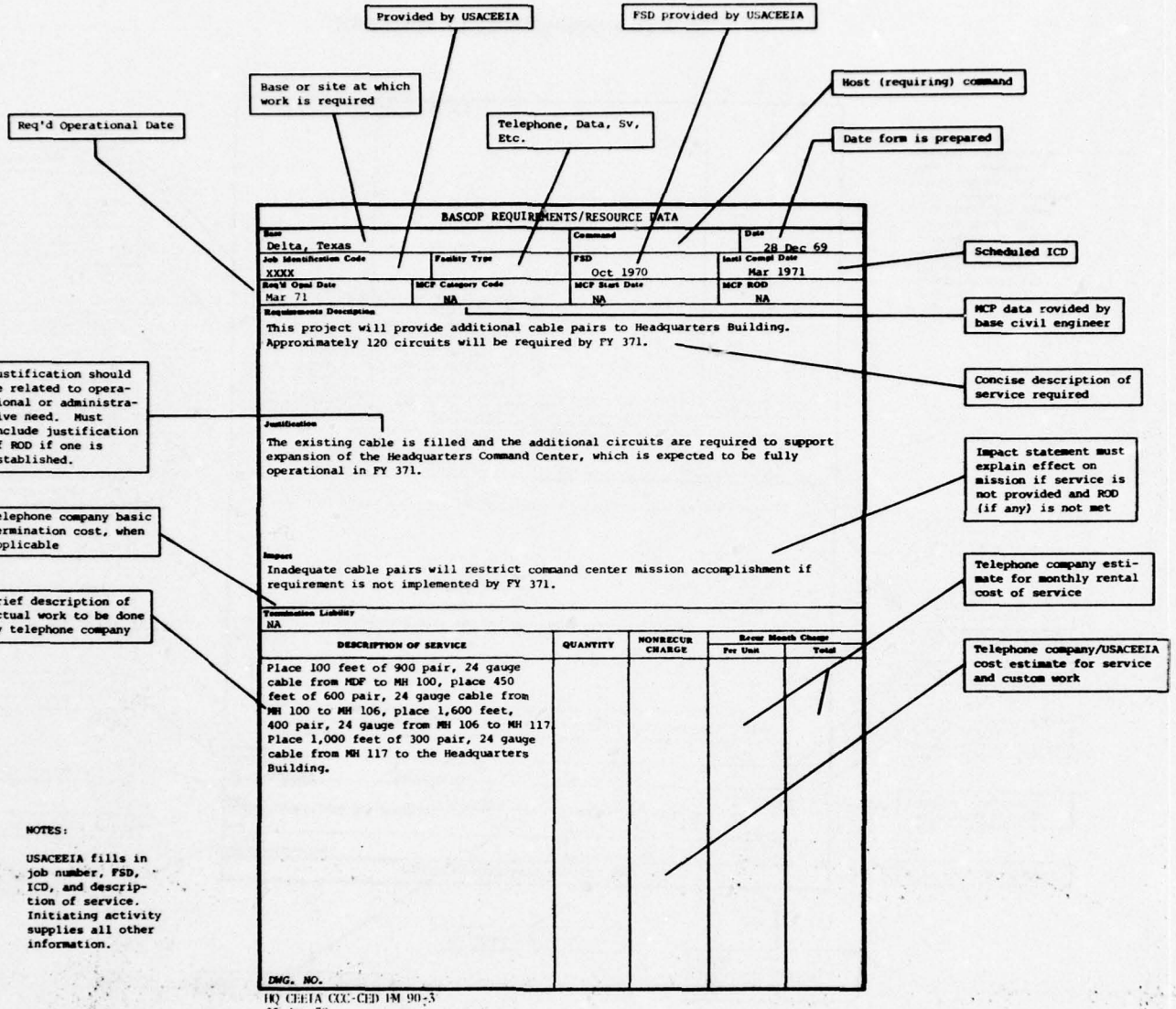
NA

DESCRIPTION OF SERVICE	QUANTITY	NONRECUR CHARGE	Recur Month Charge	
			Per Unit	Total
Place 100 feet of 900 pair, 24 gauge cable from MDF to MH 100, place 450 feet of 600 pair, 24 gauge cable from MH 100 to MH 106, place 1,600 feet, 400 pair, 24 gauge from MH 106 to MH 117. Place 1,000 feet of 300 pair, 24 gauge cable from MH 117 to the Headquarters Building.				
DWG. NO.				



