

MIL-HDBK-188

21 JANUARY 1983

MILITARY HANDBOOK

GUIDE FOR DEVELOPERS AND USERS OF
COMMUNICATIONS SYSTEMS STANDARDS IN
THE MIL-STD-188 SERIES

VOLUME I OF 2 VOLUMES
STANDARDS DEVELOPMENT AND
USE/ORGANIZATIONAL RELATIONSHIPS



NO DELIVERABLE DATA REQUIRED BY THIS DOCUMENT

SLHC TCTS

MIL-HDBK-188
21 January 1983

DEPARTMENT OF DEFENSE
WASHINGTON, D.C. 20360

GUIDE FOR DEVELOPERS AND USERS OF COMMUNICATIONS
SYSTEMS STANDARDS IN THE MIL-STD-188 SERIES

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1. This Military Handbook is approved for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, Defense Communications Agency, ATTN: Code J110, 1860 Wiehle Avenue, Reston, VA 22090, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

1. In the past three decades, MIL-STD-188, a Military Standard covering Military Communication System Technical Standards, has evolved from applicability to all military communications (MIL-STD-188, MIL-STD-188A, and MIL-STD-188B) to applicability to tactical communications only (MIL-STD-188C).
2. In the past two decades, the Defense Communications Agency (DCA) has published DCA circulars promulgating standards and criteria applicable to the Defense Communications System and to the technical support of the National Military Command System (NMCS).
3. Standards for military communications are now published as a MIL-STD-188 series of documents, under the guidance of a Joint Steering Committee (JSC). Military Communications System Technical Standards are subdivided into Common Long Haul/Tactical Standards (MIL-STD-188-100 series), Tactical Standards (MIL-STD-188-200 series) and Long Haul Standards (MIL-STD-188-300 series).
4. Military communications handbooks are published in the MIL-HDBK-400 series, as a rule. An exception, however, is this handbook (MIL-HDBK-188).
5. An OASD(C³I) memorandum of 10 May 1977 (Reference 2.1; see Appendix A) directed that relevant 188 series of military standards will continue to be mandatory for use by the DoD. Further, they are to be of uniformly high quality, clear and concise as to application and, wherever possible, compatible with existing or proposed national, international and Federal telecommunication standards.
6. This document is intended to assist the achievement of the goals in the 10 May 1977 OASD(C³I) memorandum by providing: (a) basic and fundamental information on the objectives, procedures, programs and activities that impact the development and use of the MIL-STD-188 series, and (b) valuable information and guidance to personnel concerned with the development of, or use of, MIL-STD-188 series standardization documents. The handbook is not intended to be referenced in purchase specifications, except for informational purposes, nor shall it supersede any specification requirements.
7. MIL-HDBK-188 consists of two volumes: Volume I - Standards Development and Use/Organizational Relationships, and Volume II - Details Concerning Standardization Organizations.

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1. SCOPE

1.1 Purpose. The prime purpose of this handbook is to provide, in a single document:

a. Guidance and reference sources for standardization policies, programs and organizations, both national and international, which influence standardization documents in the MIL-STD-188 series.

b. Guidance on the methods and procedures for the development and use of MIL-STD-188 series documents.

1.2 Application. This handbook applies to all personnel that are involved in:

a. The development of standards of the MIL-STD-188 series. However, personnel involved in other communications-electronics or ADP activities will find this handbook useful in many cases.

b. The use of the MIL-STD-188 series for whatever reason, such as in the design of telecommunication/teleprocessing equipments and systems.

1.3 Objectives. The primary objective of this handbook is to provide, in a single document, a reference for developers and users of the MIL-STD-188 series, as well as other interested individuals and organizations, so that:

a. Development of standards will be enhanced as a result of a more complete understanding of standardization policies, principles, programs and activities.

b. The use of standards will be enhanced for the same reason.

c. Policy makers, administrators, and others will have access to a better understanding of standardization activities with a resultant enhancement of the DoD standardization program.

1.4 General Instruction. The MIL-STD-188 series primarily covers telecommunications and teleprocessing, but telecommunications/teleprocessing standards are increasingly intimately entwined with information processing (otherwise known as automatic data processing (ADP)) standards. Therefore, development of DoD communications standards sometimes requires close coordination with the DoD standardization area of Information Processing Standards for Computers (IPSC). Accordingly, IPSC and related standardization activities are given considerable deserved attention, along with those for communications standardization.

1.5 MIL-HDBK-188 Organization. MIL-HDBK-188 consists of two volumes: Volume I - Standards Development and Use/Organizational Relationships, and Volume II - Details Concerning Standardization Organizations. MIL-HDBK-188 follows, as closely as possible, the format prescribed in MIL-STD-962 (Ref. 2.2). Accordingly, each Volume contains its scope in Section 1 and referenced

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documents in Section 2. Other sections are described in the following paragraphs.

1.5.1 Volume I of MIL-HDBK-188.

- a. Section 3 contains definitions of terms used in MIL-HDBK-188.
- b. Section 4 provides general information related to DoD standardization and MIL-STD-188 series, as well as related documents.
- c. Section 5 is concerned with detailed requirements concerning factors involved in MIL-STD-188 series document development and use.
- d. Appendices in this handbook include the OASD(C³I) memo concerning the MIL-STD-188 mandatory status, listings of MIL-STD-188 and related standards documents and projects, an appendix on obtaining documents, and a listing of acronyms which are cited in both volumes.

1.5.2 Volume II of MIL-HDBK-188.

- a. Section 4 of Volume II supports Volume I by providing detailed descriptive information, primarily regarding telecommunication, teleprocessing and information processing standardization bodies and documents.
- b. Appendices contain the full text of important memoranda of understanding/agreement and the MIL-STD-188 Joint Steering Committee (JSC) Terms of Reference.

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2. REFERENCED DOCUMENTS

- 2.1 OASD (C³I) Memo: Mandatory Use of Military Standards in the 188 Series, 10 May 1977 (see Appendix A).
- 2.2 MIL-STD-962, Outline of Forms and Instructions for the Preparation of Military Standards and Military Handbooks, 22 September 1975.
- 2.3 NATO Military Standardization Agreements and Allied Publications (U) AAP-4(), published once a year by the NATO Military Agency for Standardization (MAS).
- 2.4 Defense Standardization Manual, DoD 4120.3-M, August 1978 (with Change 3, dated January 1982).
- 2.5 FIPS PUB 11-1, Dictionary for Information Processing, 30 September 1977.
- 2.6 FED-STD-1037, Glossary of Telecommunication Terms.
- 2.7 Program Plan, Standards for Long Haul Communications (Standardization Area: SLHC), 30 June 1982.
- 2.8 Code of Federal Regulations (CFR) 41, Public Contracts and Property Management.
- 2.9 Quadripartite Standing Operating Procedures, February 1976.
- 2.10 Standardization Directory (SD-1), (updated on a quarterly basis).
- 2.11 DoD Directive 4120.3, Defense Standardization and Specification Program, 10 February 1979.
- 2.12 DoD Instruction 4120.19, Department of Defense Parts Control System,
- 2.13 Defense Acquisition Regulation (DAR).
- 2.14 MIL-STD-143, Order of Precedence for the Selection of Specifications and Standards, 12 November 1969 (Revised by Ref. 2.37).
- 2.15 Program Plan for Tactical Communications System Technical Standards (Standardization Area: TCTS), 30 March 1981.
- 2.16 JCS Pub 11, Tactical Communications Planning Guide, 1 April 68, Change 2, 7 March 78.
- 2.17 JCS Pub 1, DoD Dictionary of Military and Associated Terms, 1 June 1979.
- 2.18 JCS Pub 10, Tactical Communications and Control Systems Standards, 11 April 1980.

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2.19 DoD Directive 4120.18, Use of Metric System of Measurement, 28 January 1980.

2.20 MIL-STD-961A, Preparation of Military Specification and Associated Documents, 30 April 1981.

2.21 MIL-STD-490, Specification Practices, 30 October 1968.

2.22 DoD Directive 4630.5, Compatibility and Commonality of Equipment for Tactical Command and Control, and Communications, 28 January 1967 (being revised).

2.23 OASD (I&L) Memorandum of 23 January 1969 on SLHC.

2.24 OASD (I&L) Memorandum of 16 December 1969 on TCTS.

2.25 DCA and USAECOM MOU of 15 June 1970.

2.26 OASD (I&L) Memorandum of 17 December 1965 on IPSC.

2.27 DoD Directive 5000.11, Data Elements and Data Codes Standardization Program, 7 December 1964 (this directive is CONFIDENTIAL).

2.28 DoD Directive 5000.12, Data Elements and Data Codes Standardization Procedures, 27 April 1965 (this directive is CONFIDENTIAL) (Several Change Notices).

2.29 Memorandum of Understanding (MOU) on SLHC, TCTS and IPSC signed by the Director, DCA, Commanding General, USAECOM, and the Director, USAF Data Automation Headquarters.

2.30 FIPS PUB 12-2, Federal Information Processing Standards Index, 1 December 1974.

2.31 Public Law 89-306 (the Brooks Bill).

2.32 Executive Order 11717, 9 May 1973 (38 FR 12315, 11 May 1973).

2.33 Part 6 of Title 15, Code of Federal Regulations, dated 5 December 1973.

2.34 Public Law 96-511, Paperwork Reduction Act of 1980.

2.35 Federal Property and Management Regulation 101-29.

2.36 CCITT Recommendation A.20, Collaboration with other International Organizations Over Data Transmission (Geneva, 1964; revised in 1968 and 1972).

2.37 DoD Instruction 4120.20, Development and Use of Non-Government Specifications and Standards, 28 December 1976.

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- 2.38 Army Regulation AR 27-60, Patents, Inventions, and Copyrights.
- 2.39 Army Regulation AR 310-1, Publication, Blank Forms and Printing Management.
- 2.40 Office of Naval Research Instruction ONRI 5402.1B, Geographical Areas of Responsibility for Providing the Navy Shore Establishment with Advice and Services Relating to Patents, Inventions, Trademarks, Copyrights, Royalty Payments, and Matters Connected Therewith; Assignment of.
- 2.41 Office of Naval Research Instruction, ONRINST 5870.5, Permissions to Use Copyrighted Materials in the Department of the Navy.
- 2.42 Air Force Regulation AFR 110-8, Inventions, Patents, Copyrights and Trademarks.
- 2.43 DoD 5000.19-L, Vol II, Acquisition Management Systems and Data Requirements Control List (AMSDL).
- 2.44 ASTM E380-82 - Metric Practice.
- 2.45 ANSI/IEEE STD 268-1982, Metric Practice.
- 2.46 FED-STD-376, Preferred Metric Units for General Use by the Federal Government, 8 July 1980.
- 2.47 DoD Directive 4120.21, Specifications and Standards Application, 3 November 1980.
- 2.48 USDR&E Memo, Metric Specifications and Standards, 7 March 1980.
- 2.49 DA Pamphlet 310-35, Index of International Standardization Agreements.

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3. DEFINITIONS

3.1 Acquisition Management Systems and Data Requirements Control List (AMSDL). DoD 5000.19-L, Vol II. The AMSDL identifies acquisition management systems/source documents which contain product or non-product data requirements and data item descriptions (DID) available for contractual application.

3.2 Allied Communications Publications (ACP's). Allied Communications Publications are documents that contain communications instructions and are issued for guidance and use of allied forces (Ref. 2.3). NOTE: This is the NATO definition. The MCEB considers ACP's mandatory for use by U.S. Departments and Agencies.

3.3 Area Assignment. A standardization category encompassing a subject not applicable to a single Federal Supply Classification Class or Group (FSC or FSG). Area assignments are made for broad engineering disciplines and practices (Ref. 2.4).

3.4 Assignee. The Military Department or agency delegated responsibility for the development, preparation and implementation of a program analysis and for standardization in an FSC class. (Ref. 2.4).

3.5 Automatic Data Processing (ADP).

(1) (ISO) Data processing largely performed by automatic means.

(2) (ISO) The branch of science and technology concerned with methods and techniques relating to data processing largely performed by automatic means.

(3) Pertaining to data processing equipment such as electrical accounting machines and electronic data processing equipment. (Ref. 2.5).

3.6 Black Box Interface. Originally a colloquial expression, now in common usage, used to designate a signal conversion device that renders interoperable, at the interface, two otherwise uninteroperable circuits by means of appropriate signal conversion techniques that make the interface transparent.

3.7 Commonality. (Ref. 2.6 and see paragraph 4.3.1.3.a).

3.8 Communications. A method or means of conveying information of any kind from one person or place to another, except by direct unassisted conversation or correspondence through nonmilitary postal agencies. (Ref. 2.6).

3.9 Compatibility. (Ref. 2.6 and see paragraph 4.3.1.2.a).

3.10 Custodian. The activity responsible for coordination of standardization projects within its own Department/Agency. (Ref. 2.4).

- 3.11 Data Item Description (DID) (DD Form 1664). A form which specifies the data required to be furnished. The forms specifically define, using the descriptive method, the content, preparation instructions, format and intended use of each data product.
- 3.12 Data Processing. (ISO) The execution of a systematic sequence of operations performed upon data, e.g., handling, merging, sorting, computing. Synonymous with information processing. (Ref. 2.5).
- 3.13 Data Requirement. A requirement that a contractor prepare, maintain or deliver data.
- 3.14 Defense Communications System (DCS). The DCS is a composite of DoD owned and leased telecommunications subsystems and networks comprised of facilities, personnel, and material under the management control and operational direction of the DCA. It provides the long-haul, point-to-point, and switched network telecommunications needed to satisfy the requirements of DoD and certain other Government agencies.
- 3.15 Departmental Standardization Office (DepSO). The assignee and the participating department organizational unit identified for the management of assigned standardization activities (Ref. 2.4).
- 3.16 Department of Defense Index of Specifications and Standards (DoDISS). Part I of the DoDISS is an alphabetical listing and Part II is a numerical listing of Military and Federal specifications and standards, Qualified Products List, Industry Documents, International Standardization Documents, Military Handbooks, Air Force-Navy Aeronautical Standards, Air Force-Navy Aeronautical Design Standards, Other Departmental Documents, Military/AF-Navy Aeronautical Bulletins and U.S. Air Force Specifications Bulletins. Another index related to the DoDISS is the DoD Federal Supply Classification Listing of DoD Standardization Documents.
- 3.17 Department of Defense Single Stock Point (DoDSSP). DoDSSP is the central point for stocking and distributing the Department of Defense Index of Specifications and Standards (DoDISS) and all standardization documents listed therein. It is located at the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.
- 3.18 Design Objective (DO). (See paragraph 4.3.3.b).
- 3.19 Facility Design Handbook. Facility Design Handbooks provide guidance pertaining to installation of communications equipment and facilities. The handbook covers areas such as theory, equipment layout, signal and power cable runs, environmental control, grounding, transmission lines and antennas (Ref. 2.7). See paragraph 3.23 for a general definition of handbook.
- 3.20 Federal Specifications. "Federal Specification" means a Government specification which covers those materials, products, or services used by two or more Federal agencies (at least one of which is a civil agency). Federal

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Specifications are promulgated by GSA and are mandatory for use by all Federal agencies. (Ref. 2.8).

3.21 Federal Standard. "Federal Standard" means a standard promulgated by GSA which is mandatory for use by all Federal agencies, including the Department of Defense (Ref. 2.8; also, see 3.36).

3.22 Federal Supply Classification (FSC) Classes. The commodity classes as established in Cataloging Handbook H2-1, Federal Supply Classification, Part I, Groups and Classes (Ref. 2.4).

3.23 Handbook. A reference document containing standard procedural, technical, engineering or design information and data relating to the material and associated processes, practices and methods covered by the Defense Standardization and Specification Program (DSSP) (Ref. 2.4).

3.24 Interoperability. (Ref. 2.6 and see paragraph 4.3.1.1.a).

3.25 Information Processing. (ISO) Synonym for data processing. (Ref. 2.5).

3.26 Lead Service Activity. The Military Department or Agency delegated responsibility for the development, preparation and implementation of the standardization program in an assigned area. (Ref. 2.4).

3.27 Long-Haul Communications. Communications which permit users to convey information on a worldwide basis. Compared to tactical communications, long-haul communications are generally characterized by higher levels of users (including National Command Authorities), more stringent performance requirements (higher quality circuits), longer distances between users (up to global distances), higher traffic volume and density (larger sizing of switches and trunk cross sections) and fixed or recoverable assets. Normally used in reference to the Defense Communications System. (Ref. 2.6).

3.28 Military Standard. "Military standard" means a standard issued by the Department of Defense used solely or predominantly by military activities. (This definition includes both fully coordinated and limited coordination military standards) (Ref. 2.8; also, see 3.36).

NOTE: All military standards were mandatory before 1972 but most are now considered "approved for DoD use" (the MIL-STD-188 series is among those documents that are mandatory; see paragraph 5.4.2.1).

3.29 Military Specification. "Military specification" means a specification issued by the Department of Defense that is used solely or predominantly by and mandatory on military activities. (This definition includes both fully coordinated and limited coordination military specifications). (Refs. 2.4 and 2.8; also, see 3.34).

3.30 Planning Standards. Electrical performance characteristics established to provide uniform guidance for the design of the evolving and future DCS.

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Performance values for these characteristics may meet the criteria for Communication System Standards, i.e., proved by measured performance, etc., or the criteria for Design Objectives, i.e., best engineering judgment of performance desired. Planning standards are being developed by DCA. (Ref. 2.7).

3.31 Program Analysis. A planning document outlining the goals and time schedule for accomplishing standardization in an FSC (Federal Supply Classification) (Ref. 2.4) (See Program Plan, definition 3.32).

3.32 Program Plan. A planning document outlining the goals and time schedules for accomplishing standardization in an area assignment (Ref. 2.4). Note that prior to the date of issue of reference 2.4 on August 1978, the requirement was for a Program Analysis.

3.33 Quadripartite Standardization Agreement (QSTAG). A QSTAG is an American, British, Canadian and Australian (ABCA) Armies document that records the degree of standardization achieved and to be maintained for any item of equipment, and on operational, logistical, administrative and technical procedures. (Ref. 2.9).

3.34 Specification

a. A document prepared specifically to support procurement which clearly and accurately describes the essential technical requirements for purchased materiel. Procedures necessary to determine that the requirements for the purchased materiel covered by the specification have been met shall also be included. (Ref. 2.4).

b. A "specification" is a document intended for use in procurement. It describes the essential and technical requirements for items, materials, or services, including the procedures for determining that the requirements have been met. Specifications for items and materials also contain preservation, packaging, packing, and marking requirements. (Ref. 2.8). Also, see definitions 3.20 and 3.29.

3.35 STANAG (NATO). A STANAG (Standardization Agreement) is the record of an agreement among several or all of the member nations of NATO to adopt like or similar military equipment, ammunition, supplies and stores, and operational, logistical and administrative procedures. (Ref. 2.3).

3.36 Standard

a. A document that establishes engineering and technical requirements for processes, procedures, practices and methods that have been adopted as a standard. Standards may also establish requirements for selection, application and design criteria for materiel. (Ref. 2.4).

b. "Standards" means documents that establish engineering and technical limitations and applications of items, materials, processes, methods, designs,

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and engineering practices. They include any related criteria deemed essential to achieve the highest practical degree of uniformity in materials or products. Standards may be used in specifications, invitations for bids, proposals, and contracts. The identification of the categories and intended use of such standards are as set forth in FPMR 101-29.301. (Ref. 2.8).

3.37 Standardization. The adoption and use (by consensus or decision) of engineering criteria to achieve the objectives of the DSSP (Ref. 2.4).

3.38 Standardization Directory (SD-1). A document issued quarterly that identifies standardization responsibility assignments by FSC's and areas, and the addresses of the military offices and federal civil agencies participating in the DSSP. (Ref. 2.4).

3.39 System Standard. 1. The minimum required electrical performance characteristics of communication circuits which are based on measured performance of developed circuits under the various operating conditions for which the circuits were designed. 2. Specific characteristics not dictated by electrical performance requirements but necessary in order to permit interoperation. (For example, the values for center frequencies for telegraph channels, test tone, etc.) (Ref. 2.6).

