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FINAL REPORT

USASC CDSF COMMUNICATIONS DATA BASE (CDB) PHASE III (WITH SOFTWARE DOCUMENTATION)

TASK ORDER 018

30 MARCH 1989

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The Communications Data Base (CDB) has been developed by the Signal Center (SIGCEN) to be used as an analytical tool supporting various studies and analysis applications, both auto- an manual. The CDB describes mission essential communications requirements for a set of organizations notionally comprising a US Theater in a North Atlantic Treaty Organization (NATO) environment. Communications requirements are expressed in terms of needlines in the CDB. A needline is a set of related data elements describing a need to exchange information between two or more battlefield communicators.

The report's introduction discusses the reasons for developing the CDB and the data base's importance to Army tactical communications analysis. The background section describes earlier attempts to quantify tactical communications requirements and CDB strategies to overcome previous difficulties. Also included is an important discussion of the CDB and its relation to the Network Assessment Model (NAM) and the Operational Facilities (OPFAC) Data Base. (REV

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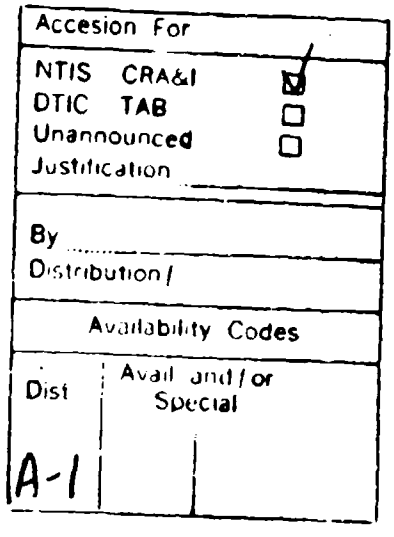
These three products form an analytical triad essential for communications modeling.

The methodology section of the report provides a detailed explanation of the CDB, its elements, support files, how it was built and verified. The summary/recommendations section discusses contractor recommendations for long-term development and enhancements of the product.



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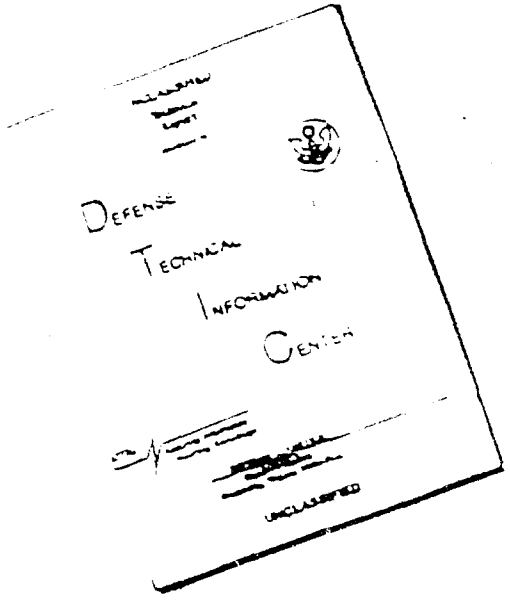

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TRADOC DABT60-85-C-0520

FINAL REPORT

TASK ORDER 018

COMMUNICATIONS DATA BASE (CDB) PHASE III (WITH SOFTWARE DOCUMENTATION)

30 MARCH 1989

PREPARED FOR
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ABSTRACT

The Communications Data Base (CDB) has been developed by the Signal Center (SIGCEN) to be used as an analytical tool supporting various studies and analysis applications, both automated and manual. The CDB describes mission essential communications requirements for a set of organizations notionally comprising a U.S. Theater in a North Atlantic Treaty Organization (NATO) environment.

Communications requirements residing in the CDB are expressed in terms of needlines. A needline is a set of related data elements describing a need to exchange information between two or more battlefield communicators. A needline exists independent of capability. That is, a needline can exist between two communicators even if they do not possess an electronic means to pass the information.

The INTRODUCTION to this report discusses the reasons for developing the CDB and why such an analytical tool is so important to the Signal Center and the Army. The BACKGROUND section includes a brief of some of the earlier attempts to quantify communications requirements data, a discussion of the reasons these efforts did not endure, as well as a look at CDB strategy aimed at overcoming these difficulties. The BACKGROUND section also includes an important discussion of the CDB in its relationship to the Network Assessment Model (NAM) and the Operational Facility (OPFAC) Data Base as essential elements of the Signal Center's analytical arsenal.

The METHODOLOGY section of the report provides a detailed explanation of the CDB, its elements, how it was built, and how it was verified/validated. The SUMMARY AND RECOMMENDATIONS Section provides some recommendations considered vital to the long term usefulness of the data base.

The CDB has been developed, in phases, during the period 1986 through the present. As development of the several phases of the data base has progressed, some modifications to developmental methodology, procedures, and software have occurred. This report will not address the entire developmental history of all phases of the data base, but will attempt to provide a summarization of the need for the data base and the processes employed to satisfy that need.

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1. INTRODUCTION

How does the Army make a multi-billion dollar decision to buy a new communications system to support the tactical force? How does the Department of Defense decide to support the request and how do they articulate the need for such a system to the Executive and Legislative Branches so that budgets and appropriations support the new system? These questions are at the heart of the reasons for the development and maintenance of a credible communications and automation network modeling capability at the Signal Center.

Why does the Army need a new tactical communications system? Does the old system satisfy the "requirements"? Does the proposed new system satisfy the "requirements"? What are the "requirements"? These are the questions asked by staffers and decision makers as part of the process leading to the decision to recommend or support funding for a new system. These are good and valid questions. Unfortunately, the answers are not easily obtained. Unlike weapons systems, combat vehicles, and other hardware developments and acquisitions, tactical communications requirements are difficult to quantify and rationalize. Hard statistics and threat capability data are available to support the decision making process for most hardware developments and acquisitions. Similarly straightforward, factual, statistically supportable data has traditionally not been available to support the decision making process for communications and automation systems. Decision makers are uncomfortable deciding such issues based upon someone's intuition or personal beliefs. They want firm recommendations supported by credible analysis and statements of fact, not vacillating opinions.

TRADOC is the Army's Combat Developer. The Signal Center is responsible to TRADOC for Combat Developments for tactical communications and automation, as

well as for the broader Theater/Tactical level of the Information Mission Area. The Combat Developments process is logical and well defined. At the heart of that process is the analysis of mission area battlefield deficiencies, concept formulation, and requirements generation and articulation. The Signal Center has long needed a comprehensive, credible analytical capability to support the Combat Developments process. The Communications Data Base is an essential element of that capability.

2. BACKGROUND

The CDB is the latest in a series of efforts aimed at quantifying battlefield communications requirements. The ability to accurately quantify such requirements is vital to the Signal Center Combat Developer because of his responsibility to assess the capabilities of fielded and developmental systems to meet the needs of tactical army units and organizations. This assessment cannot be credibly accomplished without the ability to compare the capability of the system(s) to the requirements of the user(s). The requirements of the user(s) are the purview of the CDB.

Numerous efforts have preceded the CDB. The Communications Support Requirements (COMSR) data base of the seventies is perhaps the most notable. This data base, structured much like the CDB, was designed and maintained by the SIGCEN, and built with input directly from proponent project officers. COMSR was used for a variety of studies and analyses, including at least one Mission Area Analysis (MAA). The data base was criticized, rightly or wrongly, for being an overstatement of the "mission essential" communications requirements. COMSR fell into disuse in the early 1980s. Other efforts include the Data Distribution (D^2) Data Base, the Battlefield Command and Control Systems Review (BC^2SR), the OMEGA Study, The What Rides What Study, the Why 3 Study, and a host of others. Some of these efforts have included the development of supporting data bases, others have been only studies. All were worthwhile efforts and were successfully used for their intended purposes. Their scope and long term utility was, however, limited.

In designing and developing the CDB, the SIGCEN has endeavored to avoid those difficulties that were perceived as injurious to previous efforts. Some of these difficulties, along with the CDB approaches to overcoming them, are discussed below:

2.1 SCENARIO

Communications requirements can be developed for virtually any scenario. The more specific and detailed the scenario, the more specific and detailed can the needlines be. The major problem with developing a data base of needlines for a particular scenario is the resultant loss of flexibility and adaptability. Once tied to a specific scenario, a specific situation, a specific task organization, mission, and detailed events, the data base becomes irrelevant to any and all others. In essence, if one chooses the scenario specific approach to needline development, he has also made the decision to build a new data base for each and every scenario he might want to examine. Time and money make this approach impractical.

The CDB was not tied to any specific scenario. The CDB attempts to capture the normal communications requirements during a 24 hour period of mid-intensity war. Several needline elements allow the user to examine deviations in communications requirements resulting from changes in combat intensity, mobility condition, and mission (activity), if desired.

2.2 SUBJECTIVITY

Each needline element expresses someone's opinion of the value represented. About what does a company commander need to talk to his battalion commander during the normal day? How many times do they need to talk? How long do they talk? What is the importance (cost of failure) of these requirements? Under which mobility conditions do these requirements exist? Does the requirement change when conducting river crossing operations? With whom does the company supply sergeant have a mission essential need to communicate? Given the availability of both telephones and radios, which type of equipment will be used to satisfy these requirements?

Each of these questions requires an answer. Whoever answers the questions will do so based upon his personal experiences and beliefs. It can be

argued that there aren't any "correct" answers to the questions; That no two communicators communicate exactly like any two others; That specific events, circumstances, and personalities will influence communications requirements to such an extent that precise quantification is impossible. There are those who argue that the only way to accomplish the task would be to gather empirical data by sending groups of observers to a REFORGER or other major exercise. Others would say that to do so would only provide the requirements for that particular exercise, with its unique events, circumstances, and personalities. How would these requirements relate to any other major exercise or to an actual war? Would people communicate differently if an observer were watching than without one? How many observers would be required tc gather data from a division? A corps? A theater?

The use of a credible, sanctioned data base to support a comprehensive modeling and simulation capability is the only practical solution to the analytical requirement. To maintain its credibility, the data base must be maintained and kept current. As part of this maintenance and update process, provisions should be made to incorporate empirical data obtained from field training exercises and command post exercises. The use of such data would, over time, improve the validity of the data base by providing an ever increasing number of samples being used as input sources to the data base. One must be wary, however, of using a single observation or exercise as the standard by which the data base is evaluated or even modified. Only through the use of many inputs, observations, and proponent consensus can the data base maintain its credibility.

The current CDB contains over 300,000 needlines representing nearly ten million individual data elements. Each needline and each individual data element is somewhat subjective and arguable. Recognizing these controversies, the CDB was built through the application of a logical, consistent, and straightforward

development methodology and has been reviewed and modified by the developers, the individual branch and Battlefield Functional Area (BFA) proponents, and by CACDA. While subjective, the data base represents the opinions of those responsible for the articulation of battlefield requirements. While any individual element may be arguable, the Law of Large Numbers should be operable. If so, the data base should be accepted as a realistic approximation of the expected "normal" communications requirements of a force engaged in conflict. If this premise cannot be accepted, the development of a data base for use in communications modeling and simulation is probably not possible.

2.3 ADAPTABILITY

In an effort to build a data base that could be used as input to a wide range of scenarios, task organizations, and deployment schemes, needlines were designed and developed to accommodate such flexibility. Although needlines were developed to capture "normal" requirements, during the "normal" day of the "normal" war, several needline elements allow for the articulation of changes in communications requirements resulting from scenario-specific qualifiers. Each needline includes data fields for Intensity, Activity, Mobility, and a Unit Relationship Code. These needline elements provide for variances from "normal" communications requirements based upon battlefield dynamics and changes in unit missions. The CDB can be used to support a broad range of scenarios, task organizations, and support relationships.

2.4 CLASSIFICATION

Every effort was made to construct and maintain the CDB as an "UNCLASSIFIED" data base. This was done in order that the data base, once built, could be used and analyzed for the widest range of purposes and by the widest range of users. No classified sources were used to construct the data base. The

SIGCEN has recognized, however, that some classified appendices may be required to augment the CDB. If built, these will be constructed separately from the core data base to negate the need to classify it in its entirety.

2.5 FORCE STRUCTURE

The CDB was not built to any specific task organization. To do so would have forever tied the data base to that specific structure. Needlines were instead constructed for a set of 767 Standard Requirements Code (SRC) units notionally comprising a U.S. Theater in a NATO environment. From this set of SRCs one can construct and tailor many different organizational and support structures. The SRCs selected for inclusion in the CDB were, in all cases, the most current series residing in the Army's T.O.& E. system at the time of selection. As SRCs change, the CDB will have to be updated to reflect differences in communications requirements resulting from such organizational changes.

Phase I of the data base development was oriented at divisional units; Phase II, corps. Phase III was aimed at Echelons Above Corps (EAC). Each of the first three phases were specifically oriented on NATO. Future additions should include Joint Readiness Forces and perhaps have a Southwest Asia orientation. The long term intention has been to build a data base that could be used tc support virtually any force structure in any scenario.

2.6 SCOPE

The CDB has been built to describe communications requirements for those units that use communications and automation systems over which the SIGCEN exercises Information Mission Area (IMA) proponent responsibility. In IMA terms, the CDB is oriented at the Theater/Tactical level and its interfaces, but not specifically at the Strategic or Sustaining Base levels. Neither is the CDB designed to capture requirements for so called "closed loop" systems - those that are designed, operated and maintained outside the Signal Center's proponent responsibility

and/or those exclusively used by another proponent or agency which do not support the force as a whole.

2.7 THE ANALYTICAL TRIAD

The CDB represents one leg of the Signal Center's analytical triad. It provides the network loading requirements data to the Network Assessment Model (NAM), the modeling and simulation leg of the triad, in which technical and operational characteristics of communications/automation systems and devices are simulated. The NAM also contains user interface software with which the analyst inputs scenario data and force structure. The third leg of the triad, the OPFAC Data base, is required to establish deployment configurations and groupings of the units within the force structure to be modeled. Because units do not deploy and configure themselves as singular and isolated entities, their impact on the communications network(s) can only be realistically modeled if they are connected as they really deploy. The OPFAC Data Base, as an input to the NAM, provides for these deployment configurations.

These three components - the CDB, the NAM, and the OPFAC Data Base are all required to support the analytical effort. They are equally important and must be mutually supportive. Without all three, the analytical capability required by the Signal Center Combat Developer cannot exist (See Figure 2.7-1).

THE ANALYTICAL TRIAD

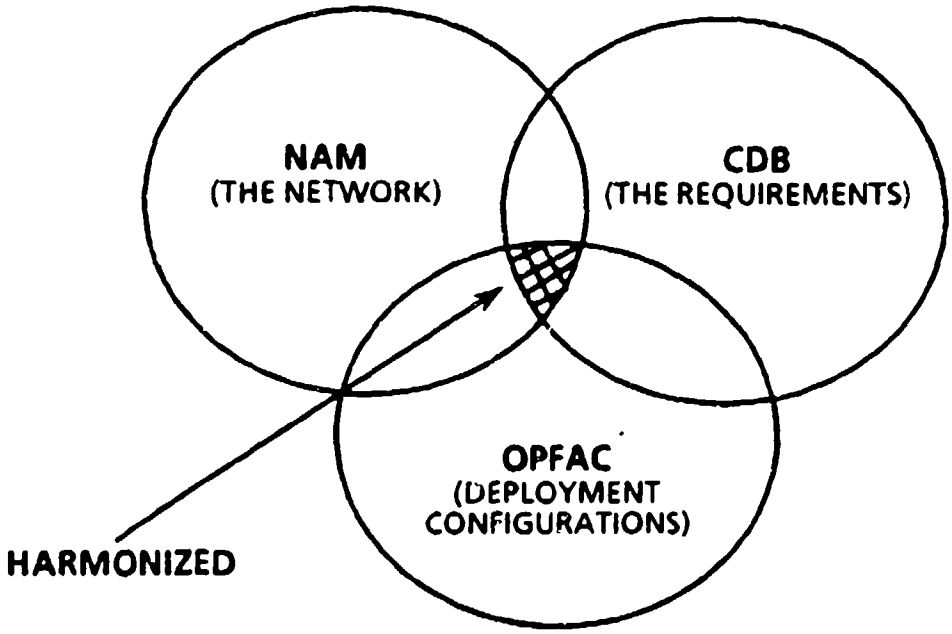

FIGURE 2.7-1. The Analytical Triad

3. METHODOLOGY

3.1 TROOP LIST

Before one can develop communications requirements for a set of units, the units must be identified. TBE was tasked, for each phase of the CDB, to develop a list of units for which communications requirements data (needlines) would be developed. Two separate troop lists were constructed; One for Phases I and II which represented those units found at division and corps, and one for Phase III which represented units found at Echelons Above Corps (EAC). In both cases units were identified by Standard Requirements Code (SRC) and in both cases the latest versions/series of the SRCs available from the Army's TO&E System were selected for use.