(E) CEEIA CCC-CED FM 90-2
25 Jan 78

Example of Completed Form 2



Example of a Completed Form 3

SECTION III - INSIDE PLANT SUMMARY

1. NARRATIVE. The following is a review of Site Telecommunications Plan actions for inside telephone plant requirements prior to the Site Telecommunications Plan meeting.

a. Approved Inside Plant Tasks Pending Implementation

(1) Items in the last Base Communications Plan:

XXXX - Base Public Address System

XXXX - AV 4-W Access for 2nd Sig Det

(2) Items approved since the last Site Telecommunications Plan:

XXXX - AUTOVON Test Conn Panels

b. Inside Plant Tasks Pending Approval

Assigned during preparation of this Site Telecommunications Plan:

XXXX - Direct Line Circuits

c. Completed, Deleted or Cancelled Job Numbers:

XXXX - Direct Line Circuits - Cancelled

2. INSIDE PLANT SUMMARY.

a. General Information:

(1) This facility is a S.C. CO X-Y dial central office. The capacity is 400 lines and 500 connector terminals. At present 326 of the 400 lines (82% fill) and 456 of the 500 connectors (91% fill) are assigned.

(2) Traffic samples were collected on 1-2 Dec 71 by the use of installed traffic recorders.

(3) The central office busy hour is between 1430-1530 hours.

b. Findings:

As mentioned in the FY 72 Traffic Study, some minor load imbalance exists in the Line and Connector groups. This can be corrected by routine assignments and disconnects. Also it was noted that additional AUTOVON trunks are required. The remaining categories of equipment were installed in adequate qualtities to provide good telephone service to existing users.

c. Summary of inside telephone plant items in the minutes of the Site Telecommunications Plan meeting that are not clearly covered above are listed by paragraph number.

PARA NO	DISCUSSION
6c	Only when a Telephone Service Request is approved for additional trunks can action for additional PBX AUTOVON trunking equipment be initiated.

3. COMMENTS AND RECOMMENDATIONS:

The projected line and Connector Terminal Increase for FY 74 and FY 75 goes beyond the capacity of the existing Central Office. At least 100 line terminals and 200 additional connector terminals must be added to satisfy this increase.

4. INSIDE PLANT COST SUMMARY (Excluding supporting structures):

a. Current FY - None

b. FY 73 - None

c. FY 74 - $2250

d. FY 75 - None

e. Total - $2250

5. FORM 4 (EXAMPLE)

TRAFFIC ENGINEERING RESULTS SUMMARY

Installation and Location	Type and Make of Equipment	Date Study Conducted
Delta, Texas	SXS A-E	13-15 January 1972

EQUIPMENT	CCS Per Unit	PRESENT			FUTURE REQUIREMENTS			
		Instl'd	In Use	Required	FY 73	FY 74	FY 75	FY
Line Equipment Installed		1600			1800	1800	1800	
Line Equipments Operative		--	1388	1430	1710	1710	1710	
Linefinder Groups - 200 line		8	8	8	9	9	9	
Linefinders Per Group		20	20	18	18	18	18	
Linefinders - Total		157	157	144	162	162	162	
	Per Line							
First Selectors	1.96	157	157	144	162	162	162	
Connector Groups		8	8	8	8	8	8	
Connectors Per Group		20	20	18	18	18	18	
	Per Line							
Connectors Total	1.32	160	160	144	162	162	162	
Special Second Selectors		10	10	4	4	4	4	
Regular 2nds 2000 series		80	80	66	65	65	65	
Regular 2nds 3000		--	--	--	57	57	57	
Regular 2nds 4000		--	--	--	--	--	--	
CO Trunks - 2 Way		20	20	20	--	--	--	
CO Trunks - 1 Way Out		30	30	33	46	46	46	
CO Trunks - 1 Way In		--	--	--	30	30	30	
LD Terminals		10	10	6	--	--	--	
"O" Level Trucks		20	20	25	15	15	15	
Tie Lines		10	10	12	--	--	--	
Autovon		--	--	--	10	10	10	
Manual Lines		10	4	4	4	4	4	
Information Trunks		10	5	5	6	6	6	
Test Deck Pos		1	1	1	1	1	1	
Attendant Pos		3	3	4	3	3	3	

Remarks

SECTION IV - SUPPORTING STRUCTURES

1. NARRATIVE. The following is a review of Base Supporting Structure actions prior to and resulting from the Site Telecommunications Plan meeting.

a. Base is committed to provide supporting structures as covered in the site concurrence letters for approved tasks pending implementation.

b. Supporting structures identified in paragraph 3 (below) are listed for budgeting purposes only. Detailed supporting structure requirements will be listed in each site concurrence letter.