3.40 Tactical Communications. A method or means of conveying information of any kind, especially orders and decisions from one command, person, or place to another within the tactical forces, normally by means of electronic equipment (including communications security equipment) organic to the tactical forces.

NOTE: Excluded from this definition are communications provided to tactical forces by DCS, to nontactical forces by DCS, to tactical forces by nontactical military commands, and to tactical forces by civil organizations. (Ref. 2.6).

3.41 Tactical Communications System. A system configured by various types of fixed-size, self-contained assemblages (such as: radio repeaters and terminis; switching, transmission, and terminal equipments; and interconnect and control facilities) which are organic to the tactical forces and designed to meet the requirements of ever changing tactical situations.

NOTE: The system provides securable voice and data communications among mobile users to facilitate command and control within, and support of, tactical forces. Based on different requirements of the multichannel trunking networks, a distinction is made between (a) tactical systems requiring extremely short facility installation times (on the order of hours) necessitated by relocation requirements that are sometimes frequent, and (b) other tactical telecommunications systems. (Ref. 2.6).

3.42 Tailoring. The process by which the individual requirements (sections, paragraphs, or sentences) of the selected specifications and standards are evaluated to determine the extent to which each requirement is most suitable for a specific material acquisition and the modification of these

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requirements, as necessary, to assure that each tailored document invoked states only the minimum needs of the Government (Ref. 2.4).

3.43 Telecommunication. Any transmission, emission, or reception of signs, signals, writings, images, and sounds or information of any nature by wire, radio, visual, or other electromagnetic systems. (Ref. 2.6).

3.44 Telecommunication System. A system used for telecommunication.

NOTE: A telecommunication system is delimited by a set of functional interface points separating the system from its users. It performs the basic functions of acceptance, transmission, delivery, and disengagement for the users. (DoC). (Ref. 2.6).

3.45 Teleprocessing. The overall function of an information transmission system which combines telecommunications, automatic data processing and man-machine interface equipment and their interaction as an integrated whole. (Ref. 2.6).

3.46 Definitions of Acronyms and Abbreviations Used in this Handbook. The acronyms and abbreviations used in this handbook are explained in Appendix E.

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4. STANDARDIZATION DOCUMENTS AND ORGANIZATIONS, AS RELATED TO THE MIL-STD-188 SERIES STANDARDS

4.1 General. This section covers:

- a. The Defense Standardization and Specification Program (DSSP).
- b. The objectives of standardization.
- c. The standards organizations that impact the MIL-STD-188 series.

4.2 Defense Standardization and Specification Program (DSSP) (Refs. 2.4 and 2.10 and 2.11)

4.2.1 General. The Cataloging and Standardization Act (originally enacted on 1 July 1952, as P.L. 82-436; improved on 10 August 1956, by P.L. 84-1028; and codified as 10 USC, 2451-56 (1976)) requires the achievement of the highest practicable degree in the standardization of items, materials, and engineering practices within the Department of Defense. The legislation is implemented by DoD Directive 4120.3, "Defense Standardization and Specification Program" (Ref. 2.11), by other DoD directives and instructions and by the Defense Standardization Manual (DSM), DoD 4120.3-M (Ref. 2.4). The Secretary of Defense has overall responsibility of the DSSP, the only standardization program in the Department of Defense.

4.2.2 DSSP Organization.

- a. The Defense Materiel Standardization and Specification Board (DMSSB) consists of one representative from OUSDRE, one from ASD(MRA&L), two from each Military Department and one from DLA. Each representative is of General/Flag rank or equivalent civilian grade. The DMSSB serves in an advisory capacity to the OSD on policy and administration matters.
- b. The Under Secretary of Defense for Research and Engineering (USDRE) is responsible for engineering policies and determinations required to achieve program objectives. The DSSP is subdivided into Federal Supply Classification (FSC) Classes and areas (see 3.22 and 3.3). The authority to manage those classes and areas is delegated to the Military Departments/Agencies. Most of the organizations involved in the DSSP are listed in the Standardization Directory (SD-1) (see 3.38; Ref. 2.10).
- c. The Military Department/Defense Agency organizational unit charged with the overall management and administration of standardization responsibilities within the respective department/agency is the Departmental Standardization Office (DepSO).
- d. Assignee/lead service responsibilities for Federal Supply Classification Classes (FSC's)/areas are vested in the DepSO's. These

responsibilities are further delegated to organizations designated as assignee activities/lead service activities, respectively.

e. DepSO's normally delegate to functional level organizations (participating activities) the responsibility to accomplish interdepartmental standardization with the assignee activity/lead service activity of respective FSC's/areas.

4.2.3 DSSP Objectives. The objectives of standardization in the DoD are to:

- a. Improve the operational readiness of the Military Services.
- b. Conserve money, manpower, time, facilities and natural resources.
- c. Optimize the variety of items (including subsystems), processes and practices used in acquisition and logistics support.
- d. Enhance interchangeability, reliability and maintainability of military equipments and supplies.
- e. Ensure that products of requisite quality and minimum essential need are specified and obtained.
- f. Ensure that specifications and standards are written so as to facilitate tailoring of prescribed requirements to the particular need.
- g. Assure that specifications and standards imposed in acquisition programs are tailored to reflect only particular needs consistent with mission requirements.

4.2.4 Policy. The DSSP develops and manages standardization documents for materiel, manufacturing processes, and engineering practices that describe items and services employed in the design, test and evaluation, acquisition, production, maintenance, supply and disposal of materiel acquired by the DoD components. The DSSP policy, as stated in DoD 4120.3-M (Ref. 2.4), requires that:

a. Military operational requirements for materiel shall be satisfied to the maximum practical extent through the use of previously adopted designs or existing commercial products. In the acquisition cycle, existing items and engineering practices and documents prepared under the DSSP shall be used:

(1) In the program initiation phase (exploratory and advanced development) only to the extent that they satisfy the program needs when their use will not compromise the program objectives. The use of such documentation shall not be imposed to the extent that engineering initiative would be thwarted with respect to full utilization of new technologies (e.g., computerization) or that necessary performance or cost parameters of the equipment or system would be degraded.

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(2) In the Engineering Development (ED) phase and in Production/Deployment, wherever cost effective. During the ED phase, a parts control program shall be employed where applicable in accordance with DoD Instruction 4120.19 (Department of Defense Parts Control System) (Ref. 2.12) to reduce the costs associated with item proliferation.

b. Specifications shall be used for acquisition purposes in accordance with the Defense Acquisition Regulation (DAR) (Ref. 2.13). In addition, subsidiary documents which may be needed to provide details of design, performance or use of particular parts, materials or processes will be selected in accordance with the order of precedence established by appropriate Military Standards, e.g., MIL-STD-143 (Ref. 2.14; see paragraph 5.4.1 for a discussion).

c. Item reduction effort shall be planned and implemented, supplementing the effort expended in preventing new unneeded items from entering the supply systems, commensurate with the operational needs of the DoD to limit the number of different items in supply.

4.2.5 DSSP Planning. Each lead service activity is required to prepare a Program Plan for each standardization area assignment. The lead service activity coordinates the Program Plan with interested activities listed in the SD-1 (Ref. 2.14). The Program Plan will outline the standardization actions to be taken in response to the Annual Standardization Program Guidance issued by the Defense Materiel Specifications and Standards Office (DMSSO), under the USDR&E (Acquisition Policy). The Program Plan is intended to reflect the technical basis used in developing or updating that portion of the Five-Year Defense Standardization and Specification Program (FYDSSP) pertinent to the standardization area. In addition, the Program Plan will provide a basis for the DMSSO and other management levels to evaluate the adequacy of the DSSP in a given area. The Program Plan will assist in setting objectives, evaluating problems, establishing panels, task groups, determining priorities, monitoring progress, and evaluating the allocation of resources. A detailed analysis will be completed for the forthcoming 2 years, and projections made for 3 additional years. The Program Plan is not to be considered fixed, inflexible, or restrictive with regard to new ideas, approaches, or techniques in the attainment of the DSSP objectives.

4.3 Communications Standardization Objectives (Refs. 2.7 and 2.15). The primary objective of communications system standards is to establish those technical parameters necessary to ensure interoperability and to provide compatibility among communications equipment, subsystems and systems. An additional objective is to provide a degree of system performance acceptable to the majority of users of a communications system and to achieve the necessary degree of interoperation, compatibility, quality, reliability, maintainability and performance in the most economical way. The interoperation of electronic equipment, assemblages, networks, subsystems, and systems can be achieved in three distinct steps; i.e., interoperability, compatibility, and commonality.

4.3.1 Achieving Interoperability, Compatibility and Commonality

4.3.1.1 Interoperability

a. Definition of Interoperability: The condition achieved among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged directly between them or their users, or both. The degree of interoperability should be defined when referring to specific cases. (FED-STD-1037; Ref. 2.6).

NOTE 1: Interface devices may be placed between equipments or systems in order to achieve a certain degree of interoperability.

NOTE 2: In order to clarify the degrees of interoperability, JCS PUB 11 (Ref. 2.16) has been changed to define the following classes of interoperability.

Class 1 (C1): Direct interface with no conversion requirements.

Class 2 (C2): Direct interface with a black box. A subcategory is Class (2BB), which is Class 2 with return to baseband.

Class 3 (C3): Indirect or manual interface (torn tape, liaison officer, etc.).

b. Discussion of the Term Interoperability. This definition, except for a minor wording difference, is the same as that of JCS PUB 1 (Ref. 2.17), Appendix A to JCS PUB 11 (Ref. 2.16) and the NATO C-E Board definition. From the standpoint of the equipment designer, the equipment is interoperable when information can be interchanged. From the viewpoint of the user or data processor, interoperability exists only when the alphabet, language, and format allow the same interpretation of a message by both the sender and the receiver. This demands a certain understanding, at times, between sender and receiver. Consequently, care must be exercised when discussing interoperability as to whether system/equipment or user-to-user interoperability, is referred to. User-to-user interoperability, of necessity, includes equipment interoperability. When system/equipment standards are developed, the fact that user-to-user interoperability is required must be borne in mind. For this reason, the technical/electrical systems and equipment standards may refer to or include standards for alphabets and formats. JCS PUB 10 (Ref. 2.18) contains bit-oriented language, alphabet and format standards for tactical air operations and tactical air defense operations.

4.3.1.2 Compatibility

a. Definitions of Compatibility: 1. Systems for command and control, and communications are compatible with one another when necessary

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information can be exchanged at appropriate levels of command directly and in usable form. Communications equipments are compatible with one another if signals can be exchanged between them without the addition of buffering, translatives, or similar devices for the specific purpose of achieving workable interface connections and if the equipments or systems being interconnected possess comparable performance characteristics, including suppression of undesired radiation. 2. Capability of two or more items or components of equipment or material to exist or function without mutual interference. (FED-STD-1037; Ref. 2.6).

b. Discussion of the Term Compatibility. The FED-STD-1037 definition of compatibility is very much the same as that in JCS PUB 1 (Ref. 2.17) and Appendix A to JCS PUB 11 (Ref. 2.16). The first sentence of the definition can be interpreted to refer to systems interoperability. Furthermore, the statement "exchange of information can be made between appropriate levels of command in usable form" seems to imply that user-to-user (appropriate levels of command) interoperability is a potential capability. Note the expression "in useable form". However, this interpretation is not universal because the statement only ensures system/equipment interoperability. User-to-user interoperability is obtained only by the proper use (including any necessary prearrangement) of language, alphabet, and format. Nevertheless, the use of the word "can" (meaning capable of) implies that system interoperability bestows on a system the first requirement for compatibility. All that is necessary is the potential capability for user-to-user interoperability. This is bestowed on the system by the use by the operator, or user, of proper language, alphabet and format which the compatible system is designed to handle.

4.3.1.3 Commonality

a. Definition of Commonality: A term applied to equipment or systems which have the quality of one entity possessing like and interchangeable parts with another equipment or system entity.

NOTE: Equipment and systems have commonality when each can be operated and maintained by personnel trained on the others without additional specialized training; repair parts (components or subassemblies) are interchangeable; and consumable items are interchangeable between them. (FED-STD-1037; Ref. 2.6).

b. Discussion of the Term Commonality. The ultimate step of system standardization is achieved with commonality among all equipments and subsystems belonging to one type or category. However, commonality is seldom achieved, particularly in NATO, due to national interests. Achieving commonality is desirable, particularly for tactical military operations, but the absence of commonality is not as vital as the absence of interoperability or compatibility. NOTE: MIL-STD-188 series standards are primarily concerned with interoperability and compatibility based upon electrical performance criteria.

4.3.2 Satisfying Requirements. Standards are used for deriving specifications in direct support of procurement, supporting engineering design and development, eliminating interface problems prior to deployment of equipment, and avoiding costly changes and modifications during production or fielding of equipments and systems requirements.

4.3.3 Guiding Research and Development (R&D)

a. Advances in Technology. It is not intended that standards inhibit advances in communication technology. Such advances are encouraged by including design objectives (DO's), in the standard. These DO's are to be achieved if the state-of-the-art, costs, etc., permit.

b. Definition of Design Objective: A desired electrical (or mechanical) performance characteristic for communication circuits and equipment which is based on engineering judgment but, for a number of reasons, is not considered feasible to establish as a system standard at the time this standard is written. NOTE: Examples of reasons for designating a performance characteristic as a DO rather than as a standard are: (a) It may be bordering on an advancement in the state-of-the-art; (b) The requirement may not have been fully confirmed by measurement or experience with operating circuits; (c) It may not have been demonstrated that it can be met, considering other constraints such as cost and size. A DO shall be considered as guidance for DoD agencies in preparation of specifications for development or procurement of new equipment or systems which shall be used if technically and economically practicable at the time such specifications are written. (FED-STD-1037; Ref. 2.6).

c. Both design objectives and standards assist researchers by indicating what is required, if at all feasible, to provide future systems and equipment with a suitable degree of interoperability, compatibility and commonality with existing equipment that must, for a time, coexist with the new equipment.

4.3.4 Providing Common Measurement Techniques. Military standards in the 188 series provide for common measurement techniques, where applicable. This prevents proliferation of test equipments, provides a common understanding of tests and measurements, results in a minimum necessity of conversion to and from several types of units, and makes available to the uninitiated the applicable technique to use. DoD Directive 4120.18 (Ref. 2.19) specifies that all future measurements use the metric system. Thus, in the future, the values of all parameters will be stated in metric units and measurements made in metric units. (See 5.4.7 for a discussion regarding metrication in the DoD).

4.3.5 Deriving Procurement and Performance Specifications.

a. A primary use of all standards of the 188 series is in providing a basis for procurement specifications. Unless used in this way, most of the standards objectives are nullified, including the attainment of suitable

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performance. (See 3.34 and 3.36 for the difference between a specification and a standard).

b. Many of the parameters of 188 standards are provided to assure satisfactory performance when used in performance specifications. Often specifications for both procurement and performance are incorporated in one document.

NOTE: This handbook concentrates on the development and use of military standards in the 188 series. Nevertheless, there may be a requirement for standardization personnel to develop specifications. Documents providing guidance for writing specifications are:

(1) MIL-STD-961 (Ref. 2.20) contains instructions for the preparation of specifications, amendments, supplements, specification sheets and notices (changes).

(2) MIL-STD-490 (Ref. 2.21) sets forth practices for the preparation, interpretation, change and revision of program-peculiar DoD specifications. Specifications prepared in accordance with MIL-STD-490, when subjected to all pertinent conversion requirements of DoD 4120.3-M (Ref. 2.4) and MIL-STD-961, and assigned federal or military specification numbers, will be in full compliance with requirements for federal and military specifications, as addressed in the Defense Acquisition Regulatory System (DARS).

4.3.6 Preventing Equipment Proliferation. Standards, when used correctly, prevent proliferation of many different types of equipment serving the same or similar functions by specifying all applicable parameters and their values. DoD Directive 4630.5 (Ref. 2.22) requires that the variety of equipment for tactical communications shall be the minimum necessary to effectively support the missions of the tactical forces. These requirements can be logically extrapolated to include long haul communications.

4.3.7 Simplifying Training, Operations, Maintenance and Logistics. Standards reduce equipment proliferation (see 4.3.6) and thereby simplify training, operations, maintenance and logistics. Training manuals, operations manuals, and maintenance manuals are reduced in number. The size of catalogs is reduced and warehousing activities are simplified.

4.3.8 Allowing for Advances and Progress in Technology. Standards not only guide R&D (see 4.3.3), but must also allow for advances and progress in technology through R&D, or other means, by not being too restrictive or inflexible. This is often difficult to accomplish; in fact, there is sometimes a conflict existing between that which is current and that which is anticipated or desired. However, it is an objective of standards to attempt to resolve such conflicts.

4.4 Communications Standardization Area Assignments. Two area assignments for DoD communications standards were made in 1969 by the Office of the

Assistant Secretary of Defense. One assignment covered long-haul communications and the other, tactical communications.

4.4.1 Standardization Area for Long Haul Communications (SLHC). The SLHC area was established and assigned to the Defense Communications Agency (DCA) by OASD(I&L) Memorandum of 23 January 1969 (Ref. 2.23). DCA was directed to carry out its responsibilities in accordance with the Defense Standardization Manual 4120.3-M (Ref. 2.4) under the standardization area SLHC. The area scope covers standards for long haul and point to point communications for the Defense Communications System (DCS) and the National Military Command System (NMCS), and also to provide the necessary interface with non-DCS equipments.

4.4.2 Standardization Area for Tactical Communications (TCTS). The TCTS area was established and assigned to the Department of the Army by an OASD(I&L) Memorandum of 16 December 1969 (Ref. 2.24). The Army was directed to carry out its responsibilities in accordance with the Defense Standardization Manual 4120.3-M under the standardization area TCTS. The U.S. Army Electronics Command (USAECON) (now U.S. Army Communications-Electronics Command (USACECOM)) has been designated the Area Assignee Activity (now called Lead Service Activity). The scope is to establish engineering criteria for tactical communications systems; to provide a baseline of standards for achieving the objectives of DoD Directive 4630.5 (Ref. 2.22), Compatibility and Commonality of Equipment for Tactical Command, Control and Communications; and to assure the necessary interface with Defense Communications System (DCS) equipments. (Note that the DCA area SLHC is to provide the necessary interface with non-DCS equipments).

4.4.3 Common Long Haul/Tactical Communications Systems Standards. An important aspect in the assignment of SLHC and TCTS areas is the development of standards common to both areas. For this purpose, a Memorandum of Understanding (15 June 1970) between DCA and USAECON was signed by the Director, DCA, and Commanding General, USAECON (Ref. 2.25; see Appendix A of Volume II). Further, a Joint Steering Committee (JSC), co-chaired by DCA and USAECON, was established with the objective to guide the scope of work for the preparation and development of common long haul/tactical standards to be published as MIL-STD-188-100 series of documents. JSC participants include Army, Navy, Marine Corps, Air Force, DCA, NSA, TRI-TAC, JCS and NCS representatives. (See Appendix B of Volume II for the JSC Terms of Reference).

4.4.4 MIL-STD-188 Series Standards (Refs. 2.7 and 2.15). The MIL-STD-188 series standards contain technical standards and design objectives for the long haul and tactical communications systems and the technical support of the National Military Command System (NMCS). All standards of this series are mandatory (Ref. 2.1; see Appendix A and paragraph 5.4.2.1).

4.5 Standardization Efforts Impacting the MIL-STD-188 Series. There are many standardization efforts that are related to and impact the SLHC/TCTS areas. The major ones are depicted in Figure 1 and discussed in the following paragraphs. A more complete listing of related standardization activities is shown in Figure 2; information on the activities shown in Figure 2, other than the SLHC and TCTS activities, can be found in Volume II of this handbook.