3.1.1 Troop List Development

TBE was provided various studies, doctrinal material, and force structure data to use for the development of Troop Lists. TBE analysts reviewed all available information and developed recommended Troop Lists which were provided to the SIGCEN for their review and approval. In some cases units/organizations were not identifiable by SRC (Joint, Allied, and Host Nation organizations do not, of course, reside in the Army's T.O.&E. System). These organizations were included in the Troop List and were assigned SRC Numbers beginning with "99". TRADOC Proponents, including CACDA, provided input to the Troop List development process. Following the SIGCEN review, and TBE incorporating changes to the Troop List that the SIGCEN directed, the SIGCEN approved the Troop Lists, directing TBE to proceed with needline development. Figure 3.1-1 illustrates the Troop List Developmental Methodology.

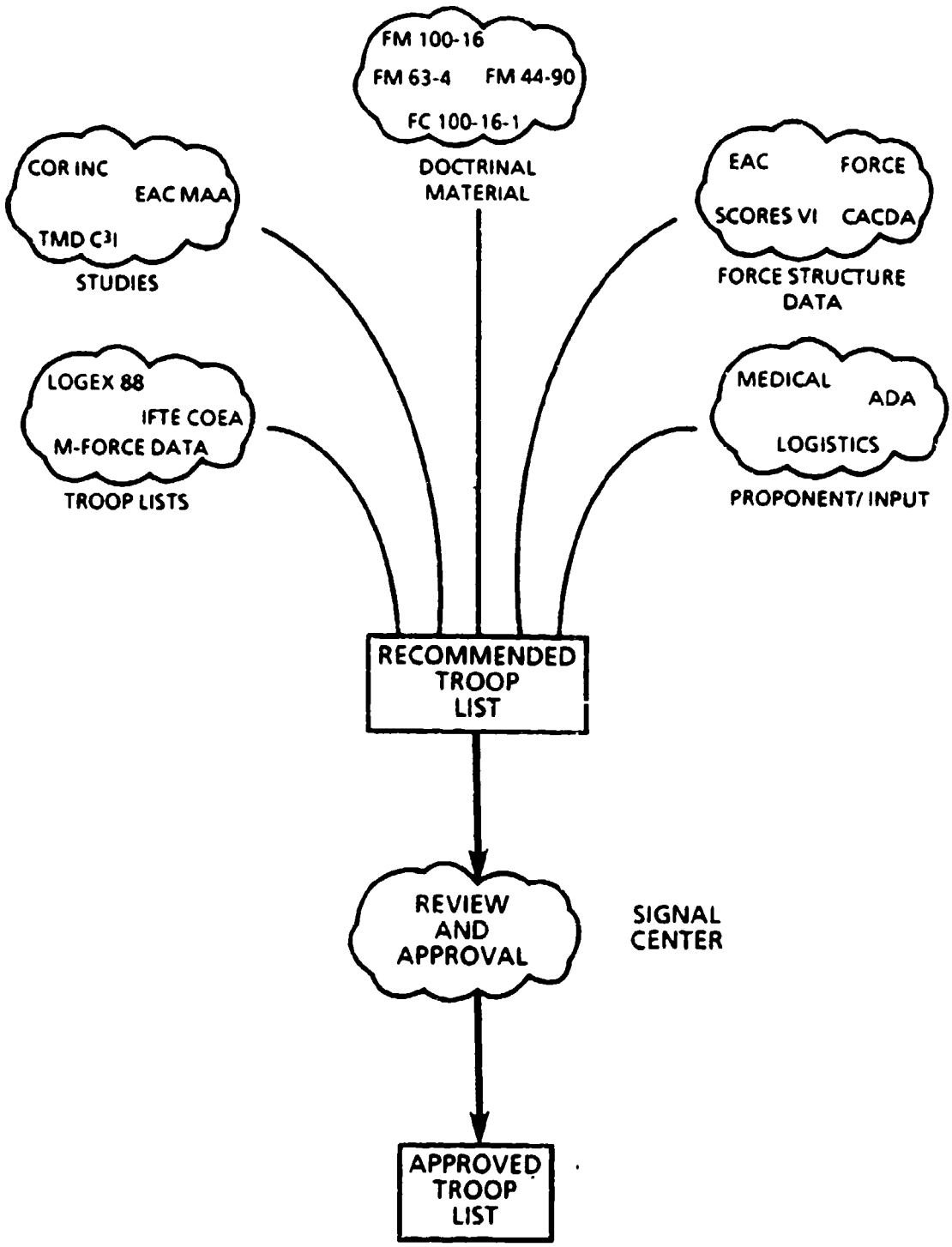

FIGURE 3.1-1. Troop List Development

3.2 NEEDLINE DEVELOPMENT

The following section will define a CDB needline and describe the methodology used to build CDB needlines. Needlines were built in iterative steps, using the logic and rationale described in this section. Automation was used to implement this logic and rationale. Systems Analysts and Software Engineers worked together to develop the CDB. Systems Analysts developed the logic and rationale; Software Engineers built the data bases, programs, and support files to implement it. Throughout the entire process both analysts and software personnel reviewed the developing needlines, making whatever changes to methodology and/or software were required. This section is oriented on the methodology. Appendix A - SOFTWARE DOCUMENTATION - provides a more thorough discussion of the data bases, programs, and support files used to build the CDB.

3.2.1 What is a CDB Needline?

A CDB needline is a series of related data elements describing a requirement to exchange mission essential information between two or more battlefield communicators. Two important concepts are embodied in this simple definition and merit further discussion. The first is the words ....mission essential.... .

All needlines in the CDB are, by definition, mission essential. No needlines were developed by TBE analysts unless the analyst believed they fit this criteria. Obviously, this is one of the many areas in which subjectivity exists. This is also one of the principal reasons the COMSR Data Base, previously discussed, drifted into obscurity. The requirement for mission essentiality was at the forefront during development, verification, and validation of CDB needlines.

The second important concept is .... a series of related data elements ..... A CDB needline is composed of 33 data elements, all of which relate to a single needline requirement. Each needline identifies and describes the purpose of the communication, the originator of the call, the receiver, the message, the number of

times per day the message is sent, the type of equipment and/or data device used, and a number of other descriptors of the requirement. Needline data structure was specified by the government and only minor changes to the original structure have been made as the project progressed (See Figure 3 2.1-1).

NEEDLINE DATA ELEMENTS

ORIGINATOR SRC	RECEIVER MOBILITY	BROADCAST GROUP
ORIGINATOR PARAGRAPH	UNIT RELATIONSHIP CODE	MODE
ORIGINATOR LINE	SUBSET RATIO	PRIMARY EQUIPMENT
NEEDLINE STATUS	PURPOSE	SECONDARY EQUIPMENT
ORIGINATOR MULTIPLIER	FUNCTION	ORIGINATOR DATA DEVICE
ORIGINATOR MOBILITY	MESSAGE CODE	RECEIVER DATA DEVICE
RECEIVER SRC	LENGTH (MESSAGE)	ACTIVITY
RECEIVER PARAGRAPH	MESSAGE CLASSIFICATION	INTEROPERABILITY
RECEIVER LINE	FREQUENCY (MESSAGE)	INTENSITY
NEEDLINE STATUS DATE	COST OF FAILURE	NEEDLINE SEQUENCE
RECEIVER MULTIPLIER	PERISHABILITY	

FIGURE 3.2.1-1 CDB Needline Data Elements

There are two types of needlines. INTER-unit needlines describe communications requirements between units (different SRCs). INTRA-unit needlines describe communications requirements within a unit (SRC). A company commander talking to his battalion commander is captured on an INTER-unit needline since they belong to different SRCs. A company commander talking to his platoon leader(s) is captured on an INTRA-unit needline since they are assigned to the same SRC (See Figure 3.2.1-2).

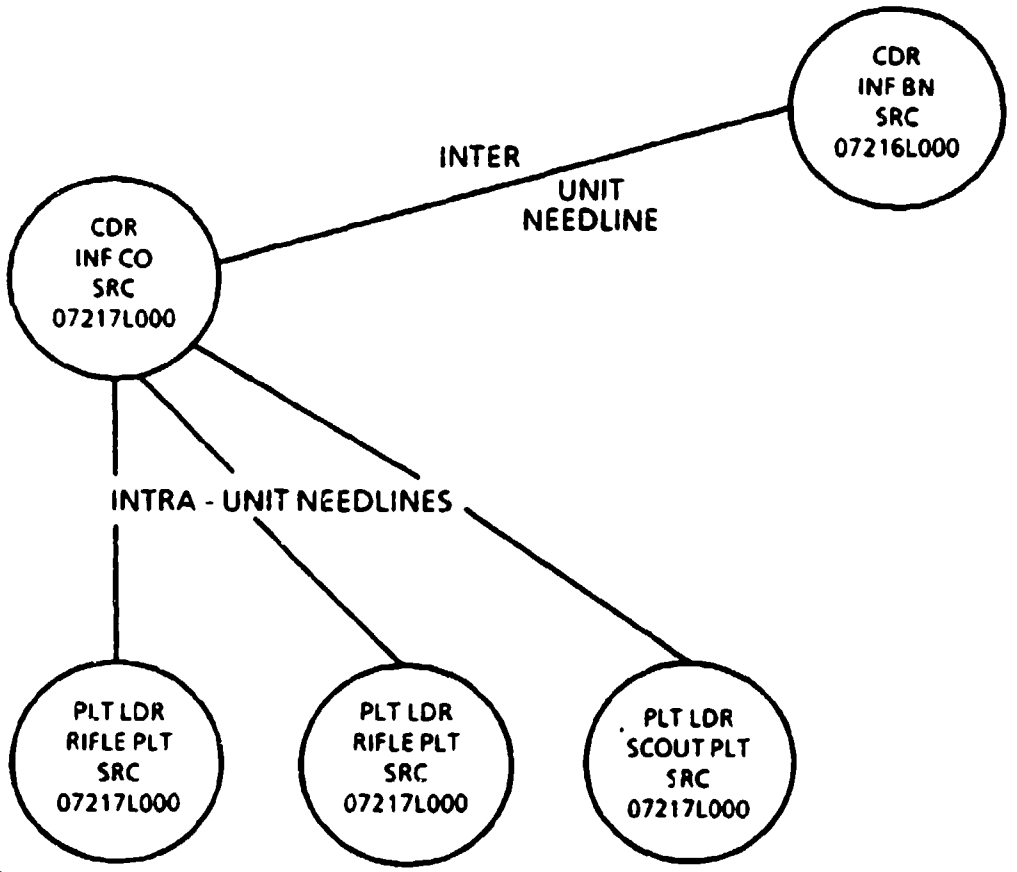

FIGURE 3.2.1-2. Inter-unit and Intra-unit Needlines

3.2.2. How Were CDB Needlines Built?

Fundamental to an understanding of how needlines were constructed is an awareness of two key needline elements; PURPOSE and FUNCTION.

People communicate for reasons. The mere possession of a means by communicator A, to talk to communicator B, does not necessarily establish a mission essential requirement for him to do so. Capability does not drive requirement. Hopefully, the reverse would be true.

The government specified to TBE five reasons or "Purposes" for which communications requirements can exist. These were Command, Administration, Operations, Intelligence, and Logistics. Each needline is tied to one of these five Purposes.

TBE expanded this concept by establishing sub-purposes or "Functions" which add further specificity to the identification of the reason for the existence of the communications requirement. TBE analyzed the five specified Purposes and attempted to break each down into its component Functions. Through this process TBE identified 58 Functions, each associated with a Purpose. Personnel Replacements became a Function associated with the Purpose of Administration, Repair Parts Resupply became a Function associated with the Purpose of Logistics, and so forth. Each needline carries both a PURPOSE and a FUNCTION designation which, together, identify the specific reason for the existence of the needline requirement. Figure 3.2.2-1 illustrates PURPOSES, FUNCTIONS, and their relationships.

3.2.3 Unit to Unit Connections

Having identified the units comprising the Troop List and the reasons (Purposes/Functions) these units might communicate with one another, TBE continued needline development by connecting units for the various Purpose/Function combinations. To do this, each unit (SRC) was placed in the "object" position, and connected to another unit(s) for each applicable Purpose/Function (See Figure 3.2.3-1).

Not every unit was connected to another unit for each Purpose/function. In some cases a unit was connected to more than one other unit for a particular Purpose/Function. TBE Analysts used their personal experience, doctrinal material, and proponent coordination to make these unit to unit connections. These initial connections were critical because they would form the basis of the needline, with remaining needline elements adding detail and specificity to the connection.