2. SUPPORTING STRUCTURE SUMMARY. Upon completion of the construction covered in this Site Telecommunications Plan, the base supporting structure system will be adequate for the period of this document.

3. SUPPORTING STRUCTURE COST SUMMARY.

a. FY 74 - $1600

b. FY 75 - 800

c. FY 76 - None

SECTION V - APPLICABLE DRAWINGS

a. Drawing Number

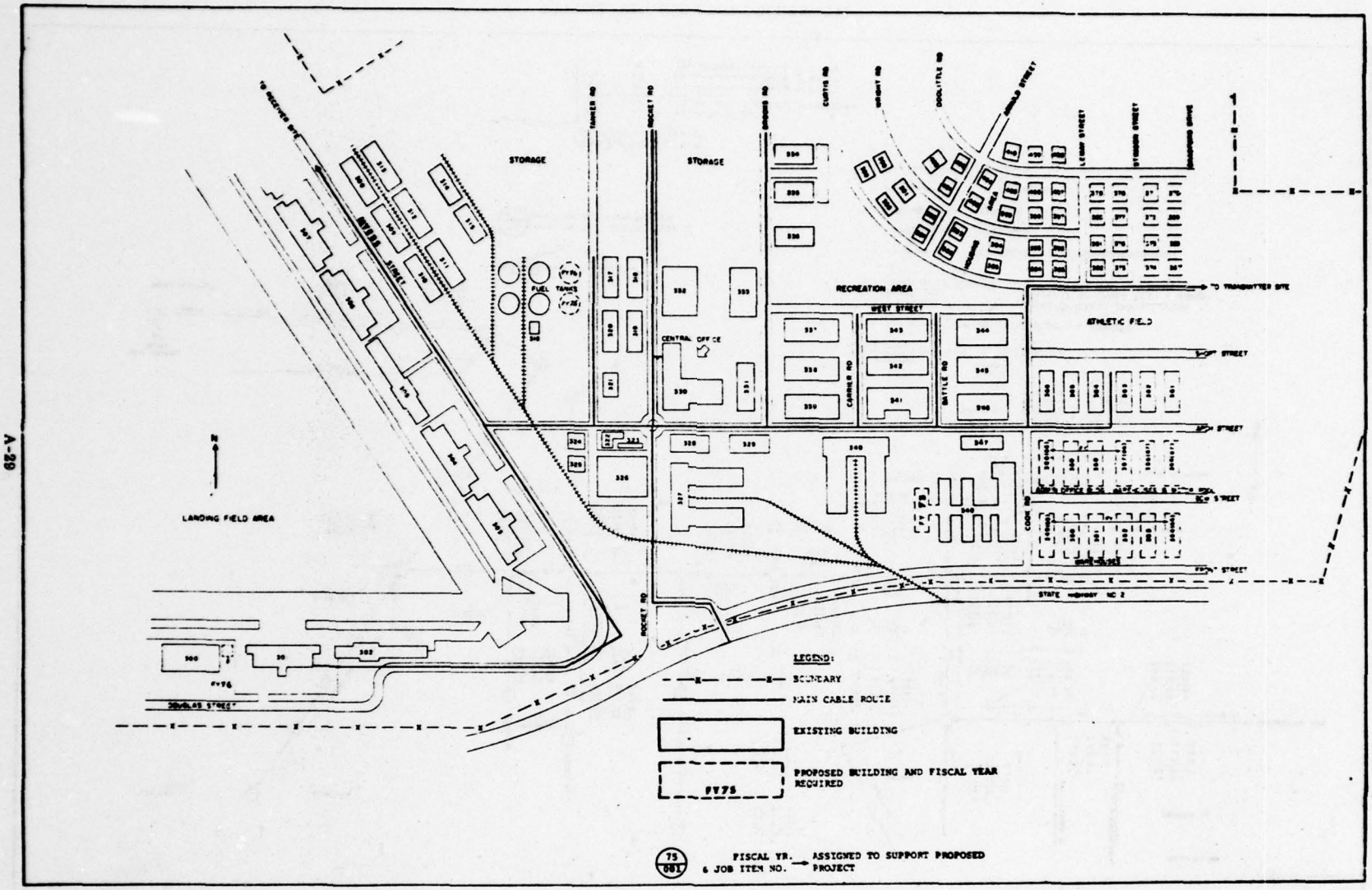
Sheet	Revision	Title
1 of 3	E	Fundamental Plan
2 of 3	E	Outside Plant Schematic
3 of 3	E	Supporting Structures