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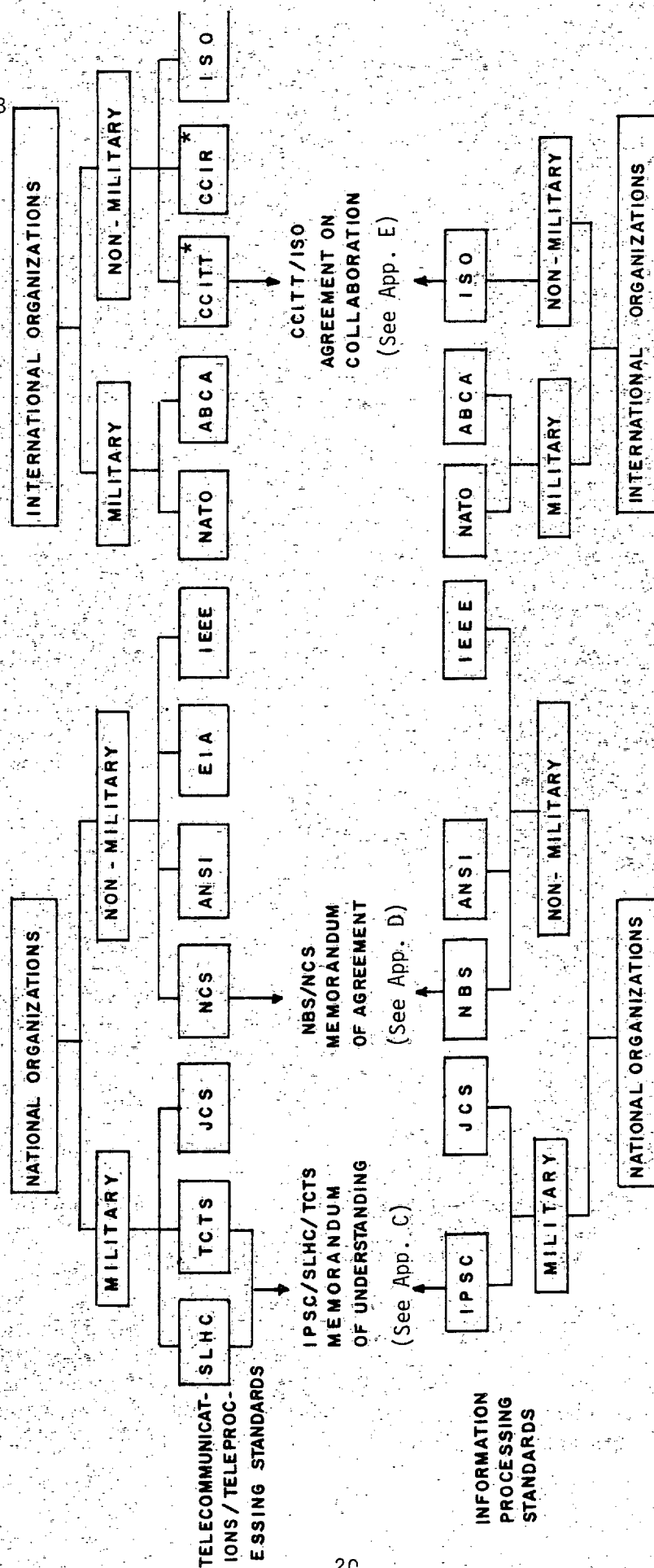
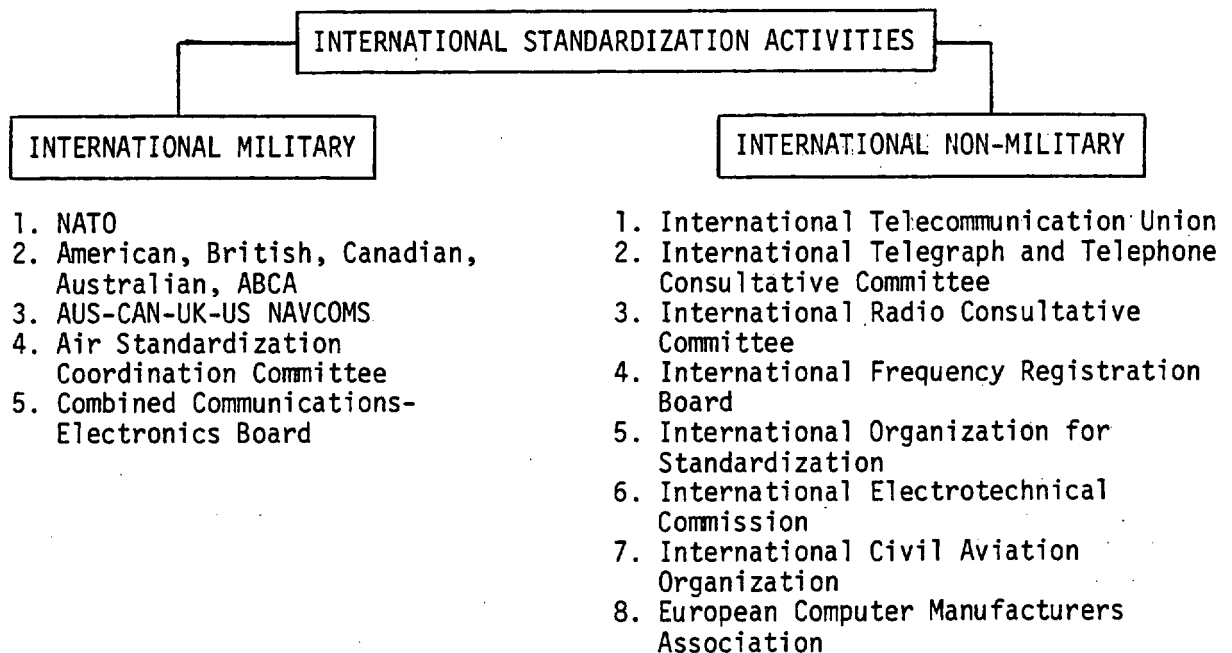
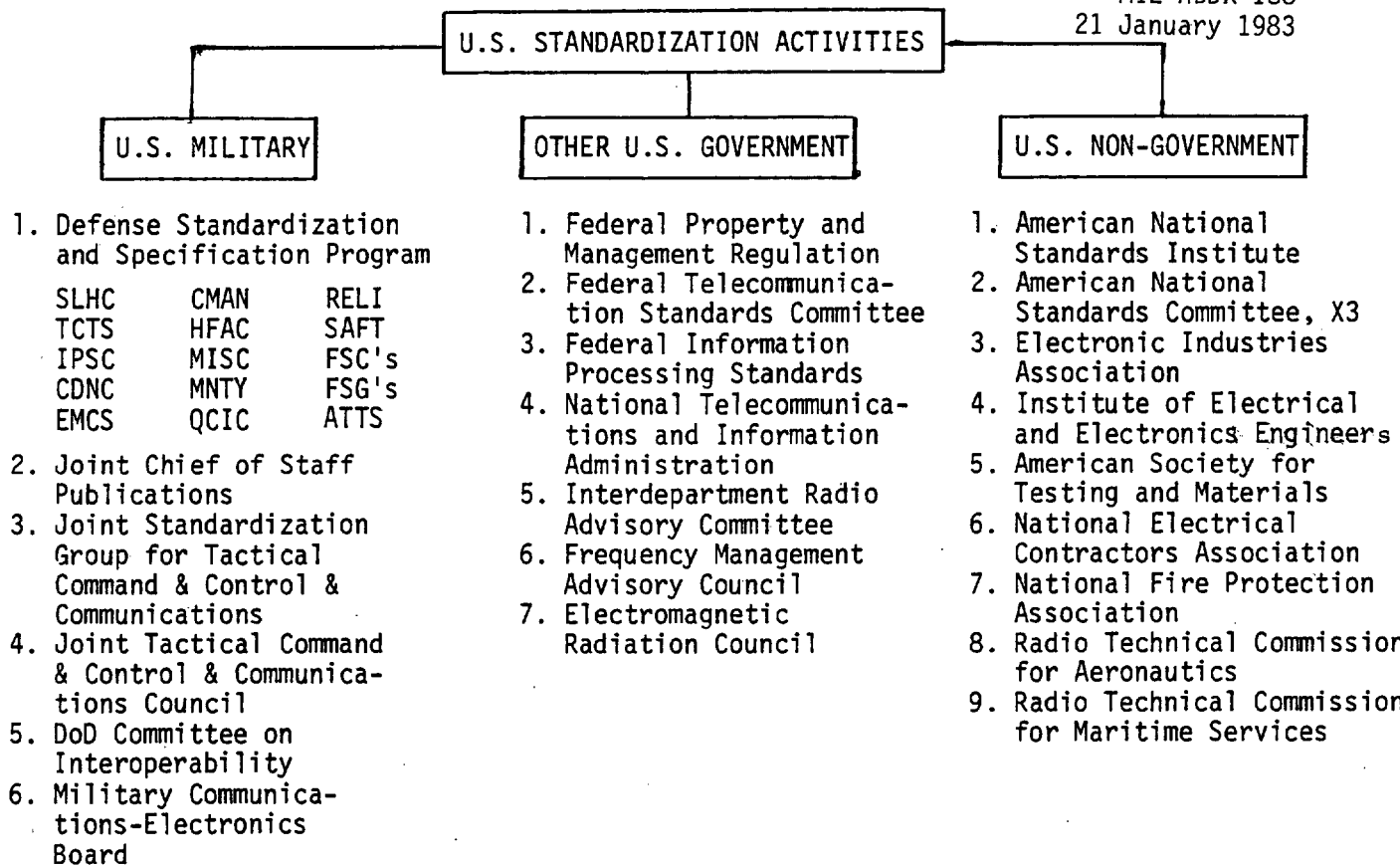


FIGURE 1 PRINCIPAL TELECOMMUNICATION AND INFORMATION PROCESSING STANDARDIZATION ORGANIZATIONS

*These organizations, part of the International Telecommunication Union (ITU), are under the United Nations but have complete independence in their decisions.

FIGURE 2. STANDARDIZATION ACTIVITIES

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4.5.1 National Military Standardization Activities.

4.5.1.1 Standardization Area for Information Processing Standards for Computers (IPSC). The IPSC area was established and assigned to the Department of the Air Force by an OASD(I&L) Memorandum of 17 December 1965 (Ref. 2.26). The Directorate of Data Automation, Headquarters (AF/ACDX) has been designated the IPSC Area Lead Service Activity.

4.5.1.1.1 Scope. The IPSC scope includes the standardization of:

- Terminology
- Programming Language
- Input and Output Media and Format
- Character Recognition
- Methods of Problem Description
- Communications Characteristics
- Character Codes

The IPSC scope does not include data elements and codes, as covered by DoD Directive 5000.11 and DoD Instruction 5000.12 (Refs. 2.27 and 2.28).

4.5.1.1.2 Objectives. The general objective of the IPSC program is to develop standards which will provide maximum compatibility among Defense Information Processing Systems in the acquisition, use and interchange of equipment, information, programs and personnel by providing independence from a particular manufacturer or make of hardware, software, and supporting components. This objective additionally recognizes the basic constraints of cost and potential effectiveness which must be considered before DoD standards are approved and promulgated.

4.5.1.1.3 IPSC Standards. The standards generated under this area assignment are military standards in the 1300 to 1700 series. DoD Manual 7935.1-S, Automated Data Systems Documentation Standards, dated September 1977, has also been published but plans are to make it a Military Standard when revised. These standards are non-mandatory, being approved for use.

4.5.1.2 IPSC/SLHC/TCTS Memorandum of Understanding. From the foregoing, it is seen that the Air Force Directorate of Data Automation is the Lead Service Activity for the area of Information Processing Standards for Computers (IPSC) and, as such, is responsible for those standards activities exclusive to ADP. On the other hand, DCA is the Lead Service for the area of long haul communications standards (SLHC) and the U.S. Army is the Lead Service for the area of tactical communications standards (TCTS) and, as such, the two share the responsibility for those standards activities exclusive to DoD communications. DCA and USACECOM, by a memorandum of understanding of 15 June 1970 (Ref. 2.25), use a Joint Steering Committee to administer and oversee the development of those standards which are exclusively its responsibility. Those standards that are the mutual responsibility of the ADP and communications communities are coordinated among the IPSC, SLHC and TCTS Lead

Service Activities pursuant to a Memorandum of Understanding signed by the Director, DCA, Commanding General, USAECOM, and the Director, USAF Data Automation Headquarters (Ref. 2.29; see Appendix C of Volume II).

4.5.1.3 Office of the Joint Chiefs of Staff (JCS). In order to satisfy command, control and communications requirements, the JCS publishes several standards and guides. The JCS publications of greatest interest to SLHC and TCTS areas are described in the following paragraphs.

4.5.1.3.1 JCS Pub 1, Dictionary of Military and Associated Terms (Ref. 2.17). This publication contains some communications-electronics terms. Telecommunications terms and definitions have been extracted and published in FED-STD-1037 (Ref. 2.6). The use of JCS Pub 1 is optional, but recommended.

4.5.1.3.2 JCS Pub 10, Tactical Communications and Control System Standards (Ref. 2.18). Message and format standards for tactical digital information links (TADILs) are contained in JCS Pub 10. The use of JCS Pub 10 is mandatory. Subsystem design and engineering standards applicable to the TADILs are contained in the MIL-STD-188-203 series.

4.5.1.3.3 JCS Pub 11, Tactical Communications Planning Guide (Ref. 2.16). JCS Pub 11 is not a standard, but it is a guide for the benefit of planners and designers. It lists currently used equipments. Its primary purpose is to assure interoperability. Its use is non-mandatory.

4.5.1.4 Military Communications-Electronics Board (MCEB).

a. The MCEB, acting for the JCS, has direct cognizance over Allied Communications Publications (ACP's), general and U.S. supplements thereto, and Joint Army Navy Air Force Procedures (JANAP's). All of these documents are listed in JANAP 201. The ACP's, in a sense, are standards.

b. The MCEB does not generate or publish any standards other than the ACP's. However, the MCEB does resolve and comment upon many individual standardization problems on a joint and combined basis. In these actions, the MCEB can impact the MIL-STD-188 series. The MCEB responsibility for subscribing to (ratifying) NATO STANAGs for the U.S. is an important example. Also, the MCEB generates policy decisions.

c. The MCEB considers its policy decisions as mandatory. The ACP's are promulgated by JCS direction and are mandatory.

4.5.1.5 DoD Committee on Interoperability for Telecommunications. Reports by the DoD Committee on Interoperability are not standards but are promulgated recommendations and guidance on interoperability factors for use by planners and designers, etc. The reports are not considered mandatory but deserve and should be given careful consideration. Appropriate parameters contained in the reports are used as a basis in the development of MIL-STD-188 documents.

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4.5.1.6 Planning Standards for the DCS (Ref. 2.7)

a. At the present time, a family of standards identified as Planning Standards and published in a separate MIL-STD series, viz MIL-STD-187-XXX are being developed for application only to the DCS. These standards are being developed to influence the MIL-STD-188-100 and 300 series. Planning standards are essentially an expansion of the standardization effort to include the development of "future" standards or planning standards which will provide uniform guidance for the design of the evolving and future DCS. Planning standards are to be developed at an earlier date and be forerunners of conventional standards. Planning standards will be based largely on the system analysis, system engineering and planning for the DCS; consequently, they provide more comprehensive and integrated DCS design guidance.

b. Planning standards are distinct from traditional standards, except with respect to Design Objectives (DO's), in that they will contain characteristics which apply to the evolving and future DCS. The characteristics may meet the same criteria as traditional standards, i.e., proven by measured performance, etc., or they may be based on the best technical judgment of what is needed for the future. Those characteristics/parameters for which it is considered premature to specify performance values will still be included in the planning standard, but without any performance values assigned. This will serve to highlight areas where further engineering effort is required and also to inhibit unilateral design decisions by one engineering group. As coordinated design decisions are made, based on engineering studies or RDT&E, the information will be documented in the planning standard by change notice or revision.

c. Also, establishing a reference source of design guidance will minimize unilateral design decisions by one project engineering group, pinpoint areas where design decisions are needed, facilitate the comparison and evaluation of design criteria in regard to tradeoffs and impact on other subsystems and overall system performance, and provide wider exposure of design decisions for the information of all DoD activities.

d. Planning standards are non-mandatory (approved for use).

4.5.2 National Non-Military Standardization Activities.

4.5.2.1 National Bureau of Standards (NBS) (Ref. 2.30)

a. The National Bureau of Standards publishes Federal Information Processing Standards (FIPS) which often adopt standards developed by the American National Standards Institute.

b. The Federal Information Processing Standards Publications (FIPS PUB) Series is the official publication medium within the Federal Government for information relating to standards which are adopted and promulgated under the provisions of (1) Public Law 89-306, "The Brooks Bill", (Ref. 2.31), an act to provide for the economic and efficient purchase, lease, maintenance,

operation, and utilization of automatic data processing equipment in Federal departments and agencies, (2) Executive Order 11717 (Ref. 2.32) which transferred to the Secretary of Commerce all functions being performed by the Office of Management and Budget relating to the establishment of government-wide automatic data processing standards, (3) Part 6 of Title 15 Code of Federal Regulations dated December 5, 1973 (Ref. 2.33), which transfers to the Department of Commerce the leadership of the executive branch program for standardizing data elements and representations, and (4) Public Law 96-511 (Ref. 2.34).

c. The FIPS series are divided into four major categories - hardware, software, applications, and data. In most cases, the technical specifications of the standards are affixed to the FIPS PUBS; if not, sources where these are available are cited. There are two types of Federal Information Processing Standards Publications (FIPS PUBS), namely standards and guidance publications. One can distinguish one from the other by the title. The standards are mandatory for use by all Federal Agencies, including the Department of Defense, pursuant to paragraph 101-29.301-1 of the Federal Property and Management Regulations (Ref. 2.35). All others are for guidance only and use is optional. A listing of FIPS PUBS is presented in Annex 1 of Appendix C.

4.5.2.2 National Communications System (NCS). The Federal Telecommunication Standards Committee (FTSC) of the National Communications System (NCS) generates Federal Telecommunication Standards (FED-STDs), published by the General Services Administration (GSA). The FED-STDs are mandatory for use by all Federal Agencies, including the Department of Defense, pursuant to the Federal Property and Management Regulations. A listing of FED-STD documents and projects is presented in Annex 2 of Appendix C.

4.5.2.3 NBS/NCS Memorandum of Understanding. In the U.S. Government, the National Bureau of Standards (NBS) is responsible for Federal Information Processing Standards (FIPS) (see 4.5.2.1) and the National Communications System (NCS), is responsible for Federal Telecommunication Standards (FED-STDs) (see 4.5.2.2). The NBS and NCS have developed an agreement on their mutual responsibilities and those exclusive to each organization. Appendix D of Volume II, extracted from reference 2.30, lists these responsibilities.

4.5.2.4 General Services Administration (GSA). The General Services Administration Automated Data and Telecommunications Service, as part of its continuing responsibilities under the Brooks Act (Ref. 2.31), semi-annually publishes the "ADP and Telecommunication Standards Index". This publication is intended to be an aid in the use of ADP and telecommunication standards in the procurement, utilization and reutilization of equipment, products and services. The index provides listings and information concerning standards applicability in procurements, published standards, standards being developed and cross-references of Federal and American National Standards.

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4.5.2.5 American National Standards Institute (ANSI).

a. ANSI generates standards on many subjects, but those that may impact the MIL-STD-188 series are primarily those of the ANSI Committee X3, Information Systems, sponsored by the Computer and Business Equipment Manufacturers Association:

b. ANSI publishes a "Catalog of American National Standards". Brief descriptions of all X3 standards are also published in an ANSI document titled, "American National Standards Cover the Wide World of Information Processing". All ANSI standards are voluntary (optional) standards, unless specifically adopted as mandatory by DoD or cited as a requirement in the MIL-STD-188 series or mandatory Federal standards. A listing of ANSI standards is presented in Annex 3 of Appendix C.