COMMAND	ADMINISTRATION	OPERATIONS	INTELLIGENCE	LOGISTICS
INTER-UNIT	COORDINATION	COORDINATION	COORDINATION	COORDINATION
INTRA-UNIT	UCMJ	LATERAL UNIT	LATERAL UNIT	LATERAL UNIT
	FINANCE	ENGR SPT	SENSORS	RATION RSPLY
	PERS REPL	COMMO SPT	SSO	TOE EQUIP
	MED TRTMT	ADA SPT	INTEL REPORTS	POL RSPLY
	MED EVAC	ARTY SPT	WEATHER	AMMO RSPLY
	INTRA UNIT	AVN SPT	INTRA UNIT	RPR PARTS RSPLY
	MP SPT	AIR SPT		TRANSPORTATION
	CASUALTY REPT	INTRA UNIT		INTRA UNIT
	CHAPLAIN SPRT	CHEM SPT		DS MAINT
	GRREG SPT	ATC SPT		GS MAINT
	POSTAL SPT	EOD SPT		BATH
		POS/LOC		CLOTHING RSPLY
		RACO		MED EQUIP RSPLY
		MISSION SPT		PKG POL
		DPU		CHEM EQUIP
				CONST EQUIP
				COMSEC SPT
				AIR SPLY/RSPLY
				NUC AMMO/WPNS
				MISSILE MAINT

FIGURE 3.2.2-1. CDB Purposes and Functions

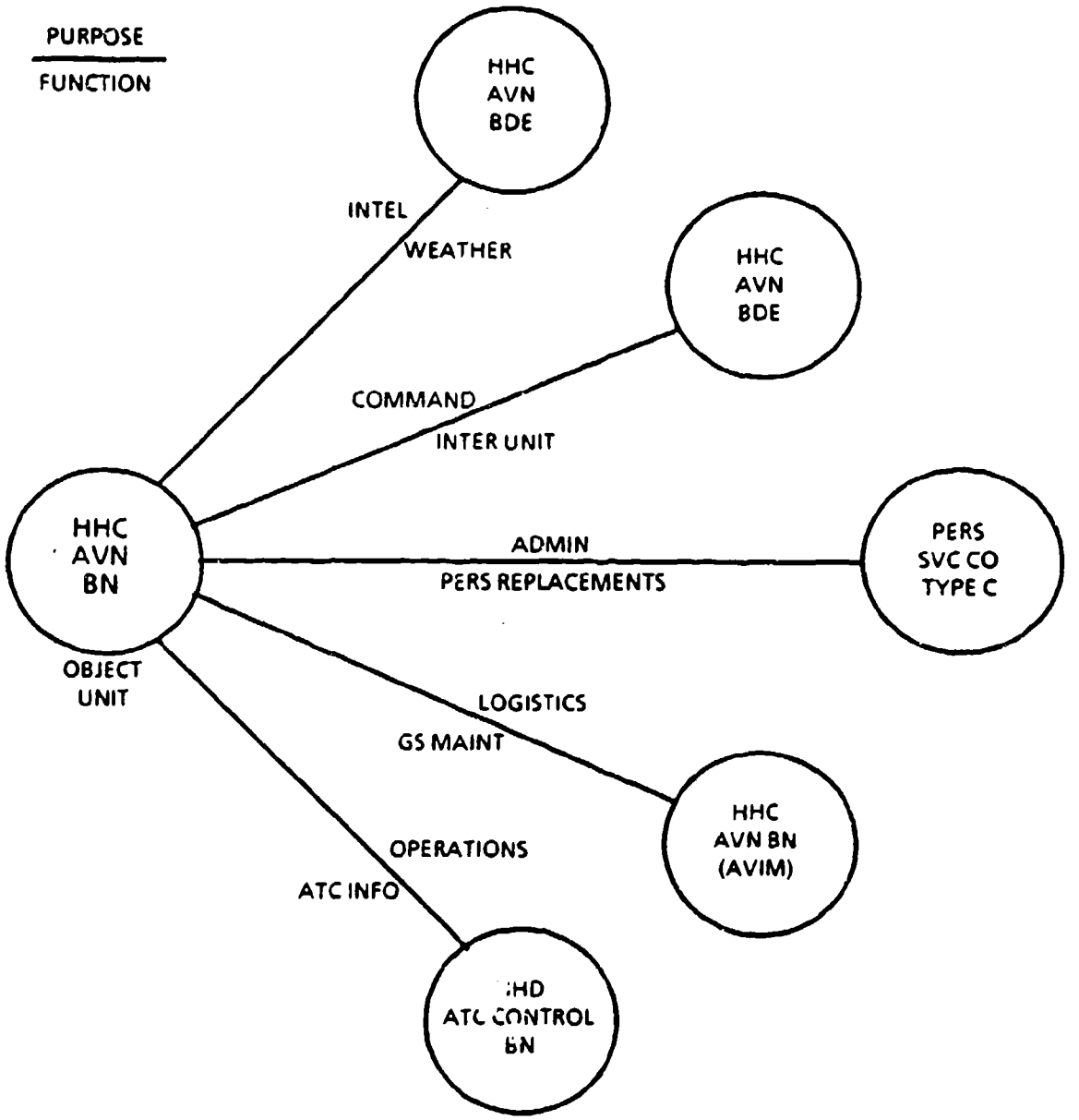

FIGURE 3.2.3-1. Unit to Unit Connections

Initial unit to unit connections were always made from the perspective of the "object" unit to a higher unit in its command structure and/or to its supporting units. A subsequent needline development step would reverse these initial lower to

higher, supported to supporting needlines, thereby providing for two way connections where applicable.

UNIT RELATIONSHIP CODES (URC) were added to needlines at this time. URC specify the relationship between the connected units (chain of command, direct support, area support, etc.). URC are intended for use in conjunction with modeling applications, such as the NAM, during the OPFAC laydown and connection stages of scenario input.

A more thorough explanation of Unit Relationship Codes and other needline elements can be found at Appendix B - CDB NEEDLINE CODEBOOK AND USER'S MANUAL FOR PROPONENT VERIFICATION.

3.2.4 Person to Person Connections

The next step in the needline development process involved the identification of the specific communicators originating and receiving the communication.

The SIGCEN provided SRC Documentation, including a listing of Personnel and Equipment authorized to each unit on the CDB Troop List. No such data was available, of course, for notional (SRC 99 series) organizations. TBE was tasked to identify, on each needline, the specific communicators (originator and receiver) of the information being exchanged. Each needline was to detail the specific SRC, Paragraph Number, and Line Number for both the originator and the receiver.

TBE analyzed SRC documents to identify communicators. As a general rule, personnel in grade E-4 and below were eliminated from consideration as communicators. This general rule was applied to limit the population of potential communicators and because our analysts believed that most communications were originated and received by personnel in grade E-5 and above. Of course this general rule is not universally true, and analysts made adjustments by adding, or deleting, specific communicators during their SRC by SRC review of the entire Troop List.

A significant problem to be overcome was a lack of standardization of Position Titles within the T.O.&E. System. As documents were reviewed our analysts observed many different titles assigned to the same functional positions. For example, different SRCs contained titles Company Commander, Co. Cdr., Company CDR, Commander, CDR, DET CDR, etc., nineteen different variations, for the same functional position. TBE developed a standard list of Position Titles and conducted a line by line review of each SRC document. Analysts assigned a standard Position Title and COMMUNICATOR CODE to each communicator in each SRC document. Through this process our analysts reduced the number of Position Titles from over 22,000 to less than 2,000. This standardization of Position Titles and the assignment of COMMUNICATOR CODES allowed us to proceed with needline development, next connecting a specific originator communicator to a specific receiver communicator for each existing unit to unit needline.

TBE Analysts developed hierarchically ordered sets of Communicator Codes for each Purpose/Function. These sets were ordered such that the Communicator Code at the top of the list would be the person who would, if found in a unit, be the most likely individual to handle a particular Purpose/Function. The Communicator Code at the bottom of the list would be the person who would, if he were the only one on the list found in a unit, be most likely to handle the communications for the particular Purpose/Function. Separate sets were developed for originators and receivers. For example, the set of Communicator Codes developed for originators for the Purpose/Function "Administration/Personnel Replacements" are shown at Figure 3.2.4-1.

"ADMIN - PERSONNEL REPLACEMENTS"
MASTER ORIGINATOR EXTRACT LIST

RANK	COMMUNICATOR
1	PERS STF NCO
2	PAC SUPVR
3	PERS RECORDS SPEC
4	PERS MGT SPEC
5	PERS ACT SPEC
	:
	65 other communicators
	:
71	MAIL DISTR SPEC
72	PROC UNIT SUPVR
73	SECRETARY
74	FIRST SGT

FIGURE 3.2.4-1. Communicator Codes

Using these ordered sets of communicators and the unit to unit needlines, previously developed, TBE Software Engineers developed programs which searched communicating units for the highest listed communicators for each Purpose/Function combination. Only one communicator (originator or receiver) was selected from each SRC for any individual Purpose/Function. Figure 3.2.4-2 illustrates this process.

At the completion of this step, needlines specified the SRC, Paragraph, and Line for both the originator and receiver, as well as the Purpose and Function, for each needline requirement in the data base.

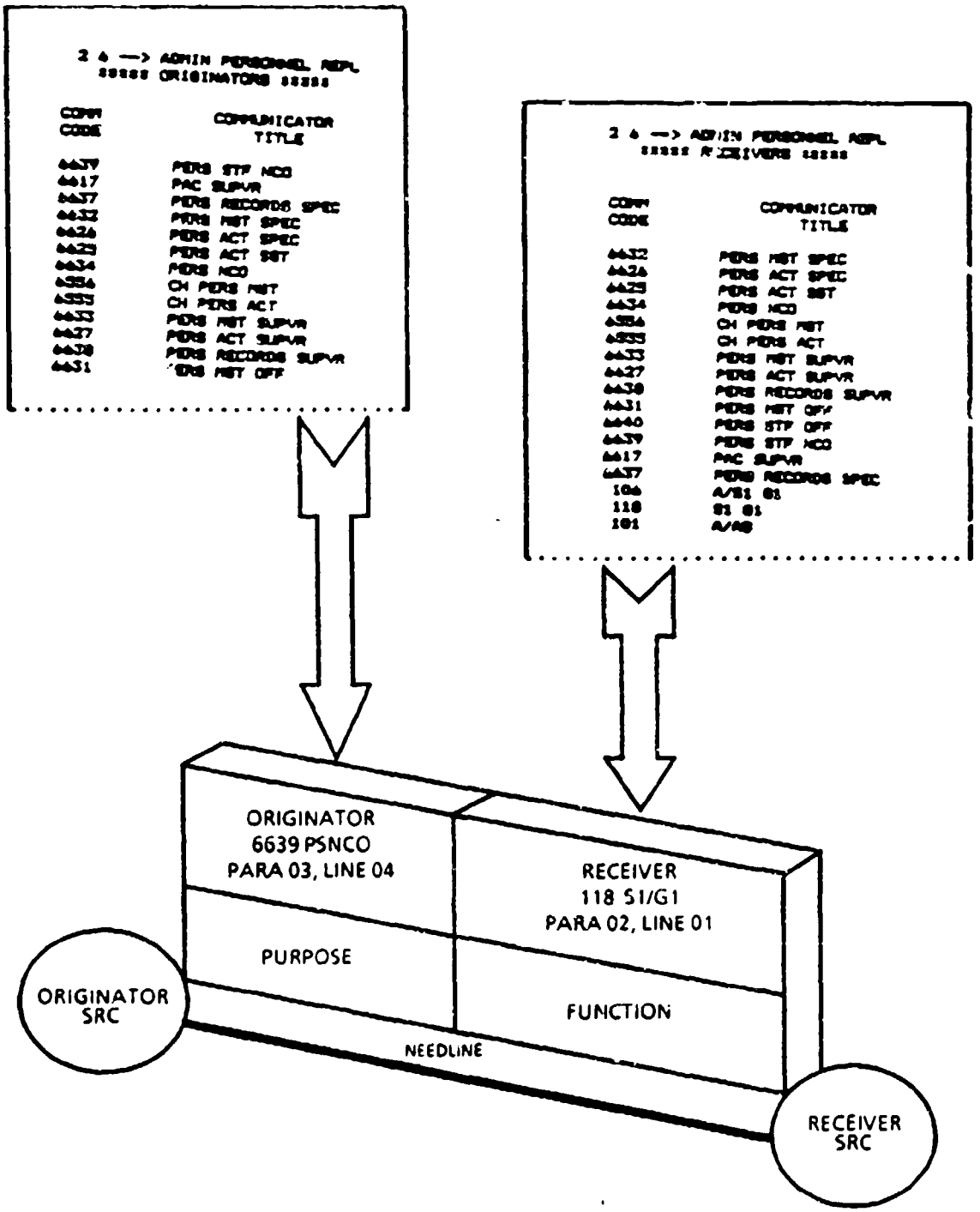

FIGURE 3 2.4-2. Person to Person Connections

3.2.5 Message Assignments

The government provided TBE with a list of messages to be used for building needlines. This list identified 432 messages, primarily United States Message Text Formats (USMTF), which were listed by MESSAGE CODE (a six digit identification code number), Message Name, Minimum Length, and Maximum Length. This message list is oriented primarily on voice and record (non-data) messages. TBE used this list as the single source for message assignments, by direction of the government.

In a manner similar to that described above (Person to Person Connections) TBE established sets of messages relating to each Purpose/Function combination. Purpose/Function message sets were developed in both Forward (lower to higher, supported to supporting) and Reverse (higher to lower, supporting to supported) groups. Recall that up to this point we had been dealing with needlines developed in the Forward direction. Software Engineers developed programs which would not only assign messages to each existing Forward needline, but would also create Reverse needlines, concurrently assigning messages to those newly created Reverse needlines. FIGURE 3.2.5-1 illustrates this process.

At this point TBE also assigned MESSAGE LENGTHS to each needline. This was accomplished by using the Minimum Lengths and Maximum Lengths obtained from the government provided Message List described above. TBE Analysts developed algorithms allowing Software Engineers to write software which assigned MESSAGE LENGTHS to needlines based upon the echelons (company, battalion, brigade, etc.) of the connected SRCs.

3.2.6 Mode and Equipment Assignments

MODE of Transmission was assigned based upon an Analyst's assessment of what the "preferred" MODE would be, from the perspective of the originator. Factors considered in making this determination included the message being sent,

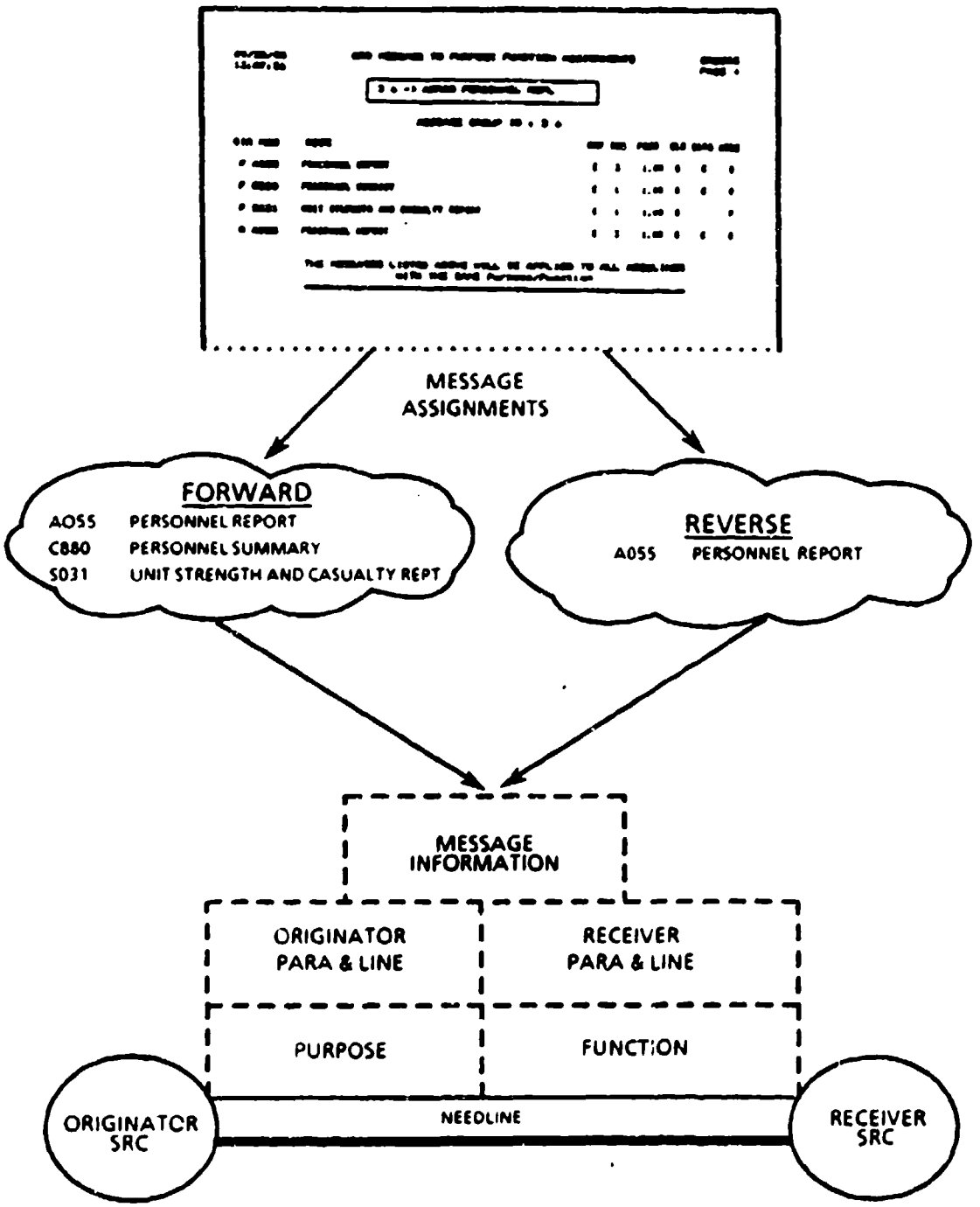

FIGURE 3.2.5-1. Message Assignments

its length, the echelons of the communicating units, their proximity to the Forward Line of Troops (FLOT), and any other factors available to aid this assignment process.