b. Drawing Number

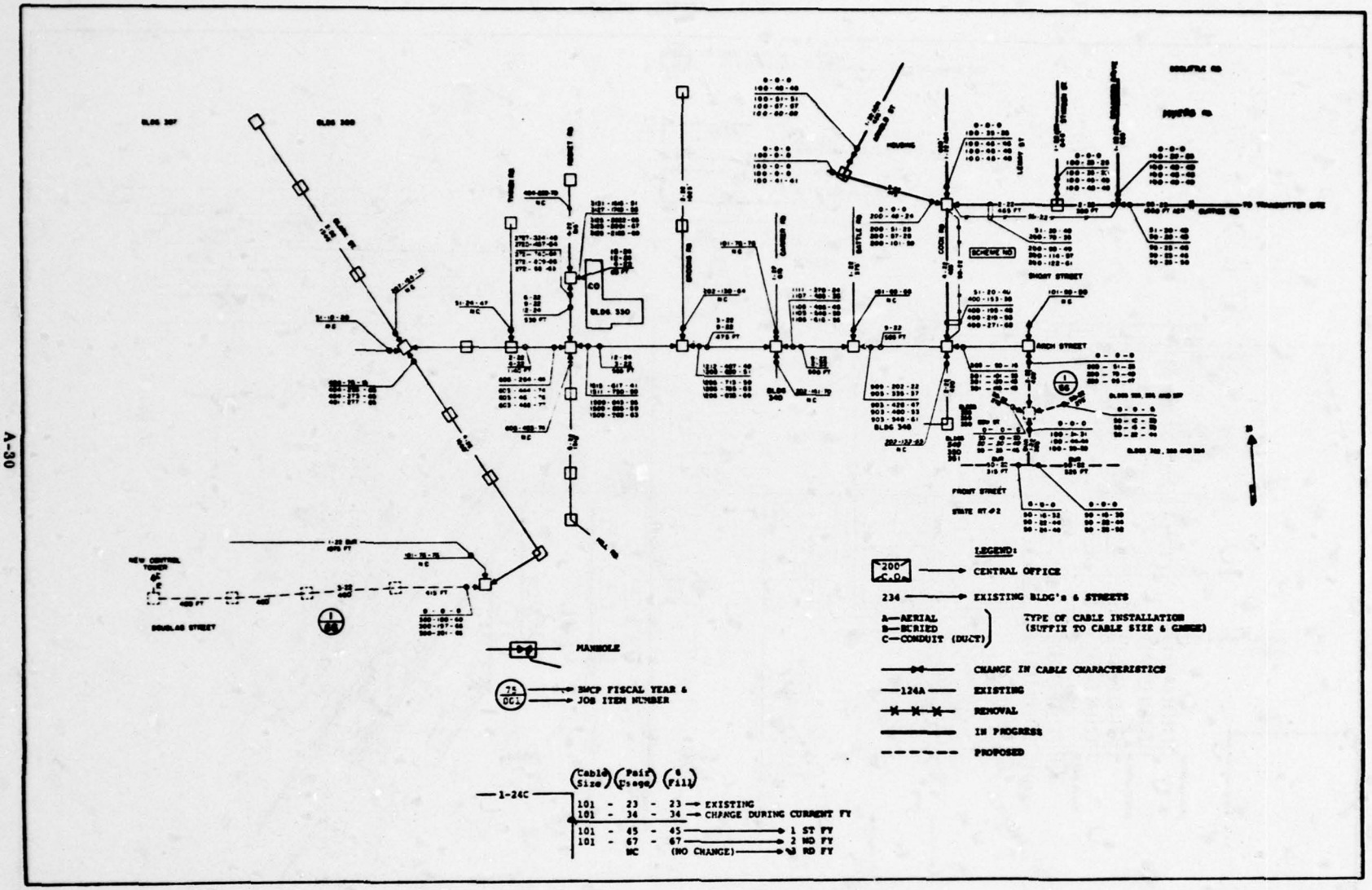
Sheet	Revision	Title
1 of 2	XX	Central Office Floor Plan