4.5.2.6 Electronics Industries Association (EIA). The EIA publishes a "Catalog of EIA and JEDEC Standards and Engineering Publications". EIA standards are voluntary (optional) standards, unless specifically adopted as mandatory by DoD or cited as requirements in a MIL-STD-188 or mandatory Federal standard. A listing of EIA standards is presented in Annex 4 of Appendix C.

4.5.2.7 Institute of Electrical and Electronics Engineers (IEEE). IEEE publishes a "Catalog of IEEE Standards". IEEE Standards are voluntary (optional) standards, unless specifically adopted as mandatory by DoD or cited as requirements in a MIL-STD-188 or mandatory Federal standard. A listing of communications-related IEEE standards is presented in Annex 5 of Appendix C.

4.5.3 International Military Standardization Activities.

4.5.3.1 North Atlantic Treaty Organization (NATO).

a. NATO publishes the following standard agreements and publications:

(1) Standard Agreements (STANAGs). STANAGs are listed in reference 2.3, NATO Military Standardization Agreements and Allied Publications AAP-4 (). Only the Communications-Electronics (C-E) STANAGs have any substantial impact on the MIL-STD-188 series. The C-E STANAGs are in the 5000 series in AAP-4. An updated list of STANAGs is provided quarterly by the NATO Military Communications Electronics Working Group (MCEWG) and the NATO Military Command, Control and Information Systems Working Group (MCCISWG).

(2) NATO Supplements to Allied Communication Publications (ACP's). These are listed in JANAP-201, Status of Non-Cryptographic JANAP's and ACP's.

b. NATO STANAGs ratified* by the U.S. and without any U.S. reservations thereto are mandatory for use by the U.S. The NATO Supplements to the ACP's are not mandatory for use by the U.S. However, the basic ACP's or U.S. supplements thereto are mandatory for use by the U.S. (see MCEB standards in paragraph 4.5.1.4). NATO publication AAP-4 (), reference 2.3, on the other hand, defines ACP's as issued for guidance and use of allied forces.

4.5.3.2 American, British, Canadian and Australian (ABCA) Armies. ABCA Armies generate standards in the form of Quadripartite Standardization Agreements (QSTAGs). These agreements are recorded on the Quadripartite Standardization Agreements List (QSAL) on a continuing basis. QSTAGs are mandatory when approved by the U.S.

4.5.4 International Non-Military Standardization Activities.

4.5.4.1 International Telegraph and Telephone Consultative Committee (CCITT). As part of the International Telecommunication Union (ITU), the CCITT develops internationally recognized recommendations for obtaining telecommunications interoperability. Probably the most frequently used CCITT documents are the multi-volume Yellow Book, VII Plenary Assembly, Geneva, 1980. These recommendations, updated and published every four years with a different cover color, are optional. (See Annex 6 of Appendix C for a listing of the types of CCITT recommendations).

4.5.4.2 International Radio Consultative Committee (CCIR). As part of the International Telecommunication Union (ITU), the CCIR develops internationally recognized recommendations dealing with radio communications. Probably the most frequently used CCIR documents are the multi-volume XII Plenary Assembly, New Delhi, 1970, XIII Plenary Assembly, Geneva, 1974, and XIV Plenary Assembly, Kyoto, 1978. These recommendations are optional. (See Annex 7 of Appendix C for a listing of the types of CCIR recommendations).

4.5.4.3 International Organization for Standardization (ISO). The ISO has produced a large number of information processing standards which are listed in their "ISO Catalog". Many ISO standards have counterpart standards published by ANSI. ISO standards are optional.

4.5.4.4 International Electrotechnical Commission (IEC). The IEC, the electrical arm of the ISO, has produced a large number of standards for communications and ADP equipment, as listed in their IEC catalog. These standards are optional.

4.5.4.5 Agreement on Collaboration Between International Organizations. The International Telecommunication Union (ITU), an organ of the United Nations, is concerned with communications standards. The International Organization

* The term ratify is applied by NATO, but the U.S. MCEB uses the term "subscribe" because only the Congress ratifies foreign documents.

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for Standardization (ISO), is concerned with ADP standards. The International Electrotechnical Commission is concerned with communications and ADP equipment standards. It was recognized that each organization had areas of exclusive responsibilities for data communication standardization, while there were also areas of mutual responsibilities. Therefore, the organizations made an agreement defining these areas of exclusive and mutual responsibilities (Ref. 2.36; see Appendix E of Volume II for the agreement).

5. DEVELOPMENT AND USE OF MIL-STD-188 SERIES DOCUMENTS

5.1 General. This section covers information that should be considered in the development and use of standards in the MIL-STD-188 series, to wit:

a. Paragraph 5.2 describes the characteristics of military standards in the 188 series.

b. Paragraph 5.3 provides guidance for developing MIL-STD-188 series standardization documents.

c. Paragraph 5.4 provides guidance for the utilization of MIL-STD-188 series standardization documents.

5.2 MIL-STD-188 Series Characteristics.

5.2.1 Sectionalization of Standards. While the ideal long range goal of the MIL-STD-188 series is a single document (comprised of several volumes) containing standards common to both long haul and tactical communications, subdivision of this standard was found to be necessary.

On June 15, 1970, a Memorandum of Understanding (MOU) (Ref. 2.25) between the Assignees for Long Haul and Tactical Military Communication System Technical Standards directed that future standards for all military communications will be published as part of a MIL-STD-188 series of documents.

Military Communication System Technical Standards are subdivided into Common Standards (MIL-STD-188-100 series), Tactical Standards (MIL-STD-188-200 series) and Long Haul Standards (MIL-STD-188-300 series). There are also Facility Design Handbooks (see 3.16) which are described in 5.2.2. (A list of MIL-STD-188 series documents is presented in Appendix B).

5.2.1.1 MIL-STD-188-100 series (DoD area SLHC/TCTS). This series contains technical standards and design objectives which are common to both the long haul and tactical communications systems.

5.2.1.2 MIL-STD-188-200 (DoD Standardization Area Assignment TCTS). This series contains current tactical communications technical standards and design objectives including a revised version of standards and design objectives that are now contained in MIL-STD-188C. Moreover, this series will include appropriate unclassified design objectives and tactical communications systems technical standards currently published in JCS Publications 10 and 11. Appropriate communications-electronics systems standards and design objectives developed under joint projects, such as the TRI-TAC program, will be integrated in the tactical communications standards, as directed in reference 2.24.

5.2.1.3 MIL-STD-188-300 Series (DoD Standardization Area Assignment SLHC). This series contains communications system standards and design objectives applicable to the field of long haul and point-to-point communications in

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support of the Defense Communications System (DCS) and the National Military Command System (NMCS), and also to provide the necessary interface with non-DCS equipments. DCA is the lead service for this area. Reference 2.7 outlines this standardization program.

5.2.2 Handbooks. The foregoing Military Communication System Technical Standards are developed to satisfy the paragraph 4.3 objectives for communications standardization, with the special goal of obtaining interoperability, compatibility and commonality, but there is still more to be accomplished in this standardization field. The equipment and systems designed in accordance with standards and procured in accordance with certain specifications must be adequately and satisfactorily installed. Assistance in this respect can be given in Handbooks. Such handbooks provide guidance pertaining to installation of communications equipment and facilities. Handbooks cover areas such as theory, equipment layout, signal and power cable runs, environmental control, grounding, transmission lines and antennas. The use of handbooks is non-mandatory.

5.2.3 Categories of Standards (Refs. 2.7 and 2.15). Standardization efforts under the SLHC and TCTS area assignments are currently planned and managed with a view towards development and promulgation of such standards for the long haul and tactical applications, as established in the following paragraphs.

5.2.3.1 System Design and Engineering Standards. A general definition of "System Standard" is given in paragraph 3, but "System Design and Engineering Standards" are standards that establish overall minimum system and subscriber-to-subscriber measures of performance, e.g., the probability of achieving given delay and/or quality in information transfer. Within circuit and network models, total system and subscriber-to-subscriber performance parameters are apportioned. Included are reference circuits, system diagrams, interrelationships and interconnectivity of component subsystems, and performance goals. The latter includes system efficiency, communications quality, delay, flexibility, availability, reliability, survivability and security goals. The system design and engineering standards provide the basis for the interconnection of subsystems into a system, as well as the design of the individual subsystems. (Planning Standards are, in general, to be established at the system design and engineering level and address characteristics pertaining to the interconnection of DCS subsystems and interoperability of the DCS with other DoD and non-DoD communications systems; see 4.5.1.6).

5.2.3.2 Subsystem Design and Engineering Standards. These standards provide electrical performance, message integrity, grade of service, interface standards, and other parameters of the subsystems, such as switching and transmission. Where applicable, the parameters for these standards are derived from the system design and engineering standards.

5.2.3.3 Equipment Technical Design Standards. These standards provide the minimum electrical performance, such as the dynamic range of operation,

input/output parameters, and interface characteristics required of the equipment. Most of these standards are based on the requirements of the appropriate subsystem design and engineering standards.

5.2.3.4 Interface Standards. These standards specify the required quantitative values for electrical parameters and for operational procedures which affect the transparency of the interface between separate subsystems or systems. The term "transparency" (see FED-STD-1037; Ref. 2.6) means that:

a. From the user's standpoint, there should be no extra effort or concern when communications are traversing separate systems. Ideally, the user's operating procedures should require no change nor should operations be degraded in any manner.

b. "Black-box" interfaces should be minimized or eliminated by careful analysis of the combined systems being traversed.

c. Interface standards provide the necessary technical parameters for the interconnection of the various communications systems and subsystems and are included as an integral part of subsystem and equipment technical design standards in accordance with the system design and engineering standards.

5.2.4 Standardization Projects. It is necessary to segment the enormous standardization effort into individual manageable standardization projects. Reference 2.4, the Defense Standardization Manual (DSM) specifies a method of assigning project designations in order to have a uniform procedure throughout the military establishment.

5.2.4.1 Types of Projects. Standardization projects are defined in paragraph 2-700 of the DSM as follows:

a. Military, Federal or industry projects to develop new or revised standards and handbooks, and page revisions to the documents.

b. Study projects for Item Reduction and Engineering Practices.

5.2.4.2 Project Numbering

a. Projects, after approval by the assignee activity/lead service activity, are assigned project numbers by the assignee activity/lead service activity identified in the Standardization Directory (SD-1) (Ref. 2.10; also, see section 3). The Defense Standardization Manual (DSM) provides that project numbers associated with area assignments (such as the TCTS and SLHC areas) will be two part numbers. As an example, the first part, consisting of four spaces, identifies the area assignment such as TCTS. The second part is to be a nonsignificant, serially assigned 4-digit number. Closely related projects may be identified by a project number followed by a dash and sequentially assigned two-digit subproject numbers.

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b. The MIL-STD-188 series Joint Steering Committee (JSC), however, as discussed in paragraph 4.4.3, approved a project numbering system consistent with that of the DSM but giving significance to the four digit second part. (Examples: the first four letters designate the standardization area, the following three numbers designate the military standard number which will follow the -188 and the fourth number is used for reissues of the document such as work on revisions, change notices, appendices, indexes, and similar items. For example, common project SLHC-1001 indicates that SLHC is the area assignment, the military standard number is MIL-STD-188-100, and this is the first revision. To be consistent, the tactical project numbers have been changed to follow this system, i.e., TCTS-2010 indicates that TCTS is the area assignment, the military standard number is MIL-STD-188-201, and this is the first action on the project). It will be noted that the 1000 series is assigned to common long haul/tactical projects, the 2000 series is assigned to tactical projects and the project numbers for the SLHC long haul projects are in the 3000 series. The SLHC planning standards projects are referred to with a prefix of "7", followed by the last three digits. (Example: SLHC-7340 refers to a project for MIL-STD-187-340).

5.2.4.3 Project Status Information

a. Projects in any given area of standardization are listed in the area Program Plan.

b. The SLHC and TCTS Area Program Plans use status and preparing activity codes as follows:

- (1) Status Codes:
 - Z - Project to be initiated (i.e., work not yet started).
 - A - Project initiated (i.e., work started).
 - D - Initial draft of document completed and circulated for comments.
 - C - Final draft of document completed and circulated for comments.
 - G - Project completed.

- (2) Examples of Preparing Activity Codes are:

- CR - Code for the U.S. Army Communications-Electronics Command
- SC - Code for the U.S. Army Communications Command
- EC - Code for the Naval Electronic Systems Command
- 90 - Code for the Air Force Communications Command
- DC - Code for the Defense Communications Agency
- NS - Code for the National Security Agency
- TT - Code for the Joint Tactical Communications Office

5.3 Development of MIL-STD-188 Series Standards

5.3.1 General. Up to this point, a host of standardization activities and their standards have been discussed (see 4.5), the primary criterion being that they may significantly impact the MIL-STD-188 series. In this paragraph on the development of standardization documents, the focus is on the MIL-STD-188 series. How organizations outside of DoD and not subject to the DSSP develop their standards is their prerogative but, for the MIL-STD-188 series, there are certain procedures to be followed. Recording them here will assist in understanding the standardization process and assist the uninitiated who may be entering the field or those who otherwise have an interest.

5.3.2 Area Assignment by DoD (Lead Service and Participating Activities)

a. The Defense Standardization Manual (Ref. 2.4) provides for Area Assignments which are standardization categories, each encompassing a subject not applicable to a single Federal Supply Classification (FSC) or Federal Supply Group (FSG) (See 4.1.4.2 in Volume II). Area assignments are made for broad engineering disciplines and practices. When making such assignments, consideration is given to the interest, technical capabilities and resources of the organizations involved.

b. Two area assignments are related to the MIL-STD-188 series. These are SLHC and TCTS, both discussed in paragraph 4.4. Both relate to a number of FSC's. The Director, DCA is the SLHC Area Lead Service while the Department of the Army is the TCTS Area Lead Service. In each instance, the Area Lead Service has designated a Lead Service Activity, the activity to which the responsibility for standardization has been delegated. For the SLHC Area, the Lead Service Activity is the DCA Interoperability and Standards Office, 1860 Wiehle Avenue, Reston, Virginia 22090; and that for the TCTS area is the U.S. Army Communications-Electronics Command, Code DRSEL-SEI-I, Fort Monmouth, New Jersey 07703.

c. The Lead Service Activity is not expected to conduct its program free of consultation with other interested activities. For this reason, Participating Activities are designated by participating departments or agencies which participate with the Lead Service in developing standardization programs.

d. The Participating Activities for SLHC and TCTS areas are:

(1) SLHC Participating Activities:

Commander
U.S. Army Communications Command
ATTN: CC-OPS-PP
Fort Huachuca, AZ 85613

Commander
Naval Electronic Systems Command
ATTN: ELEX 8111
Department of the Navy
Washington, DC 20363

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Headquarters
Air Force Communications Command
AFCC/EPES
Scott AFB, IL 62225

Director
Joint Tactical Communications (TRI-TAC) Office
ATTN: TT-E-I
197 Hance Avenue
Tinton Falls, NJ 07724

Director
National Security Agency
ATTN: Code T2
Fort George G. Meade, MD 20755

(2) TCTS Participating Activities:

Commander
Naval Electronic Systems Command
ATTN: Code 8111
Department of the Navy
Washington, DC 20363

Headquarters
Air Force Communications Command
AFCC/EPES
Scott AFB, IL 62225

Director
Defense Communications Agency
ATTN: J110
1860 Wiehle Avenue
Reston, VA 22090

Director
National Security Agency
ATTN: T2
Fort George G. Meade, MD 20755

Director
Joint Tactical Communications (TRI-TAC) Office
ATTN: TT-E-I
197 Hance Road
Tinton Falls, NJ 07724

5.3.3 Establishing the Need for a Standard and Selecting the Preparing Activity (Refs. 2.4, 2.7 and 2.15)

a. As in most standardization areas, any activity may recommend a new MIL-STD-188 standardization project. When a new project has been recommended,

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it is the responsibility of the Lead Service Activity to nominate a Preparing Activity, giving due consideration to the interests, technical capabilities, resources, time schedule and other pertinent conditions and attributes of the various candidates. An offer may be made by letter to an activity requesting acceptance as the Preparing Activity. The JSC often assists in coordinating this problem for SLHC, TCTS and SLHC/TCTS standardization. Justification for the development of all new or major revisions to standardization documents must be evaluated by the Preparing Activity and other interested activities. The intent, needs and benefits must be determined and communicated to the appropriate Lead Service Activity. The standardization project evaluation and justification must include each of the following considerations, where applicable:

- (1) Proposed scope of the standardization project.
- (2) Possibility of use of, or consolidation with, existing non-Government specifications and standards. (per Ref. 2.37).
- (3) Possibility of consolidation with or elimination of existing DoD standards.
- (4) Cost impact of applying the proposed document.
- (5) The degree of improvement in current technical state of the art.
- (6) Increased flexibility through clarification or increased options.
- (7) Application feedback received.
- (8) Industry participation inputs.
- (9) Relative priorities involved.
- (10) Estimated resource requirements.
- (11) Estimated schedule information.

b. New standardization projects shall not be initiated and project numbers will not be assigned for new documents or major revisions until they have been justified by a statement of intent and approved by the appropriate Lead Service Activity. After reviewing the statement of intent, the Lead Service Activity will recommend one of the following:

- (a) Inclusion of requirements in an existing or planned document for general, alternative, or service unique application.
- (b) Initiation as a coordinated SLHC or TCTS (as appropriate) project.
- (c) Initiation as a limited coordination (i.e., applicable to two or less services) SLHC or TCTS (as appropriate) project.
- (d) Disapproval, with rationale explaining why the project should not be approved.
- (e) Lead Service Activity submission to the MIL-STD-188 Joint Steering Committee to determine the appropriateness of paragraphs a through d above, with respect to a potential SLHC/TCTS (or other) project.

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c. In the SLHC and TCTS Areas, the Joint Steering Committee (JSC) often performs the foregoing functions of establishing and coordinating the need for a new standards project in the MIL-STD-188-100 Series (common SLHC/TCTS standards (see paragraph 4.4.3)). In the MIL-STD-188-200 series (TCTS), the Military Communications System Tactical Standards Committee (MCSTSC), which consists of the same personnel as the JSC, often performs the functions of establishing and coordinating the need for a new project. In the MIL-STD-188-300 series (SLHC), DCA may use the same personnel to assist it in establishing and coordinating the need for a new project. It is notable that all three types of standards (SLHC, TCTS, and SLHC/TCTS) business can be conducted at a meeting of JSC personnel.

5.3.4 Appointment of a Working Group and Chairperson

a. Upon designation of the Preparing Activity and within the content of the DSSP, as appropriate, a working group may be established. Such a working group is comprised of expert representation from interested activities to address, discuss, review, deliberate and accomplish an assigned task. It is essential that it first be determined that a working group is the most effective means to accomplish a proposed task. The Lead Service Activity will monitor all working groups in its assigned areas to assure prompt and timely deliberations, accomplishments, and dissolution of the group. The Chairperson of the working group will be designated by the activity establishing the group. The Chairperson presides over meetings and is responsible for the preparation of agenda and minutes of meetings. Copies of the agenda and minutes of meetings are furnished to all interested activities. Additionally, the Chairperson is responsible for submitting Quarterly Progress Reports concerning the task to the appropriate Participating Activity, who then consolidates individual task Quarterly Progress Reports and forwards them to the MIL-STD-188 series Joint Steering Committee Secretariat.

b. Qualified representatives, whose regular duties are closely related to the task for which the working group is organized, should be designated. One individual shall be designated by each Participating Activity/custodian as its representative to resolve essential differences and to obtain department coordination. Unresolved working group problems may be referred to the Lead Service Activity or to the Joint Steering Committee, if appropriate, for resolution and guidance.

5.3.5 Drafting of Proposed Standard. In the drafting of SLHC and TCTS standards, the Preparing Activity and the Working Group must keep certain principles in the forefront, such as:

5.3.5.1 Objectives of Standardization. The communication standardization objectives to be considered are given in paragraph 4.3, particularly interoperability, compatibility and commonality. Following the outlined objectives will result in the development of system and subsystem and equipment standards for satisfying user requirements and overall system performance.