PRIMARY EQUIPMENT, SECONDARY EQUIPMENT, and DATA DEVICE were the next needline elements to be assigned. Figure 3.2.6-1 illustrates this process. Values assigned to these elements were primarily determined by the availability of communications and automation devices authorized to the communicators in the Equipment Section of their SRC Documents. Software was developed to search authorization documents, paragraph by paragraph, to find communications and automation equipment compatible between connected communicators and compatible with MODE assignments previously developed. In cases where no communications or automation equipment was available for assignment, needlines were assigned values representing "desired" equipment choices. This methodology was adopted for the following reasons:

1) It allows for the easy identification of communications requirements not supported in SRC Documentation with appropriate communications/automation capability.

2) It allows for an easy transition from an "SRC" oriented equipment search to an "OPFAC" oriented search as soon as the OPFAC Data Base can be made available to support such analysis.

3) It provides a degree of discipline to the data base. An unconstrained assignment process would have allowed equipment assignments to be made without regard for actual availability. This process was employed to provide a rational basis for equipment assignment while still allowing for maximum analytical utility and flexibility.

Appendix B lists EQUIPMENT and DATA DEVICE codes found in the CDB.

3.2.7 Other CDB Needline Elements

The remaining CDB needline elements were developed using a step by step approach similar to that already described. As each step was completed, needlines were expanded, element by element, until all elements had been completed (Figure 3.2.7-1). Throughout the developmental process, Systems Analysts and Software

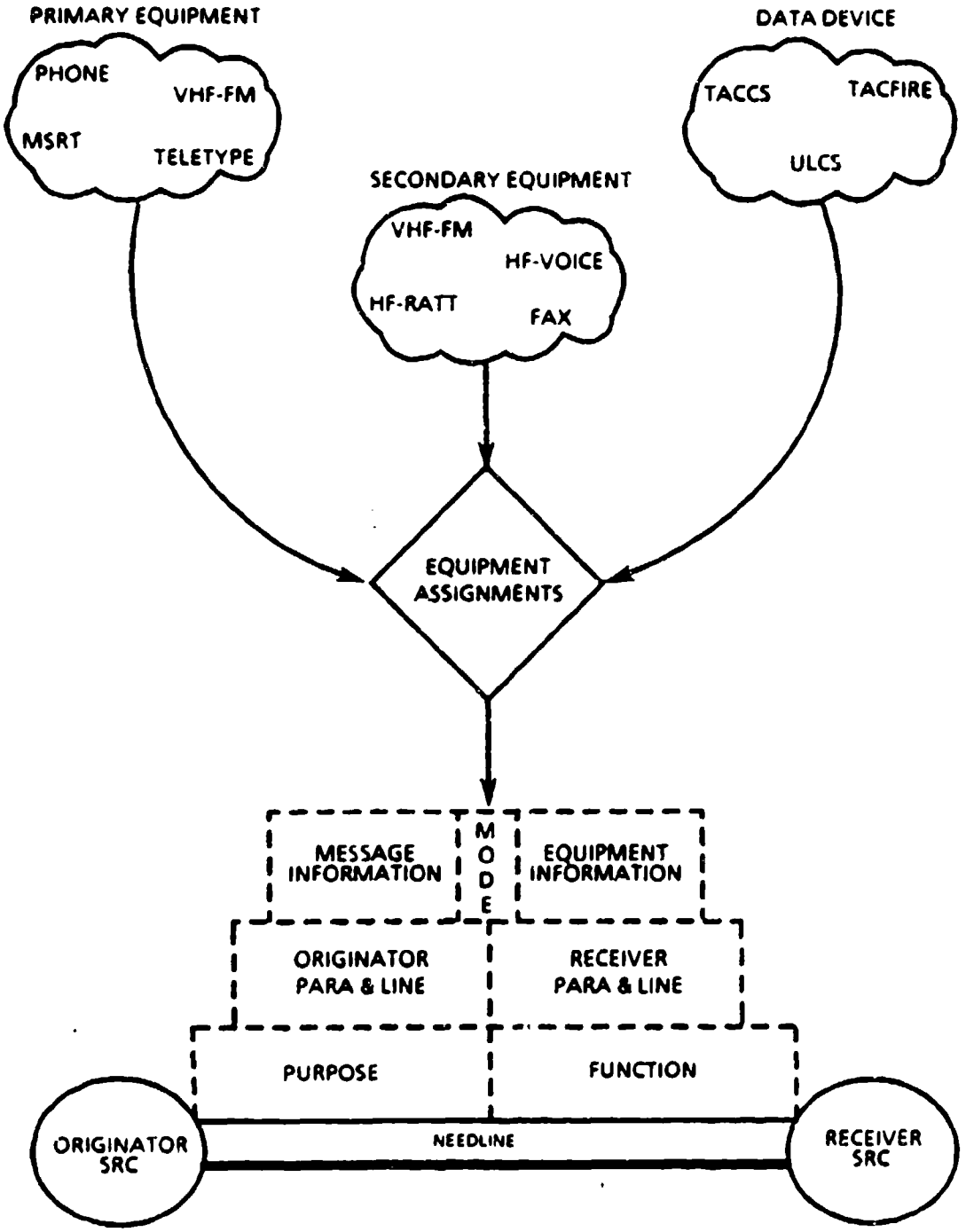

FIGURE 3.2.6-1. Equipment Assignment Process

Engineers continued to review needline elements, both individually and collectively, making changes to methodology and/or software as necessary. The Contracting Officer's Technical Representative (COTR) was continually involved in this process. The task was to develop a data base of needlines, in the structure specified by the government, which would be presented to proponents and CACDA for their respective verification and validation.

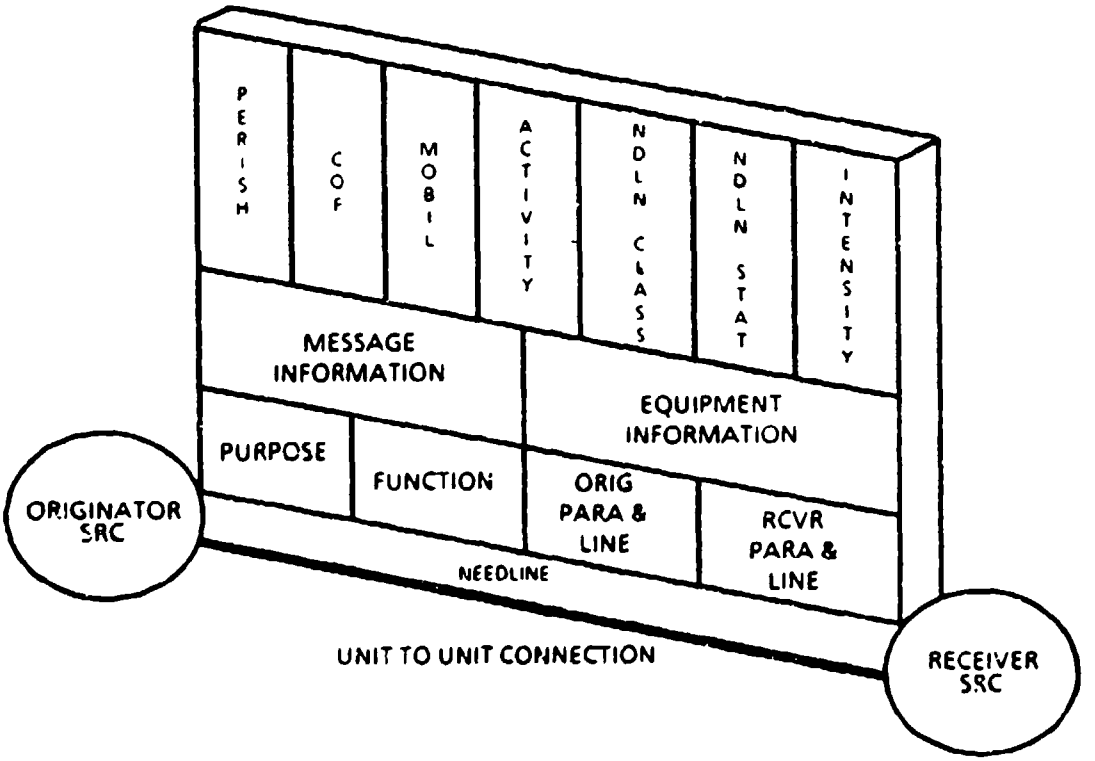

FIGURE 3.2.7-1. Needline Completion

3.3 VERIFICATION AND VALIDATION

The CDB has been verified by proponents and validated by the Combined Arms Center (CAC) for TRADOC. Verification and validation of division and corps data was conducted May-November, 1987. Verification and validation of EAC data occurred November, 1988 through March, 1989. Because these two

verification/validation processes were conducted in a significantly different manner, they will be discussed separately.

3.3.1 Division and Corps Data

TBE completed development of Division and Corps needline data in April, 1987. Concurrently, TBE had developed a comprehensive proponent verification process, along with software, to be used by proponents to accomplish their verification actions. The needline data and the verification process, with its supporting software package, were briefed to and approved by the government during April- May, 1987.

In May, 1987 a combined SIGCEN/TBE team visited the five BFA Centers, briefing the CDB to assembled Proponent Project Officers, demonstrating the verification software, and providing them with software and their needline data. Proponents were instructed, by the SIGCEN, to complete their verification and return their corrected data diskettes to the SIGCEN within thirty days.

In June, 1987 a meeting of all proponents, at the SIGCEN, was directed by CACDA. At this meeting, CACDA re-directed the verification effort. CACDA decided proponents would conduct a separate verification of divisional and corps data. Divisional needlines would be verified first, immediately followed by a verification of corps data. Additionally, CACDA directed that proponents would not use the verification software developed by TBE, but would instead record all needline changes on paper, handwritten, and forward these changes to the SIGCEN for input to the data base. At this meeting, and at a subsequent meeting (18 June, 1987, in Atlanta), CACDA directed other changes to the verification process. CACDA's stated purpose in directing these changes was to ease the burden on proponents, to improve the quality of the data base, and to provide the data base (first the division, then corps) to OTEA in preparation for its Follow-on Test and Evaluation (FOT&E) of the Mobile Subscriber Equipment (MSE).

In addition to splitting the data base for verification, CACDA directed several other changes. Among those changes directed, was to remove all but "normal" MOBILITY and ACTIVITY needlines, to restrict or remove the ability of some specific COMMUNICATOR CODES to communicate, to decrease the number of Command PURPOSE needlines, and to eliminate most divisional TACFIRE needlines. CACDA also provided a different list of MESSAGES for application to needlines and directed the SIGCEN to develop a conversion process to convert "old" messages to "new" messages in accordance with the new list of messages. Finally, CACDA directed a different needline print-out format for needline presentation to proponents. This new format reduced the number of needline elements proponents would see for verification, thereby easing their verification tasks. All CACDA directed changes were implemented by the SIGCEN. The Division and Corps Data Bases were verified by proponents June-October, 1987 and validated by CACDA and the Combined Arms Center (CAC) in November, 1987. Needline data from the CDB was provided to and used by OTEA for MSE FOT&E at Fort Hood, Texas. Figure 3.3.1-1 depicts this process.

3.3.2 Echelons Above Corps Needlines

TBE completed development of EAC needline data in October, 1988. Concurrent with needline development, TBE also designed a Proponent Verification Process and designed and developed a comprehensive, user friendly software system for proponent use during their verification of needline data. On 2 November, 1988 a briefing/software demonstration was conducted at Fort Gordon by a combined SIGCEN/TBE Team. All BFA Proponents, most Branch Proponents, and CACDA were represented at this meeting. Following a detailed briefing on the CDB, its purpose, history and developmental methodology, proponents were provided a comprehensive demonstration of CDB Verification Software. Proponents

VERIFICATION / VALIDATION
DIVISION AND CORPS NEEDLINES

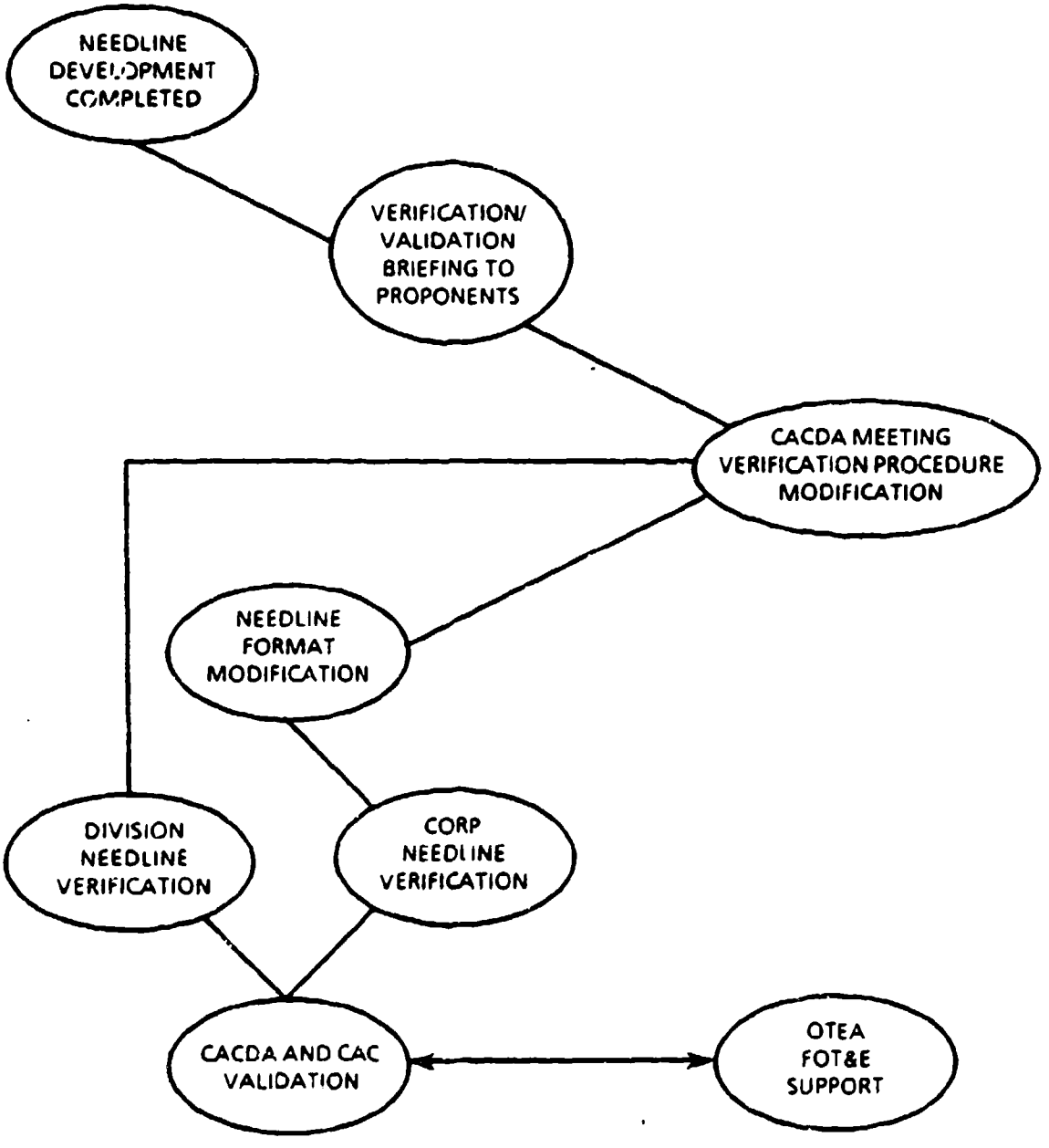

FIGURE 3.3.1-1. Division and Corps Needline Verification/Validation

were provided copies of their needline data, all required support files, and software routines necessary for them to conduct their verification actions. The SIGCEN requested proponents complete their verification actions and return needline data diskettes to the SIGCEN in preparation for CACDA/CAC Validation. Figure 3.3.2-1 depicts this process.