c. Drawing Number

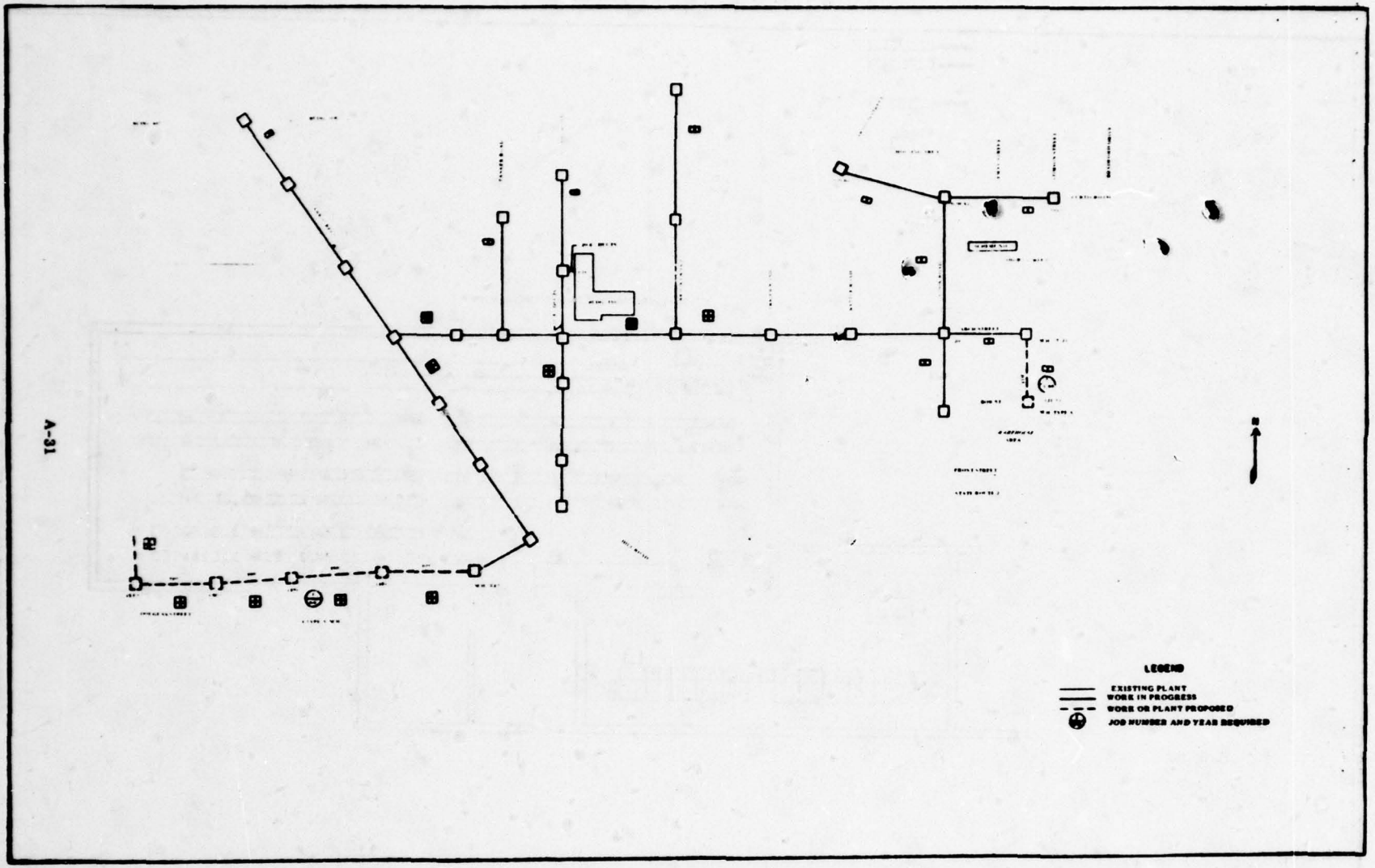
Sheet	Revision	Title
1 of 3	XX	C.O. Cable and Trunk Schematic