5.3.5.2 Patents and Copyrights. There may be instances when personnel who prepare or use military standards will have information before them raising a question whether the military standard might include copyrighted works or whether the manufacture of an item in conformance with the military standard may cause infringement of privately owned patents. In such instances, the individual with such questions should request advice from the patent counsel in his or her military department.

5.3.5.2.1 Military Department Regulations and Instructions. Pertinent regulations and instructions of the Army, Navy and Air Force are:

Army Regulation AR 27-60, Subj: Patents, Inventions, and Copyrights (Reference 2.38)

Army Regulation AR 310-1, Subj: Publications, Blank Forms, and Printing Management (Reference 2.39)

Office of Naval Research Instruction ONRINST 5402.1B, Subj: Geographical Areas of Responsibility for providing the Navy Shore Establishment with advice and services relating to patents, inventions, trademarks, copyrights, royalty payments, and matters connected therewith; assignment of (Reference 2.40)

Office of Naval Research Instruction, ONRINST 5870.5, Subj: Permissions to use copyrighted materials in the Department of the Navy (Reference 2.41)

Air Force Regulation AFR 110-8, Subj: Inventions, Patents, Copyrights, and Trademarks (Reference 2.42)

5.3.5.2.2 Guidelines. A few general guidelines are:

a. A military standard should not include information which was submitted as part of a unsolicited proposal, see Defense Acquisition Regulation (DAR) 4-913. Similarly, it should not include technical data bearing in limited rights legend or computer software which bears a restricted rights legend, see DAR 7-104.9.

b. Copyrighted works should not be incorporated into a military standard without permission of the copyright owner or his/her agent. Copyright owners will often grant permission for limited use of copyrighted material without charge.

c. With respect to patents, the award of a contract shall not be refused to a bidder/offeror merely because he is not the owner of or licensee under any patent involved in the procurement, see DAR 1-304.3. If a military specification is being prepared in a manner to call for an item known to be covered by a privately owned patent, the patent owner may grant a free license to the government for equipment manufactured under that military

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specification. Specific guidance and advice should be obtained from the cognizant office of patent counsel in the military departments and agencies.

5.3.5.3 Obtaining Related Documents. One of the first steps for the standards developer is to identify and obtain applicable documents related to the task. The documents will include MIL-STD-962, Outline of Forms and Instructions for the Preparation of Military Standards and Military Handbooks (Ref. 2.2), as well as applicable international and national standards.

NOTE: MIL-STD-962 contains instructions for the preparation of MS sheet form military standards, MIL-STD bookform military standards, MIL-STD page form military standards and military handbooks.

5.3.5.4 Considering Standards by Their Precedence. Related standards will be considered in their order of precedence, e.g., a STANAG first and a Federal Standard second (see 5.4.1 for precedence information). If information in related standards is outdated, a project to update the standards will be proposed.

5.3.5.5 Collecting Parameters. In the development of communications standards, engineering expertise is required to identify and collect a list of applicable parameters. During this technical effort, the MIL-STD-188 standards developer must adhere to the constraints described in the following subparagraphs.

5.3.5.5.1 Interoperability. Primarily, only those parameters that are considered essential to ensure interoperability should be selected.

5.3.5.5.2 Performance. Interoperability is the prime criterion for selecting a parameter and specifying parameter values. Therefore, level of performance considerations are normally of lower priority.

5.3.5.5.3 Technology. Technology, such as using vacuum tubes, transistors or integrated circuits, is not to be standardized; rather, emphasis is to be placed on standardizing interface parameters and transfer functions that can be achieved regardless of the technology employed.

5.3.5.5.4 Specifications. As discussed in 4.3.5, "Standards" are not to be confused with "specifications", which are used for development or production of equipment. Communications standards are used for deriving specifications in direct support of procurement, supporting engineering design and development, eliminating interface problems prior to deployment of equipment, avoiding costly changes and modifications during production and fielding of equipment, and providing common measurement techniques and common definitions of terms. Therefore, specification parameters should not be included in MIL-STD-188 series standards.

5.3.5.6 Identifying and Incorporating Deliverable Data Requirements (Refs. 2.2 and 2.4.3).

5.3.5.6.1 Data Requirements. Deliverable data requirements essential for quality control, installation, operation, maintenance, or logistic support should be identified and incorporated where appropriate.

5.3.5.6.2 Developing Data Item Descriptions (DID) DD Forms 1664. Where practicable, data, format, and content requirements will be selected from existing DD Forms 1664 when preparing or revising a standard or specification (see Refs. 2.43 and 3.1). In such cases, the development of new DIDs is not necessary. The preparation, revision, coordination and approval of any new DIDs will be a concurrent process and accompany the applicable new or revised standard or specification.

5.3.5.7 Outlining Sections 4 and 5 of Standards Documents. One of the first steps for producing the standardization document is to develop an outline for Section 4, General Requirements and Section 5, Detailed Requirements (see MIL-STD-962 for detailed guidance).

5.3.5.8 Quantifying Parameter Values. Quantified parameter value limits should be set, such as upper and lower limits, in order to ensure interoperability with respect to all identified requirements. (This procedure helps to resolve conflicts among competing requirements).

5.3.5.9 Writing the Text of the Standard.

5.3.5.9.1 Use of the Metric System. Reference 2.19 establishes policy to consider the use of the metric system in all its activities, consistent with operational, economical, technical and safety requirements. The metric system of measurement will be the International System of Units (SI) in accordance with ANSI/ASTM E380-82 (Ref. 2.44) and ANSI/IEEE STD 268-1982 (Ref. 2.45); also, see FED-STD-376 (Ref. 2.46) and paragraph 5.4.7 for DoD guidance.

5.3.5.9.2 Use of "shall", "should" and Notes. The word "shall" is used for expressing a mandatory requirement. The word "should" is used for expressing a preferred, or desirable requirement. Non-mandatory requirements shall be placed in a "NOTE". The use of notes should be minimized. (See MIL-STD-962 for more details).

5.3.5.9.3 Developing Appendices. In the MIL-STD-188 series, Appendix A contains reference 2.1, the USDR&E memorandum concerning the mandatory use of MIL-STD-188 standards. Other appendices, of a non-mandatory tutorial manner, may be added to a standard. (See MIL-STD-962 for details).

5.3.5.9.4 Developing Sections 1, 2, 3 and the Table of Contents. Section 1, Scope; Section 2, Referenced Documents; Section 3, Definitions; the Cover Page; the Promulgation Sheet; the Foreword; and; the Table of Contents are appropriately finalized after completion of the remainder of the document.

5.3.6 Reviewing Cycle (Essential and Suggested Comments) (Ref. 2.4).

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5.3.6.1 Circulation of Draft. The Preparing Activity processes standardization documents on behalf of all users, formally coordinating the document with designated custodian and review activities, as follows:

a. The Preparing Activity will circulate drafts or copies of the document to all custodians and review activities in the quantities indicated in SD-1 (see paragraph 3.38). A copy of the draft document will be sent to the Lead Service Activity, whether or not recorded as having review interest. Each forwarding letter will include a distribution list. In circulating the document, the preparing activity will specify the time limit for submission of unified departmental comments to the Preparing Activity by the other custodians. The allotted time will be 60 to 90 days unless the preparing activity determines a longer schedule is necessary. Comments of review activities are to be submitted to custodians with sufficient leadtime to permit adherence to schedules; otherwise, the comments will be considered for the next revision. Ordinarily, comments should be submitted to the custodians within about two-thirds of the time allowed by the Preparing Activity for receipt of departmental comments. In any case, the custodian must have at least 10 working days in which to prepare consolidated departmental comments.

b. The Preparing Activity is responsible for the editorial correctness of the document. Activities will not delay comments for the purpose of making an editorial review or editorial comments.

5.3.6.2 Comments. Comments are designated as either "essential" or "suggested". An essential comment must be supported with justification, otherwise it will be treated as a suggested comment. Letters transmitting comments to custodians, and from custodians to Preparing Activities, will confirm review and user activity designations. Comments from industry and industry associations are to be given full consideration. Industry will be advised of reasons for rejected comments.

5.3.6.3 Obtaining Industry Comments. In order to assure standardization and compatibility with latest industry practices, the draft of all new and revised standardization documents will be circulated to a representative cross-section of the affected segments of industry, concurrent with the circulation in the DoD. If the draft document is a limited coordination document, or is for the purpose of standardizing items covered by a procurement specification, either of which has previously been circulated to industry for comment, a second subsequent circulation to industry will be made only if DoD coordination substantially changes its contents or coverage.

5.3.6.4 Obtaining Industry Associations and Non-Government Standardization Organization Comments. In addition to circulating the draft to affected segments of industry, standardization documents are to be circulated to industry associations and non-government standardization organizations to foster uniform documents for both industry and Government use. To ensure proper coverage of affected segments of industry, consideration will be given to the interests of producer/manufacturer and user associations. When

particular industry association interest is known to military custodians, the Preparing Activity should be so advised.

5.3.7 Consolidating and Resolving Comments. Custodians are responsible for resolving inter-service/agency comments and for providing consolidated comments to the Preparing Activity. The Preparing Activity is responsible for consolidating and resolving all intra-service/agency comments. Suggested comments may be approved or rejected by the Preparing Activity, which is, however, responsible for reconciling essential comments. Unproductive conferences or extensive correspondence for resolution of differences should be avoided.

5.3.8 Finalizing and Approving Standard.

a. If no difficulties are experienced by the Preparing Activity, the standard is approved and the working group dissolved. However, if the comments are voluminous, a unification meeting should be called in order to avoid recirculation of a revised draft. If a unification meeting is called, copies of the agenda, along with an advance notice of at least thirty days, will be furnished to the designated representatives.

b. If complete resolution of essential comments is not effected at the unification meeting, the following procedures for unresolved comments will be initiated:

(1) The draft document, custodian and industry comments, the record of coordination and a recommendation for disposition of unresolved comments shall be submitted to the lead service activity. The lead service activity, in collaboration with the participating activities will attempt to resolve the matter. If unsuccessful, the lead service activity will forward the matter to its respective DepSO. The DepSO of the assigned Department/Agency, in collaboration with the other DepSO's, will attempt to resolve the matter. If unsuccessful, the DepSO of the assigned Department/Agency may decide the issue in accordance with the authority to act for the Secretary of Defense in the resolution of problems, or will forward the matter, along with a recommendation for disposition, to the DMSSO. The DMSSO may attempt to resolve the matter or refer it to the DMSSB. This procedure for coordination of a draft provides successive opportunities for reconciliation of unresolved comments. A concerted effort should be made at each level to reconcile differences before escalating the problem to the next higher level. Upon resolution of the comments, the document will be returned to the preparing activity for manuscript preparation and publication.

c. When there are no unreconciled comments, the preparing activity will approve the document, date and number it, and arrange for reproduction and distribution. The DD Form 1585 completion notice will be forwarded to the lead service activity. Preparing activities are to ensure that all applicable standardization documents are dispatched through established channels to the Department of Defense Specifications and Standards Point (DoDSSP) (see 3.17)

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for reproduction and distribution no later than 7 days after the date of approval or, preferably, simultaneously with the date of approval.

5.3.8.1 Preparing Photo-Ready Copy. Preparing activities will submit, no later than 7 days after the date of the document, a camera-ready copy in accordance with departmental procedures, to the DoDSSP for processing. The document will be accompanied by a NPPSO, Philadelphia, Form No. 4ND-NPPSO-5604/4, Print Order (mil specs and stds). The print order will identify the document involved by the assigned standardization document number. The print order will also identify the originating activity (e.g., Army, Air Force, Navy, etc.) and will, in those instances involving manuscripts requiring composition services, clearly indicate when proofs are to be furnished to the responsible preparing activity for proofing prior to printing production. Where information concerning the furnishing of proof is not included in print orders, proof-reading will be performed by the printer responsible for furnishing composition services.

5.3.8.2 Printing and Distribution. Printing production will be accomplished without further reference to preparing activities or their departmental representatives. It will not be necessary to indicate the quantity of documents required on the print order. From the Requirements Table (see 5.3.8.3), the DoDSSP will determine the quantities to be printed for all activities concerned plus subscription quantities, and will record the appropriate number of copies to be printed on the print order forms. In those cases where preparing activities must print a limited number of copies of documents locally to meet emergency requirements for support of imminent procurement, these copies shall be printed from the original manuscript or camera ready copy without change. That manuscript or camera ready copy will then be submitted to the DoDSSP, as indicated above, for printing sufficient copies to complete distribution and establish the shelf stock. An exception to this local printing provision has been granted to the Marine Corps because of the small quantity of limited coordination documents required by that service. One copy of Marine Corps limited coordination standardization documents will be sent to the Assignee Activity/Lead Service Activity and Participating Activities.

5.3.8.3 Requirements Table. A "Requirements Table" for determining distribution for all newly published standardization documents, including subscription quantities, is prepared by the DoDSSP. Copies of the Requirements Table will be furnished annually to the DepSO's for use in standardization planning. At least once every 3 years, the DoDSSP conducts a survey to update the distribution lists and provide departmental approving authorities with summaries of changes.

5.4 Utilization of Standardization Documents

5.4.1 Precedence

5.4.1.1 Meaning of Precedence. MIL-STD-143 (Ref. 2.14) defines precedence to mean the order of precedence for the selection of standards and specifications

to describe items, materials, and processes by design activities in the design and construction of military materiel for the Department of Defense.

5.4.1.2 Factors Influencing Precedence. In consonance with DoD policy and to satisfy DoD communications standardization requirements, standardization document precedence must be based upon the factors of document origin and the type of requirements.

5.4.1.2.1 Document Origin. The descending order of standardization document precedence, with respect to the document origin, is:

- a. International military
- b. International non-military
- c. U.S. non-Government
- d. Federal
- e. U.S. military
- f. Company/Agency

5.4.1.2.2 Type of Requirements. The descending order of standardization document precedence, with respect to the type of requirement is:

- a. Mandatory for DoD use
- b. Approved for DoD use
- c. Limited coordination standards
- d. Guidance

NOTES: (1) It must be recognized that standards which are normally at a high precedence level will not be treated at that level if they have not been coordinated with and approved for use by the DoD. An example of this possibility is a NATO STANAG which has not been subscribed to (ratified) by the U.S.

(2) The selection of a document within any one grouping of standards and specifications shall be a suitable standard, if any, over a suitable specification.

5.4.1.3 Communications Standardization Document Precedence. It is the responsibility of the MIL-STD-188 producer to conform to, and to cite or reference, applicable higher precedence standards, based upon the guidelines stated in 5.4.1.2.

5.4.2 Mandatory, Non-Mandatory and Optional Use. Several factors determine whether the use of certain standards and specifications is mandatory, non-mandatory or optional. Only these factors for standards are considered in the three following subparagraphs. It is noted that the terms "non-mandatory" and "optional" themselves are not used in a standard manner. Certain standards, for example, are termed "approved for use". Thus, such standards are both non-mandatory or optional, for use.

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5.4.2.1 Mandatory Use

a. Before 1972, all military standards were specified as mandatory for use in the Defense Standardization Manual 4120.3-M. However, because of misapplications of military standards in general, the ASD (I&L) found it necessary to cite military standards as "approved for use" rather than "mandatory for use" in the Department of Defense.

b. This deference to the judgment of designing and procuring agencies is clearly appropriate to standards dealing with process, components ruggedness and reliability, paint finishes and the like. However, it is clearly not appropriate to standards such as those in the MIL-STD-188 series which address telecommunications design parameters. These influence the functional integrity of telecommunications systems and their ability to efficiently interoperate with other functionally similar Government and commercial systems. Therefore, the ASD (C³I) by memorandum, subject: Mandatory Use of Military Standards in the 188 Series, dated 10 May 1977 (Ref. 2.1) declared that relevant military standards in the 188 series will continue to be mandatory for use within the Department of Defense. Because of its importance, this reference is enclosed as Appendix A to this handbook.

c. Reference 2.1 further instructs the Military Departments and Agencies as follows:

"To minimize the probability of misapplication of these standards, it is incumbent upon the developers of the MIL-STD-188 series to insure that each standard is not only essential but of uniformly high quality, clear and concise as to application, and wherever possible compatible with existing or proposed national, international and Federal telecommunication standards. It is also incumbent upon the users of these standards to cite in their procurement specifications only those standards which are clearly necessary to the proper functioning of the device or systems over its projected lifetime."

In order to assist in implementing this ASD (C³I) provision, the Joint Steering Committee operating in the SLHC and TCTS Areas has decreed that all interoperability parameters must be made mandatory while other parameters are subject to tailoring (see paragraph 5.4.4).

d. Even though reference 2.1 indicates that military standards, with the exception of MIL-STD-188 series, are certified as "approved for use", there is an alternative, when required. Reference 2.4 (in paragraph 1-103.2, DSSP Policy) states that "Specific military specifications or standards may be made mandatory for use through the means of Departmental/Agency administrative instructions."

e. Other standards, of particular importance to the MIL-STD-188 series, which are mandatory are:

- (1) NATO STANAGs: When subscribed to by the U.S. (see 4.5.3.1).

- (2) QSTAGs, when subscribed to: (see 4.5.3.2).
- (3) JCS-PUB 10: Mandatory by JCS (see 4.5.1.3.2).
- (4) Allied Communications Publications (ACP's): Pursuant to JCS and MCEB (see 4.5.1.4).
- (5) Federal Standards: Pursuant to FPMR (see 4.5.2.1 and 4.5.2.2).

5.4.2.2 Non-Mandatory. It has been noted in paragraph 5.4.2.1 that most military standards are "approved for use". Thus, such standards are non-mandatory. This category extends to practically all non-Government (industry) standards.

5.4.2.3 Optional. There is no specifically defined distinction between non-mandatory and optional standards. Standards are optional if they are not mandatory.

5.4.3 Planning. From the standpoint of the user of the MIL-STD-188 series, planning means what must be taken into account by the user in designing a telecommunications/teleprocessing system, subsystem, equipment, interface, etc. Some of these factors are:

- a. The specific 188 series standard(s) that is/are applicable.
- b. What other standards such as ISO, IEC, NATO, ITU, etc., (or group of standards of lower precedence) are applicable, as discussed in subparagraph 5.4.1.2 on the use of precedence.
- c. What interoperability standards are applicable, considering that the values of these parameters are mandatory. This involves, in multi-valued parameters, such as modulation rates, determining which value(s) to settle upon.
- d. What other parameters apply and considering that their values are also mandatory, if cited in a 188 series standard.
- e. What parameters are subject to tailoring?
- f. What design objectives cited in applicable standards are germane and now can be used?
- g. Considering tailoring, what are the trade-offs in analyzing optional parameters or optional values thereof?
- h. Necessity of complete interoperability, versus "black box" interfaces with other systems (when such problems are presented), must be considered.

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- i. Other factors may be applicable, depending upon the situation.

5.4.4 Application and Tailoring (Refs. 2.4, 2.13 and 2.47)

5.4.4.1 The Application/Tailoring Process (Ref. 2.47)

a. The basic process in the application and tailoring of specifications and standards to a given need involves four steps (a) the selection from the total realm of specifications and standards of those documents that may have application to a particular acquisition program; (b) a review and evaluation of these to select the documents that have a specific application; (c) tailoring each of these documents to include only those provisions (sections, paragraphs, or sentences) required for the specific application so that each document imposes only the minimum necessary requirements in the solicitation/contract, and (d) an examination of the document requirements that survive this process to specifically tailor them to support the particular system during acquisition and life cycle ownership.

b. The process described is particularly applicable in the selection and use of nonproduct (such as these with only interoperability and performance criteria) specifications and standards in a given materiel acquisition program. On the other hand, product specifications, such as those for parts, materials and components, are not as susceptible to tailoring when selected for use in a materiel acquisition, since they have been developed around a specific set of design and/or performance characteristics. The process of tailoring the requirements contained in the product specification would normally be accomplished during the development and promulgation of the document, independent of a specific acquisition program. For that reason, the decision regarding the use of product specifications in materiel acquisitions is normally a matter of adopting it in full or rejecting it completely. This does not mean that product specifications cannot be tailored for use in a particular acquisition program. They can and should be when conditions warrant such action.

c. When engaged in the tailoring process, a degree of caution must be exercised in achieving the desired balance between performance and life cycle cost. While it is essential that specifications and standards be applied in a prudent and cost-effective manner, they must also be properly structured to assure that essential operational capability requirements are not sacrificed.

d. As a collateral matter, in the case of weapon systems or programs that are of interest to more than one Service, extreme caution must be exercised during the tailoring process to assure that each Service's essential needs are met. This is particularly true in matters such as operational requirements, system interface, interoperability and logistics support.