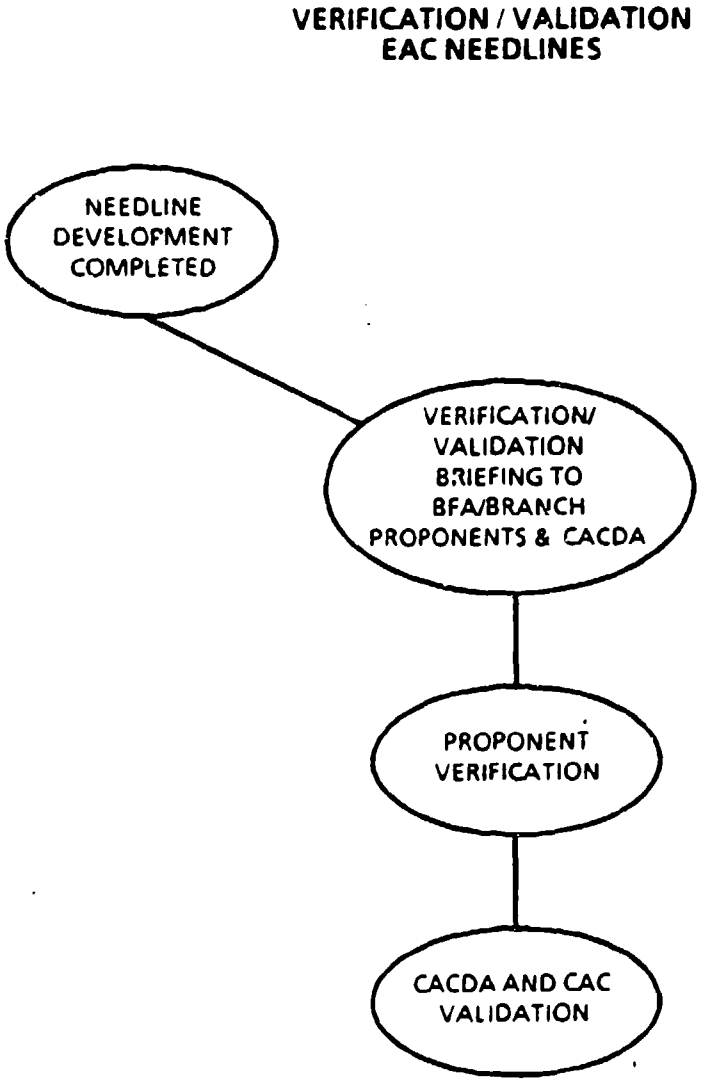

FIGURE 3.3.2-1. EAC Needline Verification/Validation

4. SUMMARY AND RECOMMENDATIONS

4.1 SUMMARY

The Signal Center exercises proponent responsibility for battlefield communications and automation as well as the other Theater/Tactical Information Mission Area sub-disciplines. At the heart of these responsibilities is a necessity to conduct continuing requirements vs. capabilities analysis of systems, both current and proposed, supporting the function of battlefield information exchange.

Analysis must be credible and feasible. Results achieved through analysis will not only be used by the Signal Center for architecture design and doctrine development, but will also be used by higher level Army and Defense decision makers in deciding which programs and acquisitions will be supported, and which will not. History has proven that one-time, special purpose, manpower intensive but analytically feeble attempts to answer requirements vs. capabilities questions cannot endure. The Signal Center sorely needs a credible, sanctioned analytical capability to support its Combat Developments activities.

The CDB is one leg of the Signal Center's Analytical Triad. The CDB, in conjunction with the OPFAC Data Base and the Network Assessment Model, will provide the Signal Center with the analytical tools needed to perform its analysis of battlefield communications and automation requirements vs. capabilities.

The CDB has been developed by the Signal Center using a logical and consistent developmental methodology. The data base has been designed and built to overcome the difficulties encountered by previous attempts to quantify battlefield communications requirements. The CDB has been verified by all TRADOC Proponents and has been validated by the Combined Arms Center. In achieving this TRADOC certification, it becomes the single, sanctioned repository of battlefield communications requirements data for the entire Army.

4.2 RECOMMENDATIONS

The following actions are recommended to insure the Signal Center receives maximum utility from the Communications Data Base:

1) The SIGCEN institutionalize a periodic (annual) process by which the data base can be re-verified and re-validated. Such a process is required to maintain the currency of the data and to allow it to keep pace with changes in doctrine and organizations. This process should be institutionalized by TRADOC or Army Regulation (AR 105-9 institutionalized the COMSR Data Base). If this is not done, the data base will soon lose its credibility and support throughout the Army.

2) The CDB be expanded to include those Battlefield Automated Systems either currently not included, or only partially included, in the data base. As was pointed out in the text, the CDB has been developed to quantify requirements associated with those equipments currently appearing in SRC documentation. It has always been the SIGCEN's intention to expand the data base by developing requirements data for developmental communications and automation systems so that their impacts on the network(s) could be analyzed. Because of the magnitude of this issue, and the requirement for timely decisions, this expansion should be accomplished as a matter of priority.

3) The CDB be expanded to include additional SRCs required to allow a broader range of architectural analysis. The current data base includes 767 SRCs, as has been pointed out. A prioritized list of SRCs should be developed and needline data should be developed for these SRCs in accordance with the established prioritization and funds availability.

4) The Analytical Triad (the CDB, the NAM, and the OPFAC Data Base) be viewed and managed as a cohesive, inseparable set of analytical tools. Because these three elements are so interrelated and interdependent, they cannot be viewed and managed as separate entities. They must be developed and maintained as a package. Changes to one or another must be made only with cognizance of the effects of these changes on the other two legs of the triad. All three legs must be coordinated and harmonized to support the total analytical capability.

TBE has worked with the Signal Center to build the CDB, the NAM and to harmonize the OPFAC Data Base. TBE understands the issues associated with the CDB as well as the two other legs of the triad. TBE will work with the Signal Center to implement these recommendations or provide any other support necessary to support the analytical efforts.

APPENDIX A. CDB SOFTWARE DOCUMENTATION.

APPENDIX A. CDB SOFTWARE DOCUMENTATION

This appendix will detail the structures and relationships of the primary and direct support databases comprising the CDB. The CDB system utilizes the dBASE III Plus database management system on an IBM compatible Personal Computer. Figure A-1 lists these databases and their alias name. Many other databases were used to build the primary databases, support the verification effort, and produce reports throughout the development of the CDB system. Only the primary and direct support databases are documented in this appendix.

DATABASE	ALIAS	BRIEF DESCRIPTION
CRDB01	WORK_NDLN	Primary needline definition.
CRDB03	SRC_MASTER	Description of each SRC in CDB.
CRDB04	TOE_PEOPLE	Description of communicators in every SRC.
CRDB08	COMMCODES	Communicator codes & names.
CRDB09	SECTIONS	Paragraph titles.
CRDB12	PF_CODE	Purpose/function codes & names.
CRDB13	MSG_CODE	Message codes & definitions.
CRDB14	ZONE_CODE	Zone codes & definitions.
CRDB16	NCLAS_CODE	Needline classification codes & names.
CRDB17	MODE_CODE	Mode codes & names.
CRDB18	URC_CODE	Unit relationship codes & names.
CRDB19	MOB_CODE	[illegible]bility codes & names.
CRDB20	NTROP_CODE	[illegible]eroperability codes & names.
CRDB21	ACT_CODE	[illegible]ity codes & names.
CRDB22	SOS_CODE	[illegible]ishability codes & names.
CRDB23	COF_CODE	Cost of failure codes & names.
CRDB24	ECH_CODE	Echelon codes & names.
CRDB25	PROP_CODE	Proponent codes & names.
CRDB26	INTEN_CODE	Intensity codes & names.
CRDB27	EQUIP_CODE	Equipment codes & names.
CRDB28	TCLAS_CODE	Traffic classification codes & names.
CRDB30	DD_CODE	Data device codes & names.
CRDB40	CDB_LIN	Line Item Numbers & nomenclatures.
CRDB41	EQUIP_SPL	SRC/PARA/LIN assignments.
CRDB42	EQUIP_SP	SRC equipment summary database.

FIGURE A-1. Database & Alias Names with Brief Description.

I. DATABASE DICTIONARY

This section will detail the primary fields within each of the databases in the CDB system. The field name, type, width, and description is listed. The field types are:

CHARACTER: These fields can store any printable character that can be entered from the keyboard.

MEMO: This type of field allows for storage of large amounts of textual data. Each memo field uses only 10 characters per record in the database.

NUMERIC: There are two types of numeric fields. Integer fields contain a whole number with no decimal places while decimal fields contain a specific number of decimal places. The first number of the width definition describes the maximum number of digits. The minus sign and decimal point each count as one digit. The following examples show the minimum and maximum values for associated width definitions:

WIDTH	MIN	MAX
6	-99999	99999
6.1	-999.9	9999.9
3.1	-.9	9.9

DATABASE: CRDB01

DESCRIPTION: This database describes the requirement for communicators to exchange "mission essential" information. Each record in this database represents one "needline". The needlines are described in great detail.

Ndln_class TYPE: Character WIDTH: 1
The classification of the needline.

Ndln_seq TYPE: Numeric WIDTH: 6
This data element provides a unique reference number for each needline.

Broad_grp TYPE: Numeric WIDTH: 4
This data element describes a group of needlines which are sent by a single originator, simultaneously, to a group of receivers using communications means which lend themselves to multiple addressee transmissions.

Org_src TYPE: Character WIDTH: 9
The standard requirements code of the unit originating a call to another unit.

Org_para TYPE: Character WIDTH: 2
The paragraph number within the SRC where the originating communicator is located.

Org_line TYPE: Character WIDTH: 2
The line number within the paragraph of the SRC that specifies the communicator originating the call.

Rcvr_src TYPE: Character WIDTH: 9
The standard requirements code of the unit receiving a call from another unit.

Rcvr_para TYPE: Character WIDTH: 2
The paragraph number within the SRC where the receiving communicator is located.

Rcvr_line TYPE: Character WIDTH: 2
The line number within the paragraph of the SRC that specifies the communicator receiving the call.

Urc TYPE: Character WIDTH: 2
This element describes the relationship between the SRC of the originator and the SRC of the receiver.

Subset_rat TYPE: Character WIDTH: 4
This data element describes the number of originators and the number of receivers represented on the needline. That is, how many originators are talking to how many receivers?

DATABASE: CRDB01 (continued)

Purpose	TYPE: Character WIDTH: 1 This data element describes the purpose for which this needline exists.
Function	TYPE: Character WIDTH: 2 This element describes the function within each of the purposes for which a needline exists.
Msg__code	TYPE: Character WIDTH: 6 This field describes the message being sent between the originator and receiver.
Activity	TYPE: Character WIDTH: 1 This element specifies that the needline applies only when a certain, specified activity is being accomplished by the communicator(s).
Org__mobil	TYPE: Character WIDTH: 1 This element specifies that the needline applies only when the originator meets this mobility condition.
Rcvr__mobil	TYPE: Character WIDTH: 1 This element specifies that the needline applies only when the receiver meets this mobility condition.
Mode	TYPE: Character WIDTH: 1 This data element describes the desired mode by which the needline should be satisfied. Modes are assigned without considering equipment available to the communicators.
Prime__eq	TYPE: Character WIDTH: 2 This element describes the primary equipment that will be used to satisfy the needline requirement. Both communicators must possess the equipment specified by this element.
Sec__eq	TYPE: Character WIDTH: 2 When the primary equipment is not available to both communicators, then the secondary equipment will be used to satisfy the needline requirement.
Org__d__dev	TYPE: Character WIDTH: 3 This data element describes the data terminal device being used by the originator. This applies to needlines with a mode of "data".
Rcvr__d__dev	TYPE: Character WIDTH: 3 This data element describes the data terminal device being used by the receiver. This applies to needlines with a mode of "data".

Freq_xmit TYPE: Numeric WIDTH: 6.1
This data element describes the number of times, per 24-hour period, the message identified on the needline is set between the originator and receiver.

Msg_length TYPE: Numeric WIDTH: 6.0
This element defines the length of the message being sent between the originator and receiver. The unit of measure is always "characters".

Perish TYPE: Character WIDTH: 1
This data element describes the amount of time, from the perspective of the originator, that can be allowed to elapse from the time he sends his message until the intended receiver(s) receives it.

Cof TYPE: Character WIDTH: 1
This data element describes the effect, on the ability of the originator, to accomplish his mission, if this needline is not satisfied.

Intensity TYPE: Character WIDTH: 1
This element describes the effect of changes in the levels of intensity, with which the originating unit is involved in performing its mission, on the volume of message traffic represented on the needline.

Msg_class TYPE: Character WIDTH: 1
This element represents the highest level of classification expected for the traffic carried on the needline. It refers to the text of the message.

Interop TYPE: Character WIDTH: 1
This data element indicates a requirement, or lack thereof, for the equipment to EVER have the need to interoperate with non-US Army equipment in a NATO environment.

DATABASE: CRDB03

DESCRIPTION: This database contains information about the SRC's used in CDB. The SRC's name, it's proponent identification, and a set of codes used to associate the SRC with a CDB Phase are the most often used data elements.

Src	TYPE: Character	WIDTH: 9
	This data element identifies the standard requirements code of a group of units. The information associated with each SRC was extracted from the TOE master files at Ft. Leavenworth.	
Name	TYPE: Character	WIDTH: 26
	This element is the name of the SRC.	
Proponent	TYPE: Character	WIDTH: 1
	This field represents the proponent code of the SRC.	
Bfa	TYPE: Character	WIDTH: 1
	This field represents the battlefield functional area of the SRC.	
Echelon	TYPE: Character	WIDTH: 1
	This element describes the echelon of the SRC.	

DATABASE: CRDB04

DESCRIPTION: This database contains information describing the communicators in each SRC. Each communicator is uniquely identified by its SRC, paragraph, and line.

Src	TYPE: Character WIDTH: 9 The standard requirements code of the unit.
Para	TYPE: Character WIDTH: 2 The paragraph within the SRC.
Line	TYPE: Character WIDTH: 2 The line number within the paragraph of the SRC.
Position	TYPE: Character WIDTH: 22 The actual job title associated with a particular SRC, paragraph, and line (SPL).
Multiplier	TYPE: Numeric WIDTH: 2 The number of people performing the same job within this paragraph.
Mos	TYPE: Character WIDTH: 5 The military occupational specialty.
Grade	TYPE: Character WIDTH: 2 The military rank authorized for each SPL.
Comm_code	TYPE: Character WIDTH: 4 This field is a communicator code assigned to each SPL in an attempt to standardize the names.
Fake_para	TYPE: Character WIDTH: 2 This data element reflects the paragraph number than an SPL works out of. Some personnel are listed in the "command section" of the SRC while actually working out of a different paragraph. This fake paragraph represents the paragraph they really belong with.
Fake_line	TYPE: Character WIDTH: 2 This element is used to represent a unique line number for a person when that persons paragraph of assignment (Para) and his work paragraph (Fake_para) are different. In these cases the Fake_line is always 'A', 'B', or 'C'.