TYPICAL FUNDAMENTAL PLAN



TYPICAL OUTSIDE PLANT SCHEMATIC



A-31

TYPICAL SUPPORTING STRUCTURE MAP

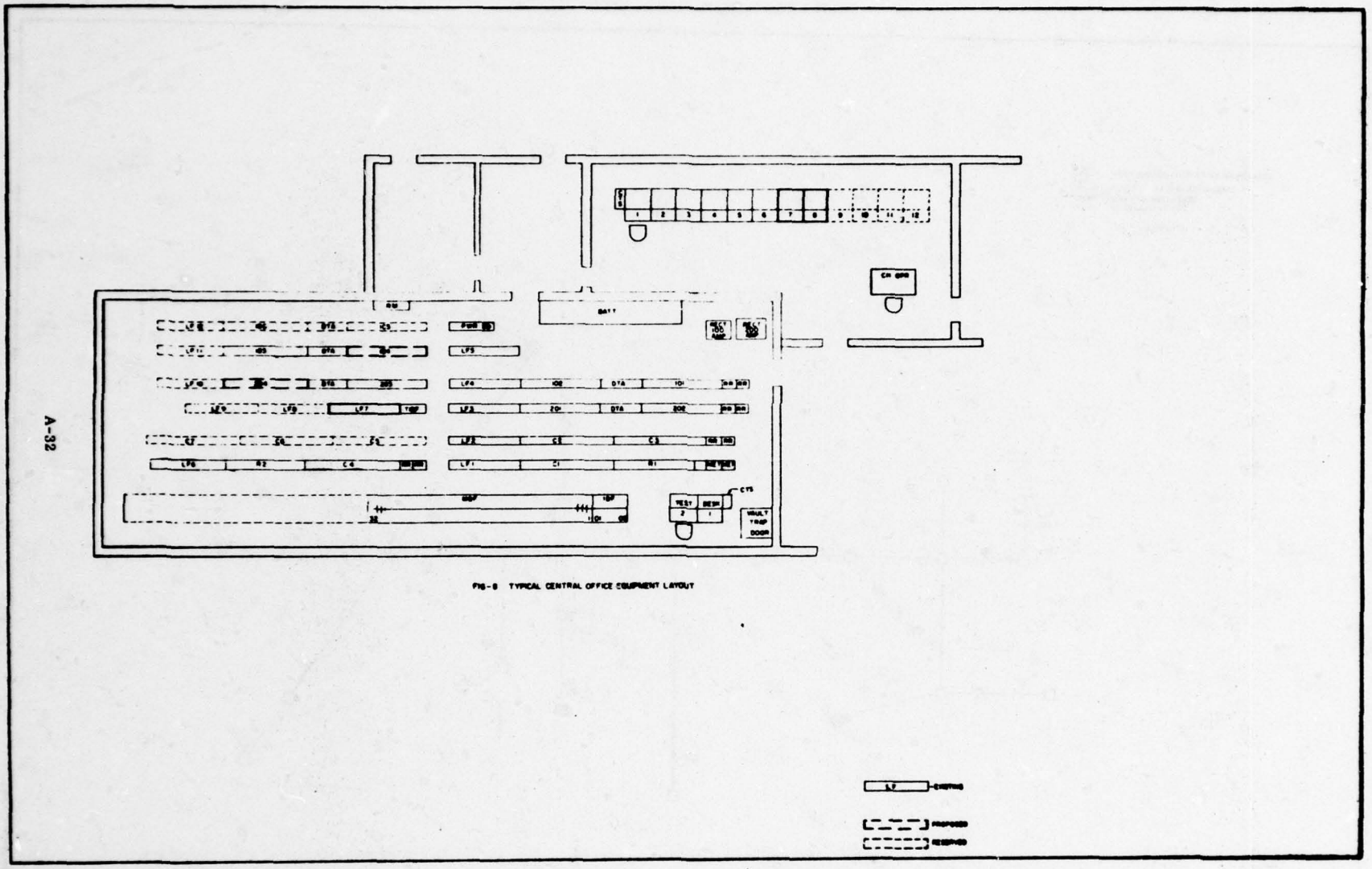
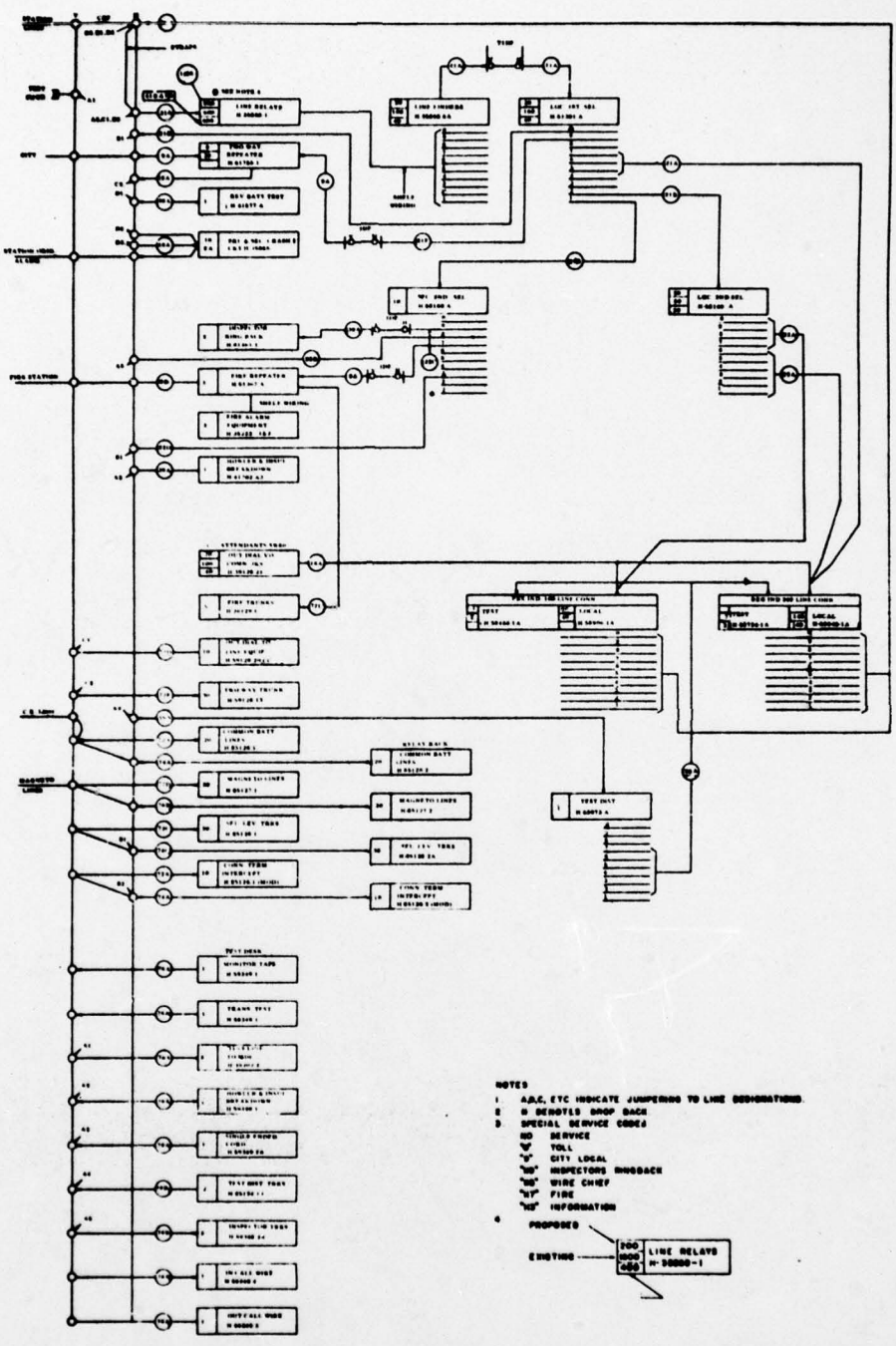