5.4.4.2 Requirements for Tailoring. Numerous studies have found examples of unnecessary requirements not contributing to mission performance, but imposing

additional cost. However, almost without exception, close examination revealed misapplication of specifications and standards, rather than a fundamental problem with the documents. The options for levels of applicability written into specifications seem consistently to be ignored, resulting in inappropriate and/or excessive and costly requirements. Contractors and Government management are often equally at fault, but for different reasons. Government authorities selecting applicable portions of specifications are motivated toward maximum application to avoid the risks of failure and to fully protect Government interests, while contractors are motivated toward full compliance rather than risk non-conformance or non-responsiveness in a highly competitive marketplace. The tendency toward overly-conservative application of military specifications and standards, coupled with a resistance to change inherent in the DoD procurement system, have resulted in unnecessary costs which can be avoided if the attitude toward selective application and tailoring can be improved.

5.4.4.3 Authority for Tailoring. The foregoing experiences have contributed to efforts to correct certain procurement inefficiencies and excessive costs by tailoring. References 2.4 and 2.47 cover tailoring in an effective manner.

5.4.4.4 MIL-STD-188 Series Relationship. The primary application of standards is towards procurement specifications. One objective of standardization, pursuant to reference 2.4, the Defense Standardization Manual, is to "assure that specifications and standards are tailored to reflect only particular needs consistent with mission requirements". For example, since MIL-STD-188 documents are mandatory for use, such a standard can no longer be referenced in a specification in its entirety but only the appropriate paragraphs which meet the needs of the equipment should be referenced. In other words, if a specification writer establishes that a certain parameter applies to a specification, then the value assigned to the parameter in the standard must be used. However, if the parameter does not apply, then it is not to be used. This is the process of application and tailoring which does not conflict with the mandatory status of MIL-STD-188 series.

5.4.5 Waivers and Deviations

5.4.5.1 Department of Defense Standards

a. At present, there are no rules or instructions set up by the Defense Standardization and Specification Program for waivers of, or deviations from, the parameters or their values as stated in the MIL-STD-188 series. This is also generally true of all military standards. The problem has been discussed and debated in various echelons of the standardization community but has not been resolved. The problem is a difficult one because, on the one hand, if a 188 series standard is well thought out from the interoperability standpoint, its use should be mandatory, at least where interoperability is concerned. On the other hand, in an isolated system where no interoperability is required, it could, in many cases, be argued that a waiver or deviation would be in order, if advantageous. Furthermore, it could

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be argued that in certain instances interoperability might be effected more economically by means of a "black box" than by direct interoperability, thus, justifying a waiver or deviation.

b. Each military department/agency is responsible for the policing and enforcing the use of standards; this responsibility includes the consideration of and granting of waivers and deviations, when appropriate.

5.4.5.2 Federal Standards

a. Federal Information Processing Standards (FIPS) Program. In the FIPS program, waivers are at times permitted by heads of agencies in connection with the provisions of the implementation schedule of certain FIPS. There is no standard waiver provision, however. Each individual FIPS must be reviewed to determine if it has a waiver provision. Generally, proposed waivers will be coordinated in advance with the National Bureau of Standards. Letters should be addressed to the Associate Director for ADP Standards, Institute for Computer Sciences and Technology, National Bureau of Standards, Washington, DC 20234. Heads of agencies should describe the nature of the waiver and set forth the applicable reasons.

b. Federal Telecommunication Standards (FED-STD) Program. Waivers of Federal Standards are discussed in paragraph 101-29.302 of the Federal Property Management Regulations. Federal standards are mandatory, as discussed in paragraph 4.5.2.2, but exceptions may be made by agency heads. An agency may be granted an exception by GSA only upon submission of adequate justification to the General Services Administration, Federal Supply Service, Standardization Division, Washington, DC 20407.

5.4.5.3 Other Standards. Requests for waivers to standards not identified above should be submitted in accordance with particular Military Department/Agency Directives.

5.4.6 Tests

a. There are two types of tests, one of which is not germane to this discussion and another which is. The first category is the test which is made to determine if an item being procured is satisfactory and meets the provisions of the specifications under which it is being procured. A description of such a test would be helpful to the procurement officer if it is described in the specification or otherwise referred to or identified, but this is not a problem of the drafters or users of a standard.

b. The second category of test is that which enables the user of a standard, such as the manager or operator of a communications system, to determine if the system is operating in such a manner as to give satisfactory results. For example, a MIL-STD-188 series standard may prescribe certain values for certain parameters to assure satisfactory communications. Examples of such parameters are surge protection, power source compatibility, transformer coupling, transmission line impedance compatibility, gain, gain

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stability, harmonic distortion, return loss, longitudinal balance, frequency response, delay distortion, cross-talk, digital distortion, etc. In order to assure that the system is performing as expected, proper tests must be made. It is appropriate that complete descriptions of such tests, along with lists of required test equipments, be incorporated in the applicable standards.

5.4.7 Measurements (Refs. 2.19 and 2.48). A 7 March 1980 Memorandum from the Under Secretary of Defense (Research and Engineering) stated that "achieving effective NATO standardization requires that we utilize the metric system in design of new weapon systems and equipments to the maximum practical extent because all other NATO countries are metric users." In the memorandum, the USDR&E established a target date of 1 January 1990 for availability of a complete spectrum of metric specifications and standards." Finally, the USDR&E requested that DoD:

- o Begin scheduling preparation of metric specifications and standards on an accelerated basis at the earliest practical date, emphasizing common areas where the private sector cannot or will not prepare the documents.

- o Participate with national standardization activities of the private sector in preparation of metric documents and assume a fair share of the work load.

- o Adjust five-year standardization plans (Defense Standardization Manual 4120.3-M) accordingly."

All MIL-STD-188 standardization documents, including revisions and notices thereof, will conform to the requirements in DoDD 4120.18 (Ref. 2.19) and the 7 March 1980 USDR&E memorandum (Ref. 2.48). This requires the use of ASTM E380-82, Metric Practice (Ref. 2.44), ANSI/IEEE STD 268-1982, Metric Practice (Ref. 2.45) and FED-STD-376 (Ref. 2.46).

5.4.8 Obtaining Standardization Documents. See Appendix D for information on obtaining standardization documents.

Review Activities:

- Army - CR
- Navy - AS, YD, OM
- Marine Corps - MC
- Air Force - 90
- TRI-TAC - TT
- NSA - NS
- USDRE - IC, SD
- NCS
- SHAPE

Custodians:

- Army - SC
- Navy - EC
- Air Force - 90

Preparing Activity:

- DCA - DC
- (Project SLHC-2880)

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APPENDIX A

Memorandum from the Assistant Secretary
of Defense for Communications, Command, Control
and Intelligence, 10 May 1977.

Subject: Mandatory Use of Military
Standards in the 188 Series

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ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D. C. 20301

10 MAY 1977

COMMUNICATIONS, COMMAND,
CONTROL, AND INTELLIGENCE

MEMORANDUM FOR Assistant Secretary of the Army (I&L)
Assistant Secretary of the Navy (I&L)
Assistant Secretary of the Air Force (I&L)
Commandant of the Marine Corps
Director, Defense Communications Agency
Director, National Security Agency

SUBJECT: Mandatory use of military standards in the 188 Series

On January 3, 1972, the Assistant Secretary of Defense (I&L) found it necessary to make a significant change in the DoD Standardization Manual 4120.3M because of recurring misapplications of military standards in general. The essence of the change is that military standards as a general rule are now cited as "approved for use" rather than "mandatory for use" in the Department of Defense.

This deference to the judgment of the designing and procuring agencies is clearly appropriate to standards dealing with process, component ruggedness and reliability, paint finishes, and the like. It is clearly not appropriate to standards such as those in the MILSTD 188 series which address telecommunication design parameters. These influence the functional integrity of telecommunication systems and their ability to efficiently interoperate with other functionally similar Government and commercial systems. Therefore, relevant military standards in the 188 series will continue to be mandatory for use within the Department of Defense.

To minimize the probability of misapplication of these standards, it is incumbent upon the developers of the MILSTD 188 series to insure that each standard is not only essential but of uniformly high quality, clear and concise as to application, and wherever possible compatible with existing or proposed national, international and Federal telecommunication standards. It is also incumbent upon the users of these standards to cite in their procurement specifications only those standards which are clearly necessary to the proper functioning of the device or systems over its projected lifetime.

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This direction is in consonance with the recommendations made by the Director, Defense Materiel Specifications and Standards Office, in his letter of March 4, 1977, which was addressed to the U.S. Army Electronics Command.

Gerald P. Dinneen
Gerald P. Dinneen

cc:

OASD(MRA&L), DMSSO
Co-Chairman, JSC, ECOM (DRSEL-CE-CS)
Co-Chairman, JSC, DCEC (R110)
OJCS (J-3), Telecom Div

APPENDIX B

Lists of Published MIL-STD-188 Series Standards Documents and Projects

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ANNEX 1 TO APPENDIX B

PUBLISHED MIL-STD-188 SERIES STANDARDS AND RELATED DOCUMENTS

<u>DOCUMENT NUMBER</u>	<u>DATE</u>	<u>TITLE</u>
MIL-STD-188C	24 Nov 69	Military Communication System Technical Standards
Change 1	1 Jun 76	
Change 2	17 Nov 76	
MIL-STD-188-100	15 Nov 72	Common Long Haul and Tactical Communication System Technical Standard
Change 1	16 Jul 75	
Change 2	1 Jun 76	
Change 3	17 Nov 76	
MIL-STD-188-110	15 Nov 80	Equipment Technical Design Standards for Common Long Haul/Tactical Data Modems
MIL-STD-188-114	24 Mar 76	Electrical Characteristics of Digital Interface Circuits
MIL-STD-188-120	15 May 76	Military Communication System Standards Terms and Definitions
MIL-STD-188-124	14 Jun 78	Grounding, Bonding and Shielding for Common Long Haul/Tactical Communication Systems
MIL-STD-188-140	3 Apr 81	Equipment Technical Design Standards for Common Long Haul/Tactical Radio Communications in the Low Frequency Band and Lower Frequency Bands
MIL-STD-188-161	30 Jan 81	Design Standards for Common Long Haul and Tactical Facsimile Equipment
MIL-STD-188-203-1	10 Sep 82	Subsystem Design and Engineering Standards for Tactical Digital Information Link (TADIL) A
MIL-STD-188-310A	14 Jan 80	Subsystem Design and Engineering Standards For Technical Control Facilities
MIL-STD-188-311	10 Dec 71	Technical Design Standards For Frequency Division Multiplexers
Change 1	31 Dec 80	

MIL-STD-188-313	19 Dec 73	Subsystem Design and Engineering Standards and Equipment Technical Design Standards for Long Haul Communications Traversing Microwave LOS Radio and Tropospheric Scatter Radio
MIL-STD-188-315	30 Jul 71	Subsystem Design/Engineering and Equipment Technical Design Standards for Wire Systems
MIL-STD-188-317	30 Mar 72	Subsystem Design and Engineering Standard and Equipment Technical Design Standard for High Frequency Radio
MIL-STD-188-322	1 Nov 76	Subsystem Design/Engineering and Equipment Technical Design Standards for Long Haul Line of Sight (LOS) Digital Microwave Radio Transmission
MIL-STD-188-340 Change 1	21 May 71 28 Jul 77	Equipment Technical Design Standards for Voice Orderwire Multiplex
MIL-STD-188-341	15 Feb 71	Modem Non-Diversity Digital Data 2400 Bits Per Second
MIL-STD-188-342	29 Feb 72	Equipment Technical Design Standards for Voice Frequency Carrier Telegraph (FSK)
MIL-STD-188-344 Change 1	1 Jun 72 8 Dec 77	Modem Non-Diversity Digital Data 1200 Bits Per Second
MIL-STD-188-346	30 Nov 73	Equipment Technical Design Standards for Analog End Instruments and Central Office Ancillary Devices
MIL-STD-188-347	29 Mar 73	Equipment Technical Design Standards for Digital End Instruments and Ancillary Devices
MIL-STD-187-310	4 Oct 76	Switching Planning Standards for the Defense Communications System
MIL-STD-187-320	29 Mar 80	Transmission Planning Standards for the Defense Communications System
<u>HANDBOOKS</u>		
MIL-HDBK-188	21 Jan 83	Guide for Developers and Users of Communications Systems Standards in the MIL-STD-188 Series

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MIL-HDBK-232 Change 1	14 Nov 72 25 Apr 80	RED-BLACK Engineering-Installation Guidelines (U)
MIL-HDBK-411A	8 Jul 82	Power and Environmental Control for the Physical Plant of DoD Long Haul Communications
MIL-HDBK-412	20 May 81	Site Survey and Facility Design Handbook for Satellite Earth Stations
MIL-HDBK-414	23 Mar 81	Technical Control Facilities and Equipment for Long Haul Communications (Volume I)
MIL-HDBK-416	15 Nov 77	Design Handbook for Line of Sight Microwave Communication Systems
MIL-HDBK-417	25 Nov 77	Facility Design for Tropospheric Scatter (Transhorizon Microwave System Design)
MIL-HDBK-419	21 Jan 82	Grounding, Bonding, and Shielding for Electronic Equipments and Facilities

ANNEX 2 TO APPENDIX B
CURRENT MIL-STD-188 SERIES PROJECTS

DOCUMENT NUMBER	TITLE OF DOCUMENT	PREPARER
MIL-STD-188-102	Equipment Technical Design Standards for Common Long-Haul/Tactical Multiplexers	Army (CR)
MIL-STD-188-111	Subsystem Design and Engineering Standards for Common Long-Haul/Tactical Fiber Optics Communications	Navy (EC)
MIL-STD-188-112	Subsystem Design and Engineering Standards for Common Long Haul/Tactical Cable and Wire Communications	Army (SC)
MIL-STD-188-113	Common Long-Haul/Tactical Standards for Analog/Digital Conversion Techniques	Army (SC)
MIL-STD-188-115	Subsystem Design and Engineering Standards for Common Long-Haul/Tactical Communications Timing and Synchronization	DCA (DC)
MIL-STD-188-141	Subsystem Design and Engineering Standards for Common Long-Haul/Tactical Radio Communications in the Medium Frequency (MF) and High Frequency (HF) Bands	Army (SC)
MIL-STD-188-144	Subsystem Design and Engineering Standards for Common Long-Haul/Tactical Tropospheric Scatter Radio Communications	Air Force (90)
MIL-STD-188-145	Subsystem Design and Engineering Standards for Common Long-Haul/Tactical LOS Microwave Radio Communications	Army (SC)
MIL-STD-188-146	Subsystem Design and Engineering Standards for Common Long-Haul/Tactical Satellite Communications	Army (SATCOMA)
MIL-STD-188-154	Subsystem Design and Engineering Standards for Common Long-Haul/Tactical Systems and Technical Control	Air Force (90)
MIL-STD-188-190	Methods of Measurement for Common Long-Haul/Tactical Communication	Air Force (90)

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MIL-STD-188-200	System Design and Engineering Standards for Tactical Communications	Army (CR)
MIL-STD-188-203	Subsystem Design and Engineering Standards for Tactical Digital Information Links	Navy (EC)
MIL-STD-188-242	Subsystem Design and Engineering Standards for Tactical Single-Channel VHF Radio Communications	Army (CR)
MIL-STD-188-243	Subsystem Design and Engineering Standards for Tactical Single-Channel UHF Radio Communications	Air Force
MIL-STD-188-256	Signaling and Supervision for Digital Switching	Army (CR)
MIL-STD-188-260	Equipment Technical Design Standards for Tactical Analog and Digital End Instruments	Army (SC)
MIL-STD-188-318	Subsystem Design/Engineering and Equipment Technical Design Standards for Television	Navy (EC)
MIL-STD-188-323	Defense Communications System (DCS) Digital Transmission Performance Standard	DCA (DC)
MIL-HDBK-232 (Rev/Supercession)	RED/BLACK Engineering-Installation Guidelines (U)	Navy (EC)
MIL-HDBK-413	Facility Design Handbook for HF Radio	Army (SC)
MIL-HDBK-414	Technical Control Facilities and Equipment for Long-Haul Communications (Volume II)	Air Force (90)
MIL-HDBK-415	Fiber Optics	Army (SC)

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APPENDIX C

Lists of Standards and Projects Related to the MIL-STD-188 Series

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ANNEX 1 TO APPENDIX C

FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATIONS (FIPS PUBS)

FIPS PUB NO.	TITLE	DATE
* 0	General Description of FIPS Register	1 Nov 68
1-1	Code for Information Interchange (ASCII)	24 Dec 80
2	Perforated Tape Code for Information Interchange	1 Nov 68
3-1	Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI)	30 Jun 73
4	Calendar Date	1 Nov 68
5-1	States and Outlying Areas of the U.S.	15 Jun 70
6-3	Countries and County Equivalents of the States of the U.S.	15 Dec 79
* 7	Implementation of Code for Information Interchange and Related Media Standards	7 Mar 69
8-4	Standard Metropolitan Statistical Areas (SMSAs)	30 Jun 74
9	Congressional Districts of the U.S.	14 Nov 69
10-2	Countries, Dependencies, and Areas of Special Sovereignty	1 Mar 77
*11-1	Dictionary for Information Processing	30 Sep 77
*12-2	Federal Information Processing Standards Index	1 Dec 74
13	Rectangular Holes in 12-Row Punched Cards	1 Oct 71
14-1	Hollerith Punched Card Code	24 Dec 80
15	Subsets of Standard Code for Information Interchange	1 Oct 71
16-1	Bit Sequencing of Code for Information Interchange in Serial-by-Bit Data Transmission	1 Sep 77

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17-1	Character Structure and Character Parity Sense for Serial-by-Bit Data Communication in Code for Information Interchange	1 Sep 77
18-1	Character Structure and Character Parity Sense for Parallel-by-Bit Data Communication in Code for Information Interchange	1 Sep 77
* 19	Guidelines for Registering Data Codes	1 Feb 71
* 20	Guidelines for Describing Information Interchange Formats	1 Mar 72
21-1	COBOL	1 Dec 75
22-1	Synchronous Signaling Rates Between Data Terminal and Data Communication Equipment	1 Sep 77
* 23	Objectives and Requirements of the FIPS Program	30 Jun 73
24	Flowchart Symbols and Their Usage in Information Processing	30 Jun 73
25	Recorded Magnetic Tape for Information Interchange (1600 CPI, PE)	30 Jun 73
26	One-Inch Perforated Paper Tape for Information Interchange	30 Jun 73
27	Take-Up Reels for One-Inch Perforated Tape	30 Jun 73
* 28	Standardization of Data Elements and Representations	5 Dec 73
* 29-1	Interpretation Procedures for Federal Standard Information Processing Standard Programming Languages	5 Apr 74
30	Software Summary for Describing Computer Programs and Data Systems	30 Jun 74
* 31	Guidelines for ADP Physical Security and Risk Management	Jun 74
32	Optical Character Recognition Character Sets	1 Dec 74
33	Character Set for Handprinting	1 Oct 74
* 34	Guide for Use of International System of Units (SI) in Federal Information Processing Standards Publications	1 Jan 75