DATABASE: CRDB08

DESCRIPTION: This database contains a standardized list of communicator titles and their associated comm_code.

Title	TYPE: Character	WIDTH: 29
	This field is a standardized name of a communicator.	
Comm_code	TYPE: Character	WIDTH: 4
	A unique code assigned each standard communicator title.	

DATABASE: CRDB09

DESCRIPTION: This database contains the paragraph titles for each paragraph of each SRC.

Src	TYPE: Character	WIDTH: 9
	The standard requirements code.	
Para	TYPE: Character	WIDTH: 2
	A paragraph within the SRC.	
Section	TYPE: Character	WIDTH: 21
	The paragraph title.	

DATABASE: CRDB 12

DESCRIPTION: This database defines each purpose/function pair used throughout CDB.

Pf_code	TYPE: Character	WIDTH: 3
	The concatenation of a purpose code and a function code.	
Descript	TYPE: Character	WIDTH: 25
	This data element is the description of a 'Pf_code'.	

DATABASE: CRDB13

DESCRIPTION: This database defines and describes each message code used in CDB.

Msg_code	TYPE: Character	WIDTH: 6
	This data element is the message code.	
Long_desc	TYPE: Character	WIDTH: 50
	This element provides a 50 character description of the message.	
Msg_def	TYPE: Memo	WIDTH: 10
	This element provides for a complete definition of the message.	
Proponent	TYPE: Character	WIDTH: 1
	This element specifies the proponent activity that defined a need for the message.	
Subject	TYPE: Character	WIDTH: 1
	A code used to specify the general subject matter of the message.	
Source	TYPE: Character	WIDTH: 1
	A code used to indicate the message source. Possible sources are 'STANAG', 'ACCS', 'USMTF', 'MCS' or 'FLIRP'.	
Min_length	TYPE: Numeric	WIDTH: 6
	This element expresses the minimum message length in characters.	
Max_length	TYPE: Numeric	WIDTH: 6
	This element expresses the maximum message length in characters.	

DATABASE: CRDB14

DESCRIPTION: This database describes each zone code used in CDB.

Zone_code	TYPE: Character	WIDTH: 1
	A unique code assigned each zone of the battlefield.	
Descript	TYPE: Character	WIDTH: 66
	The description of each battlefield zone.	

DATABASE: CRDB16

DESCRIPTION: This database describes each needline classification code used in CDB.

Nclas_code TYPE: Character WIDTH: 1
A unique code assigned each classification level. This set of codes will describe the classification of the needline itself, not the traffic represented by the needline.

Descript TYPE: Character WIDTH: 12
The description of each needline classification code.

DATABASE: CRDB17

DESCRIPTION: This database describes each mode code used in CDB.

Mode_code TYPE: Character WIDTH: 1
A unique code assigned to each possible mode of transmission.

Descript TYPE: Character WIDTH: 9
The description of each mode of transmission.

DATABASE: CRDB18

DESCRIPTION: This database describes each URC code used in CDB.

Urc_code TYPE: Character WIDTH: 2
An unit relationship codes.

Descript TYPE: Character WIDTH: 60
The description of each unit relationship code.

DATABASE: CRDB19

DESCRIPTION: This database describes each mobility code used in CDB.

Mob_code	TYPE: Character	WIDTH: 1
	A code representing a mobility. This mobility is used to qualify a needline. When a communicator does not match its required mobility, then the needline is not to be used.	
Descript	TYPE: Character	WIDTH: 27
	The description of each mobility code.	

DATABASE: CRDB20

DESCRIPTION: This database describes each interoperability code used in CDB.

Ntrop_code	TYPE: Cha cter	WIDTH: 1
	An interoperability code.	
Descript	TYPE: Character	WIDTH: 16
	The description of each interoperability code.	

DATABASE: CRDB21

DESCRIPTION: This database describes each activity code used in CDB.

Act_code	TYPE: Character	WIDTH: 1
	An activity code.	
Descript	TYPE: Character	WIDTH: 37
	The description of the activity.	

DATABASE: CRDB22

DESCRIPTION: This database describes each perishability code used in CDB.

Sos_code	TYPE: Character	WIDTH: 2
	A perishability code.	
Descript	TYPE: Character	WIDTH: 9
	The description of each perishability code.	

DATABASE: CRDB23

DESCRIPTION: This database describes each Cost Of Failure code used in CDB.

Cof_code	TYPE: Character	WIDTH: 1
	The cost of failure codes.	
Descript	TYPE: Character	WIDTH: 13
	The description of each cost of failure code.	

DATABASE: CRDB24

DESCRIPTION: This database describes each echelon code used in CDB.

Ech_code	TYPE: Character	WIDTH: 1
	An echelon code.	
Descript	TYPE: Character	WIDTH: 54
	The description of each echelon code.	

DATABASE: CRDB25

DESCRIPTION: This database describes each proponent code used in CDB

Prop_code	TYPE: Character	WIDTH: 1
	A proponent code.	
Descript	TYPE: Character	WIDTH: 55
	The description of the proponent code.	

DATABASE: CRDB26

DESCRIPTION: This database describes the intensity of battle codes used in CDB.

Inten_code	TYPE: Character	WIDTH: 1
	An intensity code.	
Descript	TYPE: Character	WIDTH: 10
	The description of the intensity code.	

DATABASE: CRDB27

DESCRIPTION: This database describes each equipment code used in CDB.

Equip_code	TYPE: Character An equipment code.	WIDTH: 2
Descript	TYPE: Character The description of the equipment code.	WIDTH: 48

DATABASE: CRDB28

DESCRIPTION: This database describes each traffic classification code used in CDB.

Tclas_code	TYPE: Character A code for the classification of the traffic expressed in the needline.	WIDTH: 1
Descript	TYPE: Character The description of the traffic classification code.	WIDTH: 18

DATABASE: CRDB30

DESCRIPTION: This database describes each data device code used in CDB.

Dd_code	TYPE: Character A data device code.	WIDTH: 1
Descript	TYPE: Character The description of the data device code.	WIDTH: 8

DATABASE: CRDB40

DESCRIPTION: This database describes each line item number (LIN) and its nomenclature. Also, the LIN is associated with specific equipment codes based on the system capabilities of the item.

Lin	TYPE: Character	WIDTH: 1
	The Line Item Number of the equipment.	
Nomen	TYPE: Character	WIDTH: 54
	The nomenclature of the equipment.	
Phone	TYPE: Numeric	WIDTH: 1.0
	The quantity of phone capabilities.	
Tty	TYPE: Numeric	WIDTH: 1.0
	The quantity of teletype capabilities.	
Facs	TYPE: Numeric	WIDTH: 1.0
	The quantity of facsimile capabilities.	
Vhf_fm	TYPE: Numeric	WIDTH: 1.0
	The quantity of VHF FM capabilities.	
Hf_voice	TYPE: Numeric	WIDTH: 1.0
	The quantity of HF VOICE capabilities.	
Msrt	TYPE: Numeric	WIDTH: 1.0
	The quantity of MSRT capabilities.	
Uhf_fm	TYPE: Numeric	WIDTH: 1.0
	The quantity of UHF FM capabilities.	
Uhf_am	TYPE: Numeric	WIDTH: 1.0
	The quantity of UHF AM capabilities.	
Hr_ratt	TYPE: Numeric	WIDTH: 1.0
	The quantity of HF RATT capabilities.	
Tacfire	TYPE: Numeric	WIDTH: 1.0
	The quantity of TACFIRE data device capabilities.	
Das_3	TYPE: Numeric	WIDTH: 1.0
	The quantity of DAS3 data device capabilities.	
Taccs	TYPE: Numeric	WIDTH: 1.0
	The quantity of TACCS data device capabilities.	
Ulcs	TYPE: Numeric	WIDTH: 1.0
	The quantity of ULCS data device capabilities.	
Mcs	TYPE: Numeric	WIDTH: 1.0
	The quantity of MCS data device capabilities.	

DATABASE: CRD841

DESCRIPTION: This database represents the communication equipment found in a SRC.

SRC	TYPE: Character WIDTH: 9 The standard requirements code of the unit.
Para	TYPE: Character WIDTH: 2 The paragraph within the unit where some equipment is located.
Lin	TYPE: Character WIDTH: 6 The Line Item Number of the equipment.
Qty	TYPE: Numeric WIDTH: 3.0 The quantity of the specific LIN found in a paragraph.

DATABASE: CRD842

DESCRIPTION: This database summarizes the equipment capabilities for each paragraph of each SRC and for each SRC. Each record with a non-zero paragraph number represents the capabilities of the specific paragraph. Each record with a paragraph number equal to zero represents the total capability of the entire SRC.

Src	TYPE: Character WIDTH: 9 The standard requirements code of the unit.
Para	TYPE: Character WIDTH: 2 The paragraph within the unit.
Lin	TYPE: Character WIDTH: 6 The Line Item Number of the equipment.
Phone	TYPE: Numeric WIDTH: 3.0 The quantity of phone capabilities.
Tty	TYPE: Numeric WIDTH: 3.0 The quantity of teletype capabilities.
Facs	TYPE: Numeric WIDTH: 3.0 The quantity of facsimile capabilities.
Vhf_fm	TYPE: Numeric WIDTH: 3.0 The quantity of VHF FM capabilities.
Hf_voice	TYPE: Numeric WIDTH: 3.0 The quantity of HF VOICE capabilities.

DATABASE: CRDB42 (Cont.)

Msrt	TYPE: Numeric WIDTH: 3.0 The quantity of MSRT capabilities.
Uhf_fm	TYPE: Numeric WIDTH: 3.0 The quantity of UHF FM capabilities.
Uhf_am	TYPE: Numeric WIDTH: 3.0 The quantity of UHF AM capabilities.
Vhf_am	TYPE: Numeric WIDTH: 3.0 The quantity of VHF AM capabilities.
Hf_ratt	TYPE: Numeric WIDTH: 3.0 The quantity of HF RATT capabilities.
Tacfire	TYPE: Numeric WIDTH: 3.0 The quantity of TACFIRE data device capabilities.
Das_3	TYPE: Numeric WIDTH: 3.0 The quantity of DAS3 data device capabilities.
Taccs	TYPE: Numeric WIDTH: 3.0 The quantity of TACCS data device capabilities.
Ulcs	TYPE: Numeric WIDTH: 3.0 The quantity of ULCS data device capabilities.
Mcs	TYPE: Numeric WIDTH: 3.0 The quantity of MCS data device capabilities.

CDB DATABASES

DATA ELEMENTS	01	03	04	08	09	12	13	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	40	41	42
MODE CODE	•									•																	
MOS			•																								
MSG CLASS DESC																					•						
MSG DESC							•																				
MSG MIN LENGTH							•																				
MSG CLASS CODE	•																				•						
MSG MAX LENGTH							•																				
MSG LENGTH	•																										
MSG FREQUENCY	•																										
MSG SUBJECT							•																				
MSG CODE	•						•																				
NDLN CLASS CODE	•							•																			
NDLN CLASS DESC								•																			
NEEDLINE SEQ	•																										
NOMINAL DIST CODE	•																					•					
NOMINAL DIST DESC																						•					
PARAGRAPH	•		•		•																					•	•
PERISHABILITY CODE	•														•												
PERISHABILITY DESC															•												

CDB DATABASES

DATA ELEMENTS	01	03	04	08	09	12	13	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	40	41	42
POSITION TITLE			•																								
PROPONENT CODE		•																•									
PROPONENT NAME																		•									
PURP/FUNCT DESC						•																					
PURPOSE CODE	•					•																					
SPL MULTIPLIER			•																								
SLC SECTION NAME					•																						
SRC	•	•	•		•																					•	•
ACTIVITY CODE	•													•													
ACTIVITY DESC														•													
BFA CODE		•																						•			
BFA NAME																								•			
COMM TITLE				•																							
COMM CODE			•	•																							
COST OF FAIL DESC																•											
COST OF FAIL CODE	•															•											
DATA DEVICE NAME																							•				
DATA DEVICE CODE	•																						•				
ECHELON CODE		•															•										

CDB DATABASES

DATA ELEMENTS	01	03	04	08	09	12	13	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	40	41	42
ECHELON NAME																	•										
EQUIPMENT CODE	•																			•							
EQUIPMENT NAME																				•							
FUNCTION CODE	•					•																					
GRADE			•																								
INTENSITY CODE	•																		•								
INTENSITY DESC																			•								
INTEROP CODE	•												•														
INTEROP DESC													•														
LIN NOMENCLATURE																									•		
LIN (Line Item No)																									•	•	
LIN QTY																									•		
LINE	•		•																								
MOBILITY CODE	•											•															
MOBILITY DESC												•															
MODE NAME										•																	
SRC NAME		•																									
SUBSET RATIO	•																										
TOTAL PHONES																											•

CDB DATABASES

DATA ELEMENTS	01	03	04	08	09	12	13	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	40	41	42
TOTAL TTYS																											•
TOTAL TAC FACS																											•
TOTAL VHF_FM																											•
TOTAL HF_VOICE																											•
TOTAL MSRT																											•
TOTAL UHF_FM																											•
TOTAL UHF_AM																											•
TOTAL VHF_AM																											•
TOTAL HF_RATT																											•
TOT DD TACFIRE																											•
TOT DD DAS-3																											•
TOT DD TACCS																											•
TOT DD ULCS																											•
URC DESC											•																
URC CODE	•										•																
ZONE CODE			•					•																			
ZONE DESC								•																			

II. DATABASE RELATIONSHIPS

One advantage of a relational database management system is the space saved by not repeating the same data for every record in a database. A good example of this is the method of storing the communicators represented by every needline. The actual communicator code is not part of the needline itself. Instead, another database associates every possible person from every SRC with a communicator code. There are over 22,000 possible communicators, but relating this database and the needline database together to obtain the communicator code for both the needline originator and receiver is desirable over including both communicator codes on more than 300,000 needlines. The primary database relationships are shown in Figure A-2. The principal fields from each database are listed inside the box. A line connecting two databases indicates that a relationship exists. A relationship requires common data from each database. This data constitutes the key of the relationship. The key can be part of a field, an entire field, or multiple fields. The field(s) comprising the key from each database are listed below the second database. When two databases can be related on more than one key, each key is listed.