FIG-8 TYPICAL CENTRAL OFFICE EQUIPMENT LAYOUT

TYPICAL CENTRAL OFFICE EQUIPMENT LAYOUT



NOTES

1. A,B,C, ETC INDICATE JUMPERING TO LINE DESIGNATIONS.
2. D DENOTES DROP BACK
3. SPECIAL SERVICE CODES
   - 00 SERVICE
   - "0" TOLL
   - "1" CITY LOCAL
   - "10" INSPECTORS BUGBACK
   - "11" WIRE CHIEF
   - "12" FIRE
   - "13" INFORMATION
4. PROPOSED / EXISTING — 200 / 600 / 400 LINE RELAYS H-30000-1

TYPICAL CABLE AND TRUNK SCHEMATIC

Appendix B

BASE COMMUNICATIONS IMPLEMENTATION MANAGEMENT PLAN OPERATIONS AND MAINTENANCE CONCEPT

The O&M concept is a required part of all telecommunications systems engineering plans (AR 105-22). The maintenance philosophy and logistics support approach to be used in Army base communications upgrade plans are established by the U.S. Army Communications Command (USACC) and described in the BASCOP program document (Volume II, September 1977). Details of the O&M concepts shall be developed for each base upgrade plan to meet its particular requirements. Accordingly, it will be necessary to consider the maintenance and logistics factors in the early planning, development, and definition of each base upgrade plan. As a consequence, the objectives of maximizing communications service performance and minimizing O&M costs over the life of the upgraded system should be realized.

The maintenance philosophy basic to the new O&M concepts exploits the built-in, software controlled, readily reprogrammable capabilities of highly reliable electronic switching systems to satisfy circuit switching requirements. A significant benefit of the new switching systems is the self-diagnostic and correcting capability, i.e., a built-in testing routine will recognize a failed unit and automatically bypass it via an alternate (backup) unit or circuit routing. This internal testing capability will be extended to system-wide testing, e.g., remote units, line concentrators, and PABX, as well as to support of external remote (off-base) monitoring systems. Another benefit of the software controlled switching capabilities is elimination of the need for manual rewiring for most phone number changes or relocations. The specific effects that these and other new developments will have on O&M concepts and procedures will be determined as a part of each individual base upgrade plan.