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35	Code Extension Techniques in 7 or 8 Bits	1 Jun 75
36	Graphic Representation of Control Characters of ASCII	1 Jun 75
37	Synchronous High-Speed Data Signaling Rates Between Data Terminal Equipment and Data Communications Equipment	15 Jun 75
* 38	Guidelines for Documentation of Computer Programs and Automated Data Systems	15 Feb 76
* 39	Glossary for Computer Systems Security	15 Feb 76
* 40	Guidelines for Optical Character Recognition Forms	1 May 76
* 41	Computer Security Guidelines for Implementing Privacy Act of 1974	30 May 75
* 42-1	Guidelines for Benchmarking ADP Systems in Competitive Procurement Environment	15 May 77
* 43	Aids for Program COBOL Conversion (FIPS 21 to 21-1)	1 Dec 75
* 44	COBOL Coding Form	1 Sep 76
* 45	Guide for the Development, Implementation, and Maintenance of Standards for the Representation of Computer Processed Data Elements	30 Sep 76
46	Data Encryption Standard	15 Jan 77
* 47	Federal Standard COBOL Pocket Guide	1 Feb 77
* 48	Guidelines on Evaluation of Techniques for Automated Personal Identification	1 Apr 77
* 49	Guideline on Computer Performance Management: An Introduction	1 May 77
50	Recorded Magnetic Tape for Information Interchange, 6250 cpi (246 cpmm), Group Coded Recording	1 Feb 78
51	Magnetic Tape Cassettes for Information Interchange (3.810 mm 0.150 in Tape at 32 bpmm 800 bpi, PE)	1 Feb 78

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52	Recorded Magnetic Tape Cartridge for Information Interchange, 4-Track, 6.30 mm (1/4 in), 63 bps (1600 bpi), Phase Encoded	15 Jul 78
53	Transmittal Form for Describing Computer Magnetic Tape File Properties	1 Apr 78
54	Computer Output Microform (COM) Formats and Reduction Ratios, 16 mm and 105 mm	15 Jul 78
* 55	Guideline for Codes for Named Populated Places and Related Entities of the States of the United States	1 Jun 78
* 56	Guideline for Managing Multivendor Plug-Compatible ADP Systems	15 Sep 78
* 57	Guidelines for the Measurement of Interactive Computer Service Response Time and Turnaround Time	1 Aug 78
58	Representations of Local Time of the Day for Information Interchange	1 Feb 79
59	Representations of Universal Time, Local Time Differentials, and United States Time Zone References for Information Interchange	1 Feb 79
60-1	I/O Channel Interface	27 Aug 79
61	Channel Level Power Control Interface	16 Feb 79
62	Operational Specifications for Magnetic Tape Subsystems	16 Feb 79
63	Operational Specifications for Rotating Mass Storage Subsystems	27 Aug 79
* 64	Guidelines for Documentation of Computer Programs and Automated Data Systems for the Initiation Phase	1 Aug 79
* 65	Guideline for Automated Data Processing Risk Analysis	1 Aug 79
66	Standard Industrial Classification (SIC) Codes	15 Aug 79
* 67	Guideline for Selection of Data Entry Equipment	20 Sep 79
68	Minimal BASIC	4 Sep 80

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69	FORTTRAN	4 Sep 80
70	Representation of Geographic Point Locations for Information Interchange	24 Oct 80
71	Advanced Data Communication Control Procedures (ADCCP)	14 May 80
* 72	Guidelines for Measurement of Remote Batch Computer Service	1 May 80
* 73	Guidelines for Security of Computer Applications	30 Jun 80
* 74	Guidelines for Implementing and Using the NBS DES	2 Dec 80
* 75	Guideline on Constructing Benchmarks for ADP System Acquisitions	18 Sep 80
* 76	Guideline for Planning and Using a Data Dictionary System	20 Aug 80
* 77	Guideline for Planning and Management of Database Applications	1 Sep 80
* 78	Guideline for Implementing ADCCP	26 Sep 80
79	Magnetic Tape Labels and File Structure for Information Interchange	17 Oct 80
* 80	Guide for the Implementation of FIPS in Acquisitions and Design of Computer Products and Services	19 Oct 80
81	DES Modes of Operation	2 Dec 80
* 82	Guideline for Inspection and Quality Control for Alphanumeric Computer-Output Microforms	26 Sep 80
* 83	Guideline on User Authentication Techniques for Computer Network Access Control	29 Sep 80
84	Microfilm Readers	31 Oct 80
85	Optical Character Recognition (OCR) Inks	7 Nov 80
86	Additional Controls for Use with ASCII	29 Jan 81
* 87	Guidelines for ADP Contingency Planning	1 Jul 81

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| * 88 | Guideline on Integrity Assurance and Control
in Database Administration | 14 Aug 81 |
| 89 | Optical Character Recognition (OCR) Character
Positioning | 4 Sep 81 |
| * 90 | Guidelines for Optical Character Recognition
(OCR) Print Quality | 29 Sep 81 |
| 91 | Magnetic Tape Cassettes for Information Inter-
change, Dual Track Complementary Return to Bias
(CRB) Four-States Recording on 3.81-mm (0.150-in)
Tape | 12 Mar 82 |

* Information documents - not implemented in the FPMR.

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ANNEX 2 TO APPENDIX C

INDEX OF FEDERAL TELECOMMUNICATION STANDARDS AND PROJECTS

FED-STD	TITLE	PUBLICATION DATE
1000	Reference Model Architecture for Data Processing Systems Interconnected by Data Communication (Transport) Systems	
1000.1	Physical Layer: Interface Specifications for Information Flow and Management Functions	
1000.2	Data Link Layer: Interface Specifications for Information Flow and Management Functions	
1000.3	Communication Network Layer: Information Flow and Management Functions	
1000.4	End-to-End Communication Transport Layer: Information Flow and Management Functions	
1001	Synchronous High-Speed Signaling Rates Between Data Terminal Equipment and Data Communication Equipment	15 Jun 75
1002	Time and Frequency Reference Information in Telecommunication Systems	22 Apr 75
1003A	Synchronous Bit Oriented Data Link Control Procedures (Advanced Data Communication Control Procedures)	19 Aug 81
1004	Communication Heading Formats For Digital Telecommunication Systems	
1005	Coding and Modulation Requirements for Nondiversity 2400 Bit/Second Modems	20 Jan 77
1006	Coding and Modulation Requirements for 4800 Bit/Second Modems	22 Dec 77
1007	Coding and Modulation Requirements for Duplex 9600 Bit/Second Modems	24 Mar 81
1008	Coding and Modulation Requirements for Duplex 600 and 1200 Bit/Second Modems	16 Jun 80
1009	Coding and Modulation Requirements for Two-Wire, Duplex 2400 Bit/s Modems	

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1010	Bit Sequencing of the American National Standard Code for Information Interchange by Serial-by-Bit Data Transmission	11 Aug 77
1011	Character Structure and Character Parity Sense for Serial-by-Bit Data Communication in the American National Standard for Information Exchange	11 Aug 77
1012	Character Structure and Character Parity Sense for Parallel-by-Bit Data Communication in the American National Standard Code for Information Exchange	11 Aug 77
1013	Synchronous Signaling Rates Between Data Terminal Equipment and Data Circuit Terminating Equipment Utilizing 4kHz Circuits	11 Aug 77
1014	Coding and Modulation Requirements for Duplex 16,000 Bit/s Modems	
1015	Analog to Digital Conversion of Voice by 2400 Bit/second Linear Predictive Coding	
1018	Interface Between Data Circuit-Terminating Equipment and Switched Telephone Networks	
1019	Interface Between Data Circuit-Terminating Equipment and 4 Wire Voiceband Private Line Channels	
1020A	Electrical Characteristics of Balanced Voltage Digital Interface Circuits	1 Jan 80
1026	Interoperability and Security Requirements for Use of the Data Encryption Standard in the Physical Layer of Data Communications	
1027	General Security Requirements for Equipment Using the Data Encryption Standard	14 Apr 82
1028	Encryption of Group 3 Digital Facsimile Images Using the Data Encryption Standard	
1029	Interoperability and Security Requirements for Encryption of Narrowband Digitized Voice Using the Data Encryption Standard	
1030A	Electrical Characteristics of Unbalanced Voltage Digital Interface Circuits	31 Jan 80

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1031	General Purpose 37-Position and 9-Position Interface Between Data Terminal Equipment and Data Circuit Terminating Equipment	24 Jul 79
1032	Signal Quality for Digital Interface Circuits	
001033	Digital Communication Performance Parameters (Interim Federal Standard)	29 Aug 79
1033	Digital Communications Performance Parameters	
1034	Standard Signaling/Supervision Protocols and Modulation Techniques for Federal Telephone Systems	
1035	Coding, Modulation and Transmission Requirements for Single Channel Medium and High Frequency Radiotelegraph Systems Used in Government Maritime Mobile Telecommunications	29 Mar 77
1036	Modulation/Demodulation Requirements for Biomedical Telemetry Equipment	
1037	Glossary of Telecommunication Terms	Jul 80
1040	General Purpose Interface Between Data Circuit-Terminating Equipment for Synchronous Operation on Digital Telecommunication Networks	
001041	Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment for Operation with Packet-Switched Data Telecommunications Networks (Interim Federal Standard)	24 Mar 81
001043	Digital Communication Performance Measurement Methods (Interim Federal Standard)	
1043	Digital Communication Performance Measurement Methods	
1050	Techniques for Protecting Federal Telecommunication Facilities from Damage by High Energy Electromagnetic Pulses (EMP)	
1051-1059	(Reserved for Additional EMP Standards)	
1061	Group 2 Facsimile Apparatus for Document Transmission	24 Mar 81

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1062	Group 3 Facsimile Apparatus for Document Transmission	19 Aug 81
1063	Procedures for Document Facsimile Transmission	14 Apr 82
1064	Group 4 Facsimile Apparatus for Document Transmission in the Public Data Networks	
1065	Procedures for Document Transmission in Public Data Networks	
1066	Facsimile Vocabulary	
1070	PBX Switching Equipment for Voiceband Applications	
1071	Telephone Instruments for Voiceband Applications with Loop Signaling	
1072	Key Telephone Systems for Voiceband Applications	
1080	Specification and Description Language	

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ANNEX 3 TO APPENDIX C
AMERICAN NATIONAL STANDARDS FOR COMPUTERS
AND INFORMATION PROCESSING

DOCUMENT NO.	TITLE OF DOCUMENT
ANSI X3.1 - 1976	DTE-DCE Synchronous Signaling Rates
ANSI X3.4 - 1977	Code For Information Interchange
ANSI X3.5 - 1970	Flowchart Symbols and Their Usage in Information Processing
ANSI X3.6 - 1973R	Perforated Tape Code for Information Interchange
ANSI X3.9 - 1978	Programming Language FORTRAN - DoD Adopted
ANSI X3.11 - 1969	Specification for General Purpose Paper Cards for Information Processing - DoD Adopted
ANSI X3.15 - 1976	Bit Sequencing of the ASCII in Serial-by-Bit Data Transmission
ANSI X3.16 - 1976	Character Structure and Character Parity for Serial-by-Bit Data Communication in the ASCII
ANSI X3.17 - 1981	Character Set and Print Quality for Optical Character Recognition (OCR-A)
ANSI X3.21 - 1980R	Rectangular Holes in Twelve-Row Punched Cards
ANSI X3.23 - 1974	Programming Language COBOL
ANSI/EIA RS-334-1968 (X3.24)	Signal Quality at Interface Between DTE and Synchronous DCE for Serial Data Transmission
ANSI X3.25 - 1976	Character Structure and Character Parity for Parallel-by-Bit Data Communication in ASCII
ANSI X3.26 - 1970	Hollerith Punched Card Code
ANSI X3.27 - 1978	Magnetic Tape Labels and File Structure for Information Interchange
ANSI X3.28 - 1976	Communication Control Characters of ASCII
ANSI X3.30 - 1971	Representation for Calendar Date and Ordinal Date for Information Interchange

ANSI X3.31 - 1973	Structure for the Identification of Counties of the United States for Information Interchange
ANSI X3.32 - 1973	Graphic Representation of the Control Characters of ASCII
ANSI X3.36 - 1975	Synchronous DTE-DCE High Speed Data Signaling Rates
ANSI X3.37 - 1980	Programming Language APT - DoD Adopted
ANSI X3.38 - 1977R	Identification of States of the United States for Information Interchange
ANSI X3.41 - 1974	Code Extension Techniques for Use with the 7-Bit Coded Character Set of American Standard Code for Information Interchange
ANSI X3.42 - 1975	For the Representation of Numeric Values in Character Strings for Information Interchange
ANSI X3.43 - 1977	Representations of Local Time of the Day for Information Interchange
ANSI X3.44 - 1974	Determination of the Performance of Data Communication Systems
ANSI X3.45 - 1974	Character Set for Handprinting
ANSI X3.47 - 1977	Identification of Named Populated Places
ANSI X3.49 - 1982R	Character Set for Optical Character Recognition
ANSI X3.50 - 1976	Representations for U.S. Customary, SI, and Other Units to be Used in Systems with Limited Character Sets
ANSI X3.51 - 1975	U.S. Time Zone References
ANSI X3.53 - 1976	Programming Language PL/I
ANSI X3.57 - 1976	Structure for Formatting Message Headings for Information Interchange Using ASCII Code for Data Communication System Control
ANSI X3.60 - 1978	Minimal Basic
ANSI X3.61 - 1978	Representation of Geographic Point Locations for Information Interchange
ANSI X3.62 - 1979	Paper Used in Optical Character Recognition (OCR) Systems

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ANSI X3.64 - 1979	Additional Controls for Use with ASCII
ANSI X3.66 - 1979	Standard for Advanced Data Communication Control Procedures (ADCCP)
ANSI X3.74 - 1981	Programming Language PL/I General Purpose Subset
ANSI X3.77 - 1980	Representation of Pocket Select Characters in Information Interchange
ANSI X3.78 - 1981	Representation of Vertical Carriage Positioning Characters in Information Interchange
ANSI X3.79 - 1980	Determination of Performance of Data Communication Systems That Use Bit-Oriented Control Procedures
ANSI X3.80 - 1981	Interfaces Between Flexible Disk Cartridge Drives and Their Host Controllers
ANSI X3.83 - 1980	U.S. Sponsorship Procedures for ISO Registration According to ISO 2375
ANSI X3.86 - 1980	Optical Character Recognition (OCR) Inks
ANSI X3.88 - 1981	Computer Program Abstracts
ANSI X3.92 - 1981	Data Encryption Algorithm
ANSI X3.93M - 1981	Optical Character Recognition (OCR) Character Positioning
ANSI X3/TR1-77	Dictionary for Information Processing
ANSI X4.10 - 1975	Minimum Requirements for Remote Dictation through an Intercommunication Switching System

R - Revised/Reaffirmed

ANNEX 4 TO APPENDIX C

ELECTRONIC INDUSTRIES ASSOCIATION STANDARDS

DOCUMENT NO.	TITLE OF DOCUMENT
EIA RS-152-B - 1970	Land Mobile Communications FM or PM Transceivers
EIA RS-160 - 1951(D)	Sound Systems
EIA RS-170 - 1957	Monochrome Television Studio Facilities
*EIA RS-188 - 1977(R)	Standard Dimensional Systems for Automation Requirements (ANSI/EIA RS-188-72)
EIA RS-195-B - 1978	Terrestrial Microwave Relay System Antennas and Passive Reflectors
EIA RS-204-C - 1982	Minimum Standards for Land Mobile Communication FM or PM Receivers, 25-947 MHz
EIA RS-210 - 1958	Terminating and Signaling Equipment for Microwave Communications Systems Part 1: Telephone Equipment
EIA RS-214 - 1981(R)	Method for Calculation of Current Ratings on Hook-up Wire
EIA RS-215 - 1958(D)	Basic Requirements for Broadcast Microphone Cables
EIA RS-219 - 1959	Audio Facilities for Radio Broadcasting Systems
EIA RS-220-A - 1979	Minimum Standards for Land Mobile Communication Continuous Tone-Controlled Squelch Systems (CTCSS)
EIA RS-222-C - 1976	Structural Standards for Steel Antenna Towers and Antenna Supporting Structures
EIA RS-232-C - 1981(R)	Interface Employing Serial Binary Data Interchange
EIA RS-240 - 1961	Electrical Performance Standards for Television Broadcast Transmitters
*EIA RS-242 - 1977(R)	Definitions for Electromagnetic Delay Lines (ANSI/EIA RS-242-72)
EIA RS-247 - 1961	Analog-to-Digital Conversion Equipment
*EIA RS-250-B - 1976	Electrical Performance Standards for Television Relay Facilities (ANSI/EIA RS-250-B-76)

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EIA RS-252-A - 1972	Standard Microwave Transmission Systems
EIA RS-269-B - 1976	Synchronous Signaling Rates for Data Transmission
EIA RS-293 - 1977(R)	Sonic Wire Delay Lines
EIA RS-316-B - 1979	Minimum Standards for Portable/Personal Radio Transmitters, Receivers and Transmitter/Receiver Combination Land Mobile Communications FM or PM Equipment 25-1000 MHz
EIA RS-329-A - 1975	Minimum Standards for Land-Mobile Communication Antennas (Part I - Base or Fixed Station Antennas)
EIA RS-329-1 - 1972	Minimum Standards for Land-Mobile Communication Antennas (Part II - Vehicular Antennas)
*EIA RS-330 - 1966	Electrical Performance Standards for Closed Circuit Television Camera 525/60 Interlaced 2:1 (ANSI/EIA RS-330-68)
EIA RS-334-A - 1981	Signal Quality at Interface Between Data Terminal Equipment and Synchronous Data Circuit-Terminating Equipment for Serial Data Transmission
EIA RS-363 - 1969	Standard for Specifying Signal Quality for Transmitting and Receiving Data Processing Terminal Equipments Using Serial Data Transmission at the Interface with Non-Synchronous Data Communication Equipment
EIA RS-366-A - 1979	Interface Between Data Terminal Equipment and Automatic Calling Equipment for Data Communication
EIA RS-368 - 1969	Frequency Division Multiplex Equipment Standard For Nominal 4 kHz Channel Bandwidths (Non-Compandored) and Wideband Channels (Greater Than 4 kHz)
EIA RS-374-A - 1981	Land Mobile Signaling Standard
*EIA RS-375-A - 1981	Electrical Performance Standards for Direct View Monochrome Closed Circuit Television Monitors 525/60 Interlaced 2:1 (ANSI/EIA RS-375-A-76)
EIA RS-378 - 1970	Measurement of Spurious Radiation from FM and TV Broadcast Receivers in the Frequency Range of 100 to 1000 MHz - Using the EIA Laurel Broadband Antenna
EIA RS-384 - 1970	Time Division Multiplex Equipment for Nominal 4 kHz Channel Bandwidths

*EIA RS-404 - 1973	Standard for Start-Stop Quality Between Data Terminal Equipment and Non-Synchronous Data Communication Equipment (ANSI/EIA RS-404-78)
EIA RS-408 - 1973	Interface Between Numerical Control Equipment and Data Terminal Equipment Employing Parallel Binary Data Interchange
EIA RS-410 - 1974	Standard for the Electrical Characteristics of Class A Closure Interchange Circuits
*EIA RS-411 - 1973	Electrical and Mechanical Characteristics of Antennas for Satellite Earth Stations (ANSI/EIA RS-411-76)
*EIA RS-412-A - 1974	Electrical Performance Standards for Direct View High Resolution Monochrome Closed Circuit Television Monitors (ANSI/EIA RS-412-A-76)
*EIA RS-416 - 1981(R)	Filters, Radio Interference (ANSI/EIA RS-416-74)
*EIA RS-420 - 1975	Electrical Performance Standards for Monochrome Closed Circuit Television Camera 525/60 Random Interlace (ANSI/EIA RS-420-76)
EIA RS-422-A - 1978	Electrical Characteristics of Balanced Voltage Digital Interface Circuits
EIA RS-423-A - 1978	Electrical Characteristics of Unbalanced Voltage Digital Interface Circuits
*EIA RS-440 - 1978	Fiber Optic Connector Terminology (ANSI/EIA RS-440-78)
EIA RS-449 - 1977	General Purpose 37-Position and 9-Position Interface for DTE and DCE Employing Serial Binary Data Interchange
EIA RS-449-1 - 1980	Addendum No. 1 to RS-449
EIA RS-450 - 1978	Standard Form for Reporting Measurements of Land Mobile, Base Station and Portable/Personal Radio Receivers in Compliance with FCC Part 15 Rules
*EIA RS-455 - 1980 (D)	Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices (ANSI/EIA RS-455-79)
*EIA RS-455-1 - 1981(D)	Addendum No. 1 to RS-455 (FOTP #2, #3, and #18) (ANSI/EIA RS-455-1-79)

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- *EIA RS-455-2 - 1980(D) Addendum No. 2 to RS-455 (FOTP #23 and #26) (ANSI/EIA RS-455-2-79)
- *EIA RS-455-3 - 1981(D) Addendum No. 3 to RS-455 (FOTP #4, #11, #17, #25, and #31) (ANSI/EIA RS-455-3-80)
- *EIA RS-455-4 - 1981(D) Addendum No. 4 to RS-455 (FOTP #12, #27, #28, and #29) (ANSI/EIA RS-455-4-81)
- *EIA RS-455-5-1982(D) Addendum No. 5 to RS-455 (FOTP #30, #33, #36, #54, #55, and #82) (ANSI/EIA RS-455-5-82)
- EIA RS-462 - 1979 Electrical Performance Standards for Television Broadcast Demodulators
- EIA RS-464 - 1979 Private Branch Exchange (PBX) Switching Equipment for Voiceband Applications
- EIA RS-465 - 1981(D)(F) Group 3 Facsimile Apparatus for Document Transmission
- EIA RS-466 - 1981(D)(F) Procedures for Document Facsimile Transmission
- EIA RS-470 - 1981(D) Telephone Instruments with Loop Signaling for Voiceband Applications - Issue 1
- EIA RS-478 - 1981 (D) Multi-Line Key Telephone Systems (KTS) for Voiceband Applications

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- * ANSI-approved
 - (R) Reaffirmed
 - (D) Adopted for DoD Use
 - (F) Adopted as a Federal Standard

ANNEX 5 TO APPENDIX C

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) STANDARDS

<u>NUMBER/DATE</u>	<u>TITLE</u>
*IEEE STD 100-1977	Standard Dictionary of Electrical and Electronics Terms
*IEEE STD 145-1973	Standard Definitions of Terms for Antennas
*IEEE STD 146-1980	Standard Definitions of Fundamental Waveguide Terms
*IEEE STD 149-1979	Standard Test Procedure for Antennas
IEEE STD 162-1963	Standard Definitions of Terms for Electronic Digital Computers (R 1972)
*IEEE STD 167-1966	Test Procedure for Facsimile (R 1971)
IEEE STD 167A-1980	Facsimile Test Chart
*IEEE STD 168-1956	Standard Definitions of Terms on Facsimile (R 1971)
IEEE STD 170-1964	Standard Definitions of Terms for Modulation Systems
IEEE STD 171-1958	Standards on Information Theory: Definition of Terms
IEEE STD 181-1977	Pulse Measurement and Analysis by Objective Techniques
IEEE STD 182A-1964	Standard Definitions of Terms for Radio Transmitters
IEEE STD 183-1958	Methods for Testing Radiotelegraph Transmitters (Below 50 MC) (58 RE 15TR1)
*IEEE STD 184-1969	Test Procedure for Frequency-Modulated Mobile Communications Receivers
*IEEE STD 185-1975	Standard Methods of Testing Frequency Modulation Broadcast Receivers
*IEEE STD 186-1948	Standard Methods of Testing Amplitude-Modulation Broadcast Receivers (R 1972)
IEEE STD 187-1951	Standards on Radio Receivers: Open Field Method of Measurement of Spurious Radiation From Frequency Modulation and Television Broadcast Receivers

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<u>NUMBER/DATE</u>	<u>TITLE</u>
*IEEE STD 189-1955	Standard Method of Testing Receivers Employing Ferrite Core Loop Antennas (R 1972)
*IEEE STD 190-1960	Methods of Testing Monochrome Television Broadcast Receivers
*IEEE STD 200-1975	Reference Designations for Electrical and Electronics Parts and Equipments - DoD Adopted
*IEEE STD 201-1979	Standard Definitions of Terms Relating to Television
*IEEE STD 202-1954	Standards on Television: Methods of Measurement of Aspect Ratio and Geometric Distortion (R 1978)
*IEEE-STD 205-1958	Standards on Television: Measurement of Luminance Signal Levels (R1972)
IEEE STD 206-1960	Measurement of Differential Gain and Differential Phase (R 1978)
IEEE STD 208-1960	Measurement of Resolution of Camera Systems (R 1978)
*IEEE STD 211-1977	Definitions of Terms for Radio Wave Propagation
*IEEE STD 213-1961	Radio Interference: Methods of Measurement of Conducted Interference Output to the Power Line From FM and Television Broadcast Receivers in the Range of 300 KHz to 25 MHz (R 1974)
IEEE STD 214-1961	Construction Drawings of Line Impedance Network Required for Measurement of Conducted Interference to the Power Line from FM and Television Broadcast Receivers in the Range of 300 KHz to 25 MHz as Specified in IEEE STD 213-1961
IEEE STD 254-1963	Definitions of Parametric Device Terms (R 1971)
IEEE STD 268-1982	Metric Practice - DoD Adopted
IEEE STD 269-1971	Method for Measuring Transmission Performance of Telephone Sets
IEEE STD 281-1968	Service Conditions for Power System Communications Apparatus
IEEE STD 291-1969	Standard Report on Measuring Field Strength in Radio Wave Propagation (R 1981)

<u>NUMBER/DATE</u>	<u>TITLE</u>
IEEE STD 297-1969	Speech Quality Measurements
IEEE STD 302-1969	Standard Methods for Measuring Electromagnetic Field Strength for Frequencies Below 1000 MHz in Radio Wave Propagation (R 1981)
IEEE STD 312-1977	Definitions of Terms for Communication Switching
IEEE STD 314-1971	State of the Art of Measuring Unbalanced Transmission-Line Impedance
*IEEE STD 315-1975	Graphic Symbols for Electrical & Electronics Diagrams (Including Reference Designation Class Designation Letters) (CSA Z 99-75) - DoD Adopted
IEEE STD 356-1974	Guide for Radio Methods of Measuring Earth Conductivity
*IEEE STD 376-1975	Measurement of Impulse Strength and Impulse Bandwidth
IEEE STD 377-1980	Recommended Practice for Measurement of Spurious Emission from Land-Mobile Communication Transmitters
*IEEE STD 455-1976	IEEE Standard Test Procedure for Measuring Longitudinal Balance of Telephone Equipment Operating in the Voice Band - DoD Adopted
*IEEE STD 487-1980	Guide for the Protection of Wireline Communication Facilities Serving Electric Power Stations
*IEEE STD 488-1978	Standard Digital Interface for Programmable Instrumentation - Supplement 488A-80
IEEE STD 503-1978	Standard for Measurement and Characterization of Diode-Type Camera Tubes
*IEEE STD 511-1979	Video Signal Transmission Measurement of Linear Waveform Distortion
*IEEE STD 623-1976	Graphic Symbols for Grid and Mapping Diagrams Used in Cable Television System
IEEE STD 643-1980	Guide for Power-Line Carrier Applications
IEEE STD 661-1979	Standard Method For Determining Objective Loudness Ratings of Telephone Connections
IEEE STD 847-1982	Standard Definitions of Digital Terms Relating to Television

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*C2-81

National Electrical Safety Code

* ANSI-approved -

R - Revised/Reaffirmed

ANNEX 6 TO APPENDIX C

CONTENTS OF THE CCITT BOOK
APPLICABLE AFTER THE SEVENTH PLENARY ASSEMBLY (1980)

YELLOW BOOK

VOLUME I

- Minutes and reports of the Plenary Assembly.
Opinions and Resolutions.
Recommendations on:
 - the organization and working procedures of the CCITT (Series A);
 - means of expression (Series B);
 - general telecommunication statistics (Series C).
- List of Study Groups and Questions under study.

VOLUME II

- Section II.1 - General tariff principles - Charging and accounting in international telecommunications services. Series D Recommendations (Study Group III).
- Section II.2 - International telephone service - Operation. Recommendation E.100 - E.323 (Study Group II).
- Section II.3 - International telephone service - Network management - Traffic engineering. Recommendations E.401 - E.543 (Study Group II).
- Section II.4 - Telegraph and "telematic services"¹⁾ operations and tariffs. Series F Recommendations (Study Group I).

VOLUME III

- Section III.1 - General characteristics of international telephone connections and circuits. Recommendations G.101 - G.171 (Study Group XV, XVI, CMBD).
- Section III.2 - International analogue carrier systems. Transmission media - characteristics. Recommendations G.211 - G.651 (Study Group XV, CMBD).
- Section III.3 - Digital networks - transmission systems and multiplexing equipments. Recommendations G.701 - G.941 (Study Group XVIII).
- Section III.4 - Line transmission of non telephone signals. Transmission of sound program and television signals. Series H, J Recommendations (Study Group XV).

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VOLUME IV

- Section IV.1 - Maintenance; general principles, international carrier systems, international telephone circuits. Recommendations M.10 - M.761 (Study Group IV).
- Section IV.2 - Maintenance; international voice frequency telegraphy and facsimile, international leased circuits. Recommendations M.800 - M.1235 (Study Group IV).
- Section IV.3 - Maintenance; international sound program and television transmission circuits. Series N Recommendations (Study Group IV).
- Section IV.4 - Specifications of measuring equipment. Series O Recommendations (Study Group IV).

VOLUME V

- Telephone transmission quality. Series P Recommendations (Study Group XII).

VOLUME VI

- Section VI.1 - General Recommendations on telephone switching and signaling. Interface with the maritime service. Recommendations Q.1 - Q.118 bis (Study Group XI).
- Section VI.2 - Specifications of signaling systems Nos. 4 and 5. Recommendations Q.120 - Q.180 (Study Group XI).
- Section VI.3 - Specifications of signaling system No. 6. Recommendations Q.251 - Q.300 (Study Group XI).
- Section VI.4 - Specifications of signaling systems R1 and R2. Recommendations Q.310 - Q.490 (Study Group XI).
- Section VI.5 - Digital transit exchanges for national and international applications. Interworking of signaling systems. Recommendations Q.501 - Q.685 (Study Group XI).
- Section VI.6 - Specifications of signaling No. 7. Recommendations Q.701 - Q.741 (Study Group XI).
- Section VI.7 - Functional Specification and Description Language (SDL). Man-machine language (MML). Recommendations Z.101 - Z.104 and Z.311 - Z.341 (Study Group XI).
- Section VI.8 - CCITT high level language (CHILL). Recommendation Z.200 (Study Group XI).

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VOLUME VII

- Section VII.1 - Telegraph transmission and switching. Series R, U Recommendations (Study Group IX).
- Section VII.2 - Telegraph and "telematic services"¹⁾ terminal equipment. Series S, T Recommendations (Study Group VIII).

VOLUME VIII

- Section VIII.1 - Data communication over the telephone network. Series V Recommendations (Study Group XVII).
- Section VIII.2 - Data communication networks; services and facilities, terminal equipment and interfaces. Recommendations X.1 - X.29 (Study Group VII).
- Section VIII.3 - Data communication networks; transmission, signaling and switching, network aspects, maintenance, administrative arrangements. Recommendations X.40 - X.180 (Study Group VII).

VOLUME IX

- Protection against interference. Series K Recommendations (Study Group V). Protection of cable sheaths and poles. Series L Recommendations (Study Group VI).

VOLUME X

- Section X.1 - Terms and definitions.
- Section X.2 - Index of the Yellow Book

¹⁾"Telematic services", used provisionally, refers to facsimile, telex, videotex, teletex, etc.

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ANNEX 7 TO APPENDIX C

VOLUMES I TO XIII OF THE XIVTH PLENARY ASSEMBLY TO THE INTERNATIONAL RADIO CONSULTATIVE COMMITTEE (CCIR) AT KYOTO IN 1978

VOLUME I	Spectrum utilization and monitoring.
VOLUME II	Space research and radioastronomy.
VOLUME III	Fixed service at frequencies below about 30 MHz.
VOLUME IV	Fixed service using communication satellites.
VOLUME V	Propagation in non-ionized media.
VOLUME VI	Propagation in ionized media.
VOLUME VII	Standard frequencies and time signals.
VOLUME VIII	Mobile services.
VOLUME IX	Fixed service using radio-relay systems. Frequency sharing and coordination between systems in the fixed satellite service and radio-relay systems.
VOLUME X	Broadcasting service (sound).
VOLUME XI	Broadcasting service (television).
VOLUME XII	Transmission of sound broadcasting and television signals over long distance (CMTT). Vocabulary (CMV).
VOLUME XIII	Information concerning the XIVth Plenary Assembly: Minutes of the Plenary Sessions. Texts of general interest. Structure of the C.C.I.R. Complete list of C.C.I.R. texts. Alphabetical index of technical terms appearing in Volumes I to XII.

APPENDIX D

OBTAINING STANDARDIZATION DOCUMENTS

10. General

10.1 Scope. This appendix describes the method of obtaining standards and other documents, such as recommendations that are discussed in this handbook.

10.2 Order of Coverage. The various types of standards, recommendations, etc., are listed generally in the same order as listed in paragraph 5.3 and Section 4 of Volume II.

20. Indices of Standards. All standards organizations have some method of tabulating their standards, whether by means of an index, list, or some other applicable term. From the standpoint of this handbook, it may be stated that the most important indices are those of the U.S. military and the U.S. Government (Civil side). These are described as follows:

20.1 Department of Defense Index of Specifications and Standards (DoDISS)20.1.1 Description

The DoDISS is comprised of three listings, as follows:

Part I - An Alphabetic Listing

Part II - A Numeric Listing

Part II Appendix - A cumulative listing of canceled documents published triennially. This cumulative listing of canceled documents is kept current by adding thereto cumulative cancellation listing of DoDISS Part II Supplement and subsequent canceled listing appearing in the Basic DoDISS Part II.

Part II, Section "A" is a cumulative listing of documents, numerically by document number. Section "A" includes the additions and changes to standardization documents listed in Section "B".

Part II, Section "B" is a ready reference listing of additions, changes and cancellations to standardization documents since the previous bi-monthly supplement.

Part III - Also available is a cumulative alphabetic listing of specifications, standards and related standardization documents, sorted by Federal Supply Classification (FSC) Class.

These listings are published under authority of the Office of the Under Secretary of Defense (R&E) and are issued with supplements effective 1 September, 1 November, 1 January, 1 March and 1 May.

The DoD Index of Classified Standardization Documents lists classified standardization documents, both numerically by document number and

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alphabetically by document title. All specifications, standards, the DoDISS and the DoD Index of Classified Documents may be ordered by DD Form 1425 from:

Military Activities:

Commanding Officer
Naval Publications and Forms Center (NPFC 105)
5801 Tabor Avenue
Philadelphia, PA 19120

**Government Civil Agencies and Non-Government Activities
(subscription basis only):**

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

The DoDISS is also available from the GPO.

20.1.2 Details on Ordering Specifications and Standards. A request can be initiated by telephone, telegraph, mail in any form, or bearer. However, it is preferred that private industry use a simplified order form, DD Form 1425, which includes a self-addressed label. Once a customer orders specifications and standards, he will automatically be provided by NPFC with sufficient blank forms to continually reorder in the preferred manner. All types of requests should be submitted in the following manner:

- a. Indicate complete mailing address (including zip code) and invitation-for-bid or contract number, when applicable.
- b. Indicate quantity of each document desired. Maximum issue to Private Industry: 10 each (no exception).
- c. List each desired specification or standard by document symbol as recorded in the DoDISS.
- d. List Federal Specifications in alphabetical order. List all others in numerical order. The following sequence of categories of material is preferred: Military Specifications, Military Standards, Federal Specifications and Standards, QPL's, etc.
- e. List the number of line items ordered on each request to five or less.

EMERGENCY TELEPHONE REQUESTS: To submit an emergency request by telephone, call AREA CODE 215, 697-3321; or AUTOVON 442-3321; Duty Hours: 8 AM to 4:30 PM - Monday thru Friday (Philadelphia time); Off-duty telephone requests are serviced by an automatic answering device seven days a week.

Generally, all types of requests are processed in two work days.

20.1.3 Helpful Hints. All amendments and revisions will be automatically issued with the basic specifications, unless specified otherwise by the requester. Only end item specifications will be furnished. Referenced documents must be requested by individual document number. Slash sheets, such as MIL-E-1/306B, must be individually requested by document number. Slash sheets will not be issued as a set. NPFC stocks only current specifications and standards listed in the DoDISS. Do not submit requests listing Federal stock numbers to applicable specification numbers. The NPFC does not maintain file of Invitations for Bid, Requests for Quotes, Contracts, etc., so each individual document must be listed by document number. When submitting multiple requests, place full mailing address on each request. Documents issued by NPFC are in printed form only. If handscribed requests are to be submitted, please use black or dark blue ink only. Superseded or canceled specifications are not stocked at NPFC. These specifications must be processed through the procurement or contracting officer of the military having an interest in the document.

20.1.4. Channels for Ordering Publications. Before ordering publications, determine the channels for doing so in your own organization.

20.2 GSA Index of Federal Specifications and Standards

20.2.1 General

(1) The GSA Index of Federal Specifications and Standards is issued for the use of Federal agencies and other authorized users under the authority contained in the Federal Property Management Regulations 101-29.1.

(2) This index provides alphabetical, numerical, and Federal Supply Classification listings of Federal Specifications, Federal Standards, and Federal Qualified Products Lists in general use throughout the Federal Government.

(3) Instructions for use of the index and availability of Federal standardization documents referenced therein are provided in the general instructions.

(4) The DoD lists Federal Specifications and Standards in the DoDISS.

(5) The Index of Specifications and Standards is available at the U.S. Government Printing Office. The check should be made out to the Superintendent of Documents and the request mailed to:

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

20.2.2 Availability of Documents

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20.2.2.1 Civil Agencies

a. Continuous distribution of all standardization documents issued during a 12-month period and prices may be obtained from:

General Services Administration
Specification and Consumer Information Distribution
Branch (3FRI)
Washington Navy Yard, Bldg. 197
Washington, DC 20407

b. Single copies of these documents are also available from this source.

c. All requests for standardization documents must be accompanied by a purchase requisition. A blanket purchase agreement is available in cases where single copies are frequently required.

20.2.2.2 Department of Defense. Military activities should submit requests to:

Naval Publications and Forms Center
5801 Tabor Avenue
Philadelphia, PA 19120

20.2.2.3 Bidders and Government Contractors. Copies may be requested from Government purchasing offices or from Business Service Centers.

20.2.2.4 Others. Copies of standardization documents are available for reference purposes at Business Service Centers and some Federal Government depository libraries.

20.2.2.5 Documents Not Available. The following documents, commonly associated with Federal standardization documents, are not available from General Services Administration:

(1) Military standardization documents listed in the Department of Defense Index of Specifications and Standards (available from the Government Printing Office) are stocked at the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

(2) Industry Standards (e.g., American Society for Testing and Materials, American National Standards Institute) are available from the publisher, society, or association which authored the standard.

20.3 ADP and Telecommunication Standards Index. This index contains lists and information concerning standards applicability in procurements, published standards, standards being developed and cross-references of Federal and American National Standards. Copies of the index should be directed to:

General Services Administration (CPSS)
Washington, DC 20405

30. Obtaining Standards

30.1 Military Standards and Specifications. Military standards and specifications are included in the DoDISS and may be obtained as indicated in paragraph 20.1. Of particular relevance to this handbook are:

- a. MIL-STD-188 series (SLHC, TCTS or SLHC/TCTS).
- b. MIL-STD-187 series (SLHC).
- c. Communications Military Handbooks (SLHC or SLHC/TCTS).
- d. Information Processing