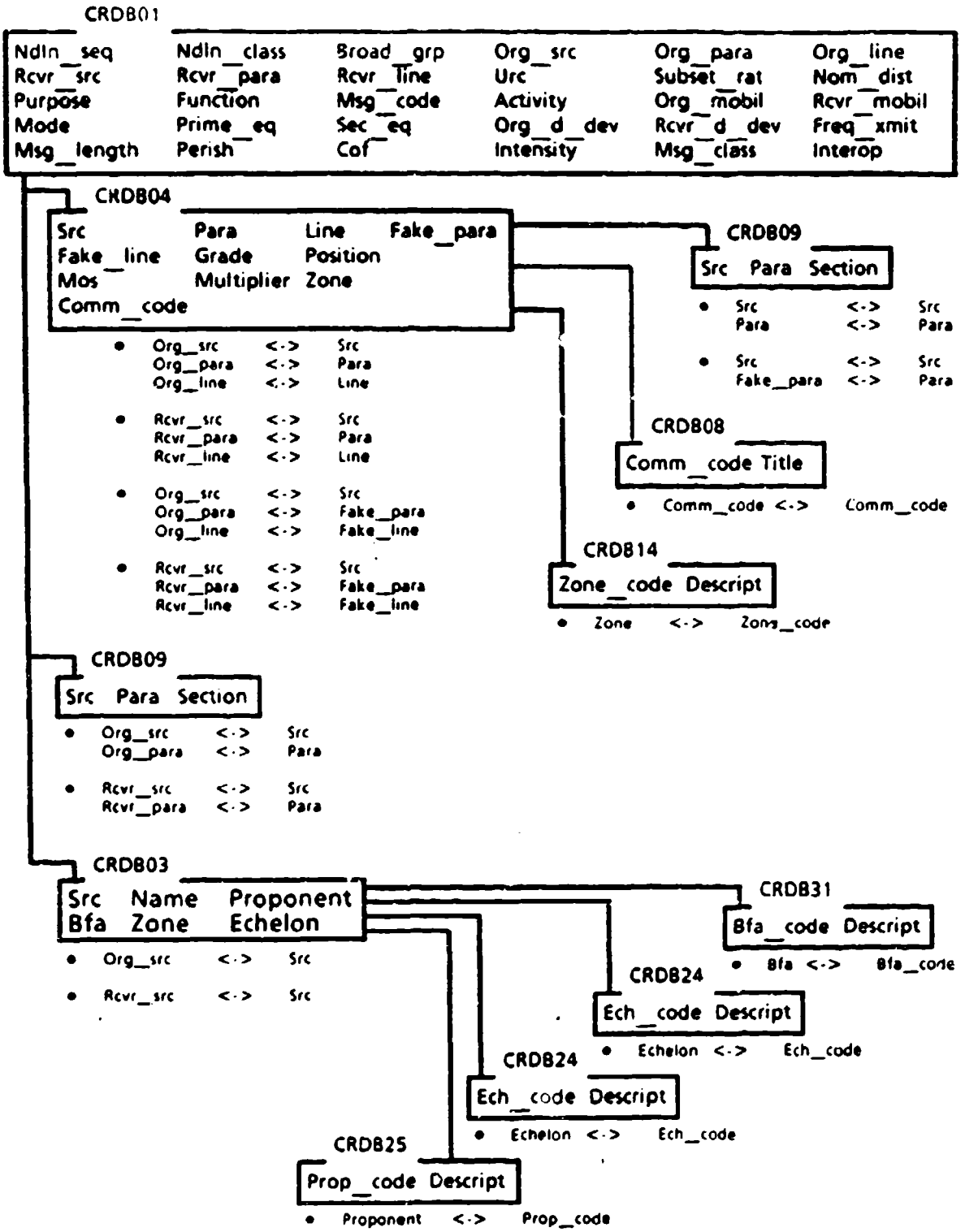

FIGURE A-2. CDB Database Relationships (1 of 2).

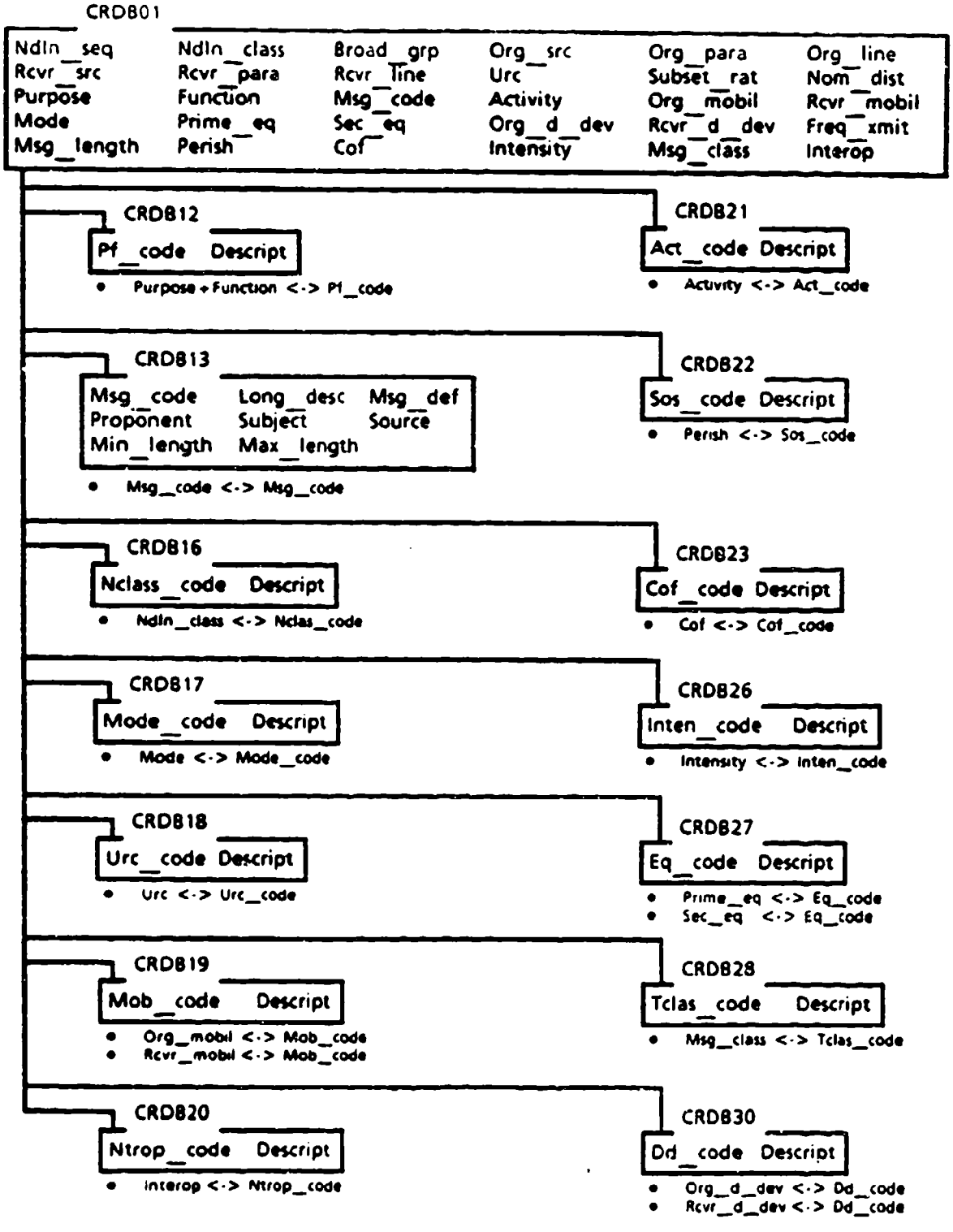

FIGURE A-2. CDB Database Relationships (2 of 2).

APPENDIX B. NEEDLINE CODEBOOK AND USER'S MANUAL FOR PROPONENT VERIFICATION

COMMUNICATIONS DATA BASE

(CDB)

NEEDLINE CODEBOOK

and

USER'S MANUAL

for

PROPONENT VERIFICATION

NOVEMBER 1988

Directorate of Combat Developments
United States Army Signal Center and Fort Gordon
Fort Gordon, Georgia 30905-5090

TABLE OF CONTENTS

I N T R O D U C T I O N

The Communications Data Base (CDB) is a database which represents communications requirements of selected organizations. Organizations represented in the CDB are identifiable by Standard Requirements Code (SRC) Number where SRC data is available for units. In cases where SRC data does not exist (NATO, Joint Services, etc.) pseudo-SRCs are developed to allow for the description of communications requirements into and out of these units. In all cases SRCs chosen for CDB use represent the most current approved version (Series) available at the time SRCs are chosen.

Communications requirements within the CDB are depicted in terms of Needlines. A Needline is a series of related data elements which describe a requirement to communicate information between two or more battlefield communicators. A Needline describes the originator and receiver of the communications (identified by SRC, Paragraph and Line), the reason for the communications requirement (Purpose and Function), the subject of the call (Message), the length of the message, the number of times per day the message is sent, the importance and perishability of the information, and a number of other descriptors of the communications requirement.

The CDB has been developed by the Signal Center to be used as an analytical tool in conjunction with the CRTAC Data Base and the Network Assessment Model. The cooperative use of these three tools will allow the Signal Center to assess the capability of various communications architectures to accommodate battlefield information exchange requirements for many different force structure arrays, using standard and non-standard deployment schemes, over a range of geographic deployment locations.

The initial set of CDB needline data was developed 1986-1987. This data was verified by Proponent Centers and Schools during the summer of 1987 and was validated by the Combined Arms Center in November 1987. This initial set of data represented a set of SRCs which would normally be assigned and deployed forward of a Corps rear boundary. A skeletal Echelons Above Corps (EAC) force was developed and used for this initial effort.

The current CDB effort was aimed at EAC. During the current phase (which began in March 1988) a set of SRCs was chosen to represent a group of units which would normally be assigned to a force operating at EAC. You have not yet seen the needlines developed for this EAC force, but are now being provided them for your initial verification. Your

task is two-fold. First, to re-verify those needlines that were developed for the initial CDB and were previously verified by your Center in 1987. These needlines were provided to you in October 1988 and you have been reviewing them for the last several weeks. Your second task is to conduct your initial verification review of the new (EAC) needlines which have been developed during the current CDB phase.

Both sets of needlines (those being re-verified and those being initially verified) are contained on the data diskettes you have been provided. Verification Software has been developed for your use which will allow you to conduct all verification actions simultaneously. When you are finished, you will have completed all verification actions necessary for the CDB this year. You will be kept informed of CDB actions planned for next year.

The CDB is a "living" data base which will require continuing monitoring, expansion and change as the Army continues to change SRC organizations and introduces newer generations of communications and automation devices and systems to improve battlefield information flow. Your continued support of the Communications Data Base efforts is vital and appreciated.

F O R E W O R D

This CDB NEEDLINE CODEBOOK AND USER'S GUIDE FOR PROPONENT VERIFICATION was developed to assist Proponent Project Officers during Proponent Verification of the Communications Data Base. The CODEBOOK provides an explanation of those CDB needline elements you will see when using the Proponent Verification Software and/or when reviewing needline printouts for your SRCs. Every effort has been made to make the CODEBOOK and Software both understandable and easy to use.

We recommend you adopt the following methodology in completing your verification actions:

1. Familiarize yourself with the CDB by reading this Needline Codebook.

2. Load your Proponent Verification Software Installation Diskettes on the Personal Computer (PC) you will be using to process your needlines. The PC should have at least 6 Megabytes of available hard disk space.

3. Print copies of the Communicator Code Dictionary (can be printed in either alphabetic or numeric sequence, or both).

4. Print a copy of the CDB Message Dictionary.

5. Using your SRC data diskettes, print the needlines for each of your SRCs.

6. Using your SRC data diskettes, print the Personnel/Equipment listings for each of your SRCs.

7. Using your SRC data diskettes, print a Connectivity Matrix for those SRCs for which you would like to review connectivity.

8. Review needlines for each of your SRCs using the needline printouts, and using the other printout material for reference material.

9. Record desired needline changes (pen and ink) on the needline printouts. After you have completed the pen and ink changes on the needline printouts, use them to enter changes on the needline data diskettes using the Proponent Verification Software previously loaded on your hard disk.

ALL CHANGES to needlines MUST BE entered on the SRC diskettes using the Proponent Verification Software you have

been provided.

DATA NEEDLINE NOTE:

During the development of the CBD we have attempted to capture DATA needlines which can be supported by data devices appearing in SRC documentation. We realize that many automated systems do not yet appear in SRCs but are in some earlier stage in the developmental process. It has long been our intention to incorporate Battlefield Automated Systems into the CDB as these systems evolved.

The Proponent Verification Software we have developed allows you to indicate those needlines which, although not presently supported in SRCs with automated equipment, will eventually be supported with such equipment. The software will prompt you to answer a set of questions regarding planned data systems, message lengths, etc.. This process will be explained in detail at the verification kick-off meeting in early November.

As you complete your CDB verification, should you have any questions regarding the software, the Codebook, or any other CDB related issue please contact the Signal Center Points of Contact:

Mailing Address	CDR, US Army Signal Center Attn: ATZH-CDC (Mr. Tracy Wood/MAJ William Key) Fort Gordon, GA 30905-5090
Telephone	AUTOVON 780-3782/3561 COMMERCIAL (404) 791-3782/3561
Electronic Mail	atzh_cdc_s@opentagon-opti.army.mil

ACTIVITY

TYPE: Character WIDTH: 1

DESCRIPTION: This data element describes the existence of a needline that applies only when a certain, specified activity is being accomplished by the communicator(s). For example, a needline having an activity code of "N" would apply only when either communicator was engaged in an "NBC OPERATIONS" activity in accordance with a particular scenario event. Most needlines carry an Activity Code of "Z" which means that the needline applies regardless of any specific activity designation. In other words, a "Z" Activity Code means the needline always applies. Activity Codes other than "Z" are additive to "Z" needlines and describe additional communications requirements associated with the performance of the indicated activity. Activity Codes and their descriptions are shown below.

CODE and DESCRIPTION:

A = ATTACK, COUNTER - ATTACK, RECONNOITER
B = EXPLOIT, PURSUE
C = DEFEND, DELAY, SCREEN
D = PASSAGE (Moving), RELIEVE
E = PASSAGE (Stationary), RELIEVE
F = MARCHING
G = MOVING TO CONTACT
H = COVERING FORCE
J = CLEARING OBSTACLE / MINEFIELD
K = CROSSING MINEFIELD
L = CROSSING RIVER
N = NBC OPS
R = RESERVE
T = TACTICAL MISSILE DEFENSE
Z = NEEDLINE NOT QUALIFIED BY ACTIVITY

BROADCAST GROUP

TYPE: Numeric WIDTH: 4

DESCRIPTION: This data element describes a group of needlines which are sent by a single originator, simultaneously, to a group of receivers using communications means which lend themselves to multiple addressee transmissions (eg. Combat Net Radio, MSE conferencing capability, etc.). Broadcast Groups are each assigned a four digit numeric value within each SRC. Broadcast Groups 0001 thru 5000 were reserved for Signal Center developmental purposes. If you wish to create Broadcast Groups for your SRCs you should use numbers 5001 thru 9999 for each SRC.

COMMUNICATOR CODE (ORG/RCVR)

TYPE: Character WIDTH: 4

DESCRIPTION: This data element describes the communicator (both originator and receiver) in terms of the code assigned to him by the TBE Analyst. Communicator Codes were developed as an attempt to standardize SRC Titles for communicators and to conserve space in needline records. You can print the complete listing of Communicator Codes (in either alphabetic or numeric sequence) by using the Print Utility Software provided in your Needline Verification Package.

COST OF FAILURE (COF)

TYPE: Character WIDTH: 1

DESCRIPTION: This data element describes the effect, on the ability of the originator, to accomplish his mission, if this needine is not satisfied. Recognizing all CDB needlines are "Mission Essential", some remain more important than others. This data element is intended to describe their relative importance. An "INDISPENSABLE" needline is one which, if not satisfied, causes complete mission failure for the originator. A "CRITICAL" needline is one which, if not satisfied repeatedly over an extended period of time, will cause mission failure for the originator. An "ESSENTIAL" needline is one which, if continually not satisfied, over an extended period of time, will have a negative impact on the ability of the originator to accomplish his mission. COST OF FAILURE codes and their values are shown below.

CODE and DESCRIPTION:

I = INDISPENSABLE
C = CRITICAL
E = ESSENTIAL

DATA DEVICE (ORG/RCVR)

TYPE: Character WIDTH: 3

DESCRIPTION: This data element describes the data terminal device being used by both the originator and receiver to send and receive the message represented on the needline. These fields are used only for DATA MODE needlines (all other modes will carry blanks in the DATA DEVICE fields). If you find a non-data mode needline which you believe should be a data mode needline, the Verification Software will prompt you to provide information which will allow us to capture your requirements.

DATA DEVICE (ORG/RCVR) (continued)

CODE and DESCRIPTION:

001 = TACFIRE
002 = DAS3
003 = FAAR
004 = TADARS
005 = PERSHING
006 = MET
007 = TACCS
008 = ULCS
009 = MCS

EQUIPMENT (PRIME EQ, SECND EQ)

TYPE: Character WIDTH: 2

DESCRIPTION: This data element describes the equipment that will be used by the originator to satisfy the needline requirement. Each needline carries both a "Primary" and a "Secondary" equipment code. These codes simply represent the originator's first and second choices, respectively, for the type of equipment he will use to satisfy the needline requirement. Compatible equipment must be available to both the originator and receiver. The Verification Software will check to insure that equipment you select is both available and compatible, and the software will help you make the right choices. In some cases you may feel that while the desired equipment is not available (at either the paragraph or SRC level) it would actually be available to the communicators (perhaps because of OPFAC configurations, or because it would be provided by a supporting Signal unit). In these cases you can select the appropriate "60" or "70" series equipment as provided for by the software.

CODE and DESCRIPTION:

00 = NOTHING
01 = PHONE
61 = PHONE * (in SRC, not in both PARAs)
71 = PHONE ** (not in SRC, potentially available)
02 = TTY
72 = TTY ** (not in SRC, potentially available)
03 = FACSIMILE
73 = FACSIMILE **(not in SRC, potentially available)
04 = VHF FM
64 = VHF FM * (in SRC, not in both PARAs)
74 = VHF FM ** (not in SRC, potentially available)
05 = HF VOICE
65 = HF VOICE * (in SRC, not in both PARAs)

EQUIPMENT (PRIME EQ, SECND EQ) (continued)

75 = HF VOICE ** (not in SRC, potentially available)
08 = MSRT
68 = MSRT * (in SRC, not in both PARA)
78 = MSRT ** (not in SRC, potentially available)
50 = POUCH
51 = UHF FM
52 = UHF AM
53 = VHF AM
54 = HF RATT

FREQUENCY (MESSAGE)

TYPE: Numeric WIDTH: 6 DECIMAL: 1

DESCRIPTION: This data element describes the number of times, per 24-hour period, the message identified on the needline is sent between the originator and receiver.

FUNCTION

TYPE: Character WIDTH: 2

DESCRIPTION: This data element describes the function, within the five CDB Purposes, for which this needline exists. It allows a further level of specificity in the description of the needline requirement. For example, a needline carrying a PURPOSE of "2" and a FUNCTION of "06" would be a needline pertaining to ADMIN/PERSONNEL REPLACEMENTS. FUNCTIONS, with their appropriate PURPOSE prefixes, are shown below.

CODE and DESCRIPTION:

1 1 = COMMAND/INTER-UNIT
100 = COMMAND/INTRA-UNIT
2 1 = ADMIN/COORDINATION
2 4 = ADMIN/UCMJ
2 5 = ADMIN/FINANCE
2 6 = ADMIN/PERSONNEL REPL
2 7 = ADMIN/MED SPT TREATMENT
2 8 = ADMIN/MED SPT EVAC
2 9 = ADMIN/CIVIL AFFAIRS
200 = ADMIN/INTRA-UNIT
210 = ADMIN/MILITARY POLICE SPT
212 = ADMIN/CASUALTY REPORT
213 = ADMIN/CHAPLAIN SPT
214 = ADMIN/GRAVES REGISTRATION
215 = ADMIN/POSTAL
3 1 = OPNS/COORDINATION

FUNCTION (continued)

3 3 = OPNS/LATERAL
3 4 = OPNS/ENGINEER SPT
3 5 = OPNS/COMMUNICATIONS SPT
3 6 = OPNS/ADA SPT
3 7 = OPNS/ARTILLERY SPT
3 8 = OPNS/AVIATION SPT
3 9 = OPNS/AIR SPT
300 = OPNS/INTRA-UNIT
310 = OPNS/CHEMICAL SPT
312 = OPNS/ATC INFO
313 = OPNS/EOD SPT
314 = OPNS/POSITION-LOCATION
316 = OPNS/RACO
317 = OPNS/MISSION SPT
319 = OPNS/DPU SPT
4 1 = INTEL/COORDINATION
4 3 = INTEL/LATERAL
4 4 = INTEL/SENSORS
4 5 = INTEL/SSO
4 7 = INTEL/INTEL REPORTS
4 8 = INTEL/WEATHER
400 = INTEL/INTRA-UNIT
5 1 = LOG/COORDINATION
5 3 = LOG/LATERAL
5 4 = LOG/RATION RESUPPLY
5 5 = LOG/TOE EQUIP RESUPPLY
5 6 = LOG/POL RESUPPLY
5 7 = LOG/AMMO RESUPPLY
5 8 = LOG/REPAIR PARTS RESUPPLY
5 9 = LOG/TRANSPORTATION SPT
500 = LOG/INTRA-UNIT
510 = LOG/DS MAINTENANCE
511 = LOG/GS MAINTENANCE
512 = LOG/BATH
513 = LOG/CLOTHING RESUPPLY
514 = LOG/MED EQUIP RESUPPLY
515 = LOG/PKG POL RESUPPLY
516 = LOG/CHEM EQUIP RESUPPLY
517 = LOG/ENG CNST SUPPLY
518 = LOG/COMSEC SUPPORT
519 = LOG/AIR SUPPLY/RESUPPLY
520 = LOG/NUC AMMO, WEAPONS
521 = LOG/MISSILE MAINTENANCE

INTENSITY

TYPE: Character WIDTH: 1

DESCRIPTION: This data element describes the effect of

INTENSITY (continued)

changes in levels of intensity, with which the originating unit is involved in performing its mission, on the volume of message traffic represented on the needline. An assumption is made that as a unit gets busier, some types of traffic increase, some types decrease, and some types stay about the same. This data element associates each needline with a volume/intensity relationship curve which will allow a user of the data base, when applying needline data to a model, to show the effects of intensity on traffic volume, by varying message frequency, for various message types.

CODE and DESCRIPTION:

D = DECREASING
I = INCREASING
S = STATIC

INTEROPERABILITY

TYPE: Character WIDTH: 1

DESCRIPTION: This data element indicates a requirement, or lack thereof, for the equipment used to satisfy this needline requirement to EVER have the need to interoperate with non-US Army equipment in a NATO environment.

CODE and DESCRIPTION:

A = ALLIED
J = JOINT + ALLIED
N = NO REQUIREMENT
O = OTHER SERVICE
S = OWN SERVICE ONLY

LENGTH (MESSAGE)

TYPE: Numeric WIDTH: 6

DESCRIPTION: This data element describes the length of the message being sent between the originator and receiver. Message lengths are all described in terms of characters. Recognizing some modes of transmission are more aptly described in terms other than characters (eg. voice mode - seconds/minutes) the following conversion factors are used for CDB purposes:

5 characters = 1 word

LENGTH (MESSAGE) (continued)

200 words = 1000 char. = 1/2 page = 1 minute of voice

400 Words = 2000 char. = 1 page = 2 minutes of voice

NOTE: It is not necessary to enter leading zeros (eg. 000555 to represent 555 characters). The software will enter them automatically.

LINE (SRC) (ORIGINATOR/RECEIVER)

TYPE: Character WIDTH: 2

DESCRIPTION: This data element describes the SRC Line, within a paragraph, to which the originator and receiver are assigned in their respective SRC Document.

NOTE: You must enter leading zeros in this field (eg. line "1" must be entered as "01", line "10" is entered as "10", etc.)

MESSAGE CLASSIFICATION

TYPE: Character WIDTH: 1

DESCRIPTION: This data element is intended to represent the highest level of classification expected for the traffic carried on the needline. It refers to the text of the message. It IS NOT used to indicate the existence of a needline which is classified. If you believe you have NEEDLINES that are classified, please contact the Signal Center Point of Contact (POC).

CODE and DESCRIPTION:

U = UNCLASSIFIED
C = CONFIDENTIAL
S = SECRET
T = TOP SECRET
5 = CONFIDENTIAL (SI)
6 = SECRET (SI)
7 = TOP SECRET (SI)
8 = TOP SECRET (SI-TK)

MESSAGE CODE

TYPE: Character WIDTH: 6

DESCRIPTION: This data element describes the message being

MESSAGE CODE (continued)

sent, from the originator to the receiver, on each needline. You can print a comprehensive listing of all CDB Message Codes, their titles and lengths, by using the Print Utility Software Provided with your Verification Package. Messages used in the CDB were provided to the Signal Center by CACDA and represent approved USMTF Messages as well as messages associated with the TACFIRE system. A sample listing:

MESSAGE CODE	MESSAGE TITLE	MIN LENGTH	MAX LENGTH
A023	ENEMY CONTACT REPORT	181	6335
A055	PERSONNEL REPORT	200	1200
S014	FRIENDLY UNIT STATUS	200	1400

MOBILITY (ORG/RCVR)

TYPE: Character WIDTH: 1

This data element describes the mobility conditions, for both the originator and the receiver, during which this needline applies. For example, a needline coded with a mobility code of S for the originator would indicate that the needline only applies when the originator is stationary. Each needline carries a MOBILITY code for both the originator and receiver. MOBILITY codes and their meanings are shown below.

CODE and DESCRIPTION:

A = Mobile in an Aircraft
F = Mobile on Foot
M = Mobile (any manner)
S = Stationary
T = Mobile in a Tracked Vehicle
W = Mobile in a Wheeled Vehicle
Z = All cases

MODE

TYPE: Character WIDTH: 1

DESCRIPTION: This data element describes the desired mode by which the needline should be satisfied. Modes are assigned without considering equipment available to the communicators. For example, if you believe a Company

MODE (continued)

Commander in one of your SRCs would send a Spot Report to his Battalion Commander using a VOICE device, you should insure that such a needline exists (either already created or you create yourself). MODE codes are shown below.

CODE and DESCRIPTION:

V = VOICE
P = PAGE
D = DATA
F = FACSIMILE
C = COURIER

MULTIPLIER (ORIGINATOR/RECEIVER)

TYPE: Numeric WIDTH: 2

DESCRIPTION: This data element describes the number (quantity) of both originators and receivers that are reflected in the SRC Paragraph, and Line in their respective SRC Document.

NOTE: These values are drawn directly from your SRC and cannot be changed.

NEEDLINE SEQUENCE (NDLN SEQ)

TYPE: Numeric WIDTH: 6

DESCRIPTION: This data element provides a unique reference number for each needline. Needline Sequence numbers DO NOT appear in any particular order for any SRC, but they DO provide a unique reference for identifying and referencing each individual needline within the data base. You cannot change Needline Sequence Numbers nor should you try to assign one for a needline you are adding. The Verification Software will automatically assign/de ~te and track Needline Sequence Numbers.

PARAGRAPH (SRC)(ORG/RCVR)

TYPE: Character WIDTH: 2

DESCRIPTION: This data element describes the SRC Paragraph to which the originator and receiver are assigned in their respective SRC Document.

NOTE: You must enter leading zeros in this field (eg. paragraph "1" must be entered as "01", paragraph "10" must

PARAGRAPH (SRC)(ORG/RCVR) (continued)

be entered as "10", etc.).

PERISHABILITY

TYPE: Character WIDTH: 1

DESCRIPTION: This data element describes the amount of time, from the perspective of the originator, that can be allowed to elapse from the time he sends his message until the intended receiver(s) receives it. It is not intended to be a measure of capability, but rather of need, as viewed from the perspective of the originator. PERISHABILITY codes and their associated time-frames are shown below.

CODE and DESCRIPTION:

0 = > 8 HRS
1 = 4-8 HRS
2 = 3-4 HRS
3 = 2-3 HRS
4 = 1-2 HRS
5 = 10-60 MIN
6 = 1-10 MIN
7 = 25-59 SEC
8 = 11-24 SEC
9 = 5-10 SEC
A = 1-4 SEC
B = < 1 SEC

PURPOSE

TYPE: Character WIDTH: 1

DESCRIPTION: This data element describes the purpose for which this needline exists. The PURPOSE Code, together with FUNCTION, acts to describe the reason for the existence of the needline. (Remember - a needline is intended to represent a Mission Essential NEED to communicate; Not necessarily a CAPABILITY)

VALUE	DESCRIPTION
1	COMMAND
2	ADMINISTRATION
3	OPERATIONS
4	INTELLIGENCE
5	LOGISTICS

STANDARD REQUIREMENTS CODE (SRC)

TYPE: Character WIDTH: 9

DESCRIPTION: This data element identifies the SRC of the originator and the SRC of the receiver for each needline. The Verification Software will show you the SRC Number and the SRC Name for both the Originator and Receiver on each needline.

SUBSET RATIO

TYPE: Character WIDTH: 4

DESCRIPTION: This data element describes the number of originators and the number of receivers represented on the needline. That is, how many originators are talking to how many receivers? The first two positions of this field represent the originator, the last two positions represent the receiver. For example, if a needline is intended to represent a message being sent by one Platoon Leader to three Squad Leaders, the SUBSET RATIO would be shown as _1_3.

UNIT RELATIONSHIP CODE (URC)

TYPE: Character WIDTH: 2

DESCRIPTION: This data element describes the relationship between the SRC of the originator and the SRC of the receiver.

CODE and DESCRIPTION:

00 = INTRA (within the same unit)
AA = CO to CO (same BN)
A0 = Lower to Higher in Command Chain
0A = Higher to Lower in Command Chain
BP = Other SVC to Host Nation (Civil)
PB = Host Nation (Civil) to Other SVC
BT = US Army Unit to NATO Military
TB = NATO Military to US Army Unit
C0 = Direct Support to Supported (ADA, ARTY & ENG spt)
0C = Supported to Direct Support (ADA, ARTY & ENG spt)
D0 = General Support to Supported (ADA, ARTY & ENG spt)
0D = Supported to General Support (ADA, ARTY & ENG spt)
F0 = GSR unit to reinforced unit
0F = Reinforced unit to GSR unit
G0 = Area Support to Supported
0G = Supported to Area Support
JK = Theater (Army) Unit to Host Nation (Civil)
KJ = Host Nation to Theater (Civil)

UNIT RELATIONSHIP CODE (URC) (continued)

LL = CO to CO (different BN - same BDE)
LM = Adjacent US DIV/CORPS unit to DIV/CORPS unit
ML = DIV/CORPS unit to Adjacent US DIV/CORPS unit
LP = Host Nation unit to CORPS unit
PL = CORPS unit to Host Nation unit
MN = DIV/CORPS unit to Adjacent Allied DIV/CORPS unit
NM = Adjacent Allied DIV/CORPS unit to DIV/CORPS unit
MP = Corps to Theater
PM = Theater to Corps
NP = Other SVC unit to US Army unit
PN = US Army unit to other SVC unit
PP = Other SVC to Other SVC
RR = CO to CO (diff BN, BDE, - same DIV)
ST = Other SVC to NATO Military
TS = NATO Military to Other SVC
TT = NATO Military to NATO Military
UU = CO to CO (diff BN, BDE, DIV, - same CORPS)
XZ = NATO to Host Nation Civil Govt
ZX = Host Nation Civil Govt to NATO