B.1 TRAINING

Following a major communications system upgrade and prior to service cutover, all personnel involved with the new communications system must receive appropriate training. Training is essential for the proper transition to normal activity levels, and to promote the improvements in organizational efficiency made possible by the improved services. Most manufacturers and carriers provide some form of initial training, usually at several levels and tailored to the needs of various groups. Management level briefings describing the system features should be provided to the managers of all using organizations. Working level training sessions to demonstrate new equipment/system features and user operating procedures must be provided to all users. Supplemental information to all users should include points of contact for questions, or for the resolution of difficulties which may occur during/following cutover.

Technical seminars should be conducted to familiarize engineering personnel with the capabilities and capacities of the new equipment. System operators and maintenance personnel should receive detailed training in system operation and in the usage of all system features, since they will often be called upon to resolve user difficulties that may arise from improper usage or misunderstanding of system capabilities. Local maintenance personnel should be trained in the use of self-diagnostic procedures and in the evaluation of system performance data. Regional maintenance personnel must receive additional training in the use of remote diagnostic procedures and routines, and must have an extensive understanding of the system interfaces and interconnections. Field Manuals, Series FM-486-1 through -11, address Electrical Communications Systems Engineering and provide excellent technical reference materials for training and review sessions.

B.2 PREVENTIVE MAINTENANCE

Recent experience has shown that modern switching equipment requires practically no periodic maintenance other than normal housekeeping. The opening of equipment cabinets is in fact discouraged, since improper adjustment and accidental misadjustments have been found to be major causes of equipment failure. System self-test routines should be exercised on a regular basis to

detect unsuspected failures and to identify performance trends and potential failures. The data and results of each self-test action should be collected as a matter of record, e.g., entered in a System Maintenance Log (see para. B.3) for later reviews and assessments of equipment performance.

B.3 CORRECTIVE MAINTENANCE

The establishment of a responsive and cost-effective system for corrective maintenance is of prime importance to the Base Communications Program. This system must provide means for trouble reporting, problem determination, and timely problem resolution. In addition, an accounting system must be established to provide a historical record, i.e., a System Maintenance Log of all maintenance activity. This System Maintenance Log will contain the name and telephone number of the person reporting the problem, brief description of the problem, diagnostic action taken, correction action taken, dates and times of each entry, and name or initials of the person making the entry. A sample log sheet is shown in Figure B-1.

A centralized location should be established for initial trouble or problem reporting. Personnel receiving trouble reports should be thoroughly familiar with system operation and system features, so that they can initiate corrective actions with minimal delay. If local corrective action fails to resolve the problem, the regional maintenance center is contacted for assistance. Frequent reviews of the log by the Base Communications Officer will indicate possible requirements for special maintenance or new controlling procedures.

B.4 LOGISTICS PLAN

The Logistics Plan is an essential part of the O&M concept for a base upgrade plan because it defines the structure of the logistics support system and identifies the tasks and procedures required for its establishment. It describes the overall maintenance concept for the base undergoing upgrade, determines manpower and spares requirement, and defines spares acquisition and handling procedures. It also details maintenance practices and procedures, and establishes maintenance management data collection requirements.

Page 1

Date/ Time	Problem/Action Description	Contact	Tel. No.	By	Diagnosis, Date and Time	By	Correction, Date and Time	By
11/3/77 1325	Can't dial outside	A. User	123-4567	AB	Improper Oper. 11/3 1325	AB	Provided procedure 11/3 1325	AB
11/3/77 1407	Phone dead	U. Baker	231-7654	AB	Broken Wire 11/3 1500	KY	Replaced plug 11/3 1600	KY
11/3/77 2000	Self diagnostic (routine)				Module A-37 marginal 11/3 2035	pg	Replaced module A-37 11/3 2045	pg
11/3/77 2050	Self diagnostic				Normal	pg	None	pg

Figure B-1. Example of System Maintenance Log

B.5 TRAINING PROGRAM DEVELOPMENT

While manufacturers provide initial training, a program must be established to accomplish the recurring operation and maintenance training or cross-training necessitated by the personnel rotation practices at Army bases. Course content and format can be patterned after the manufacturer's training program. Course materials, including system description, operation, and maintenance manuals, must be prepared. Training procedures and prerequisites must be defined, and teaching personnel assigned.

B.6 FACILITIES DEVELOPMENT

The availability of proper support facilities is essential to the success of the communications system. Required tools and test equipment will be allocated. Special training equipment requirements will be determined and the necessary actions taken. Spares will be procured and stocked, and inventory control procedures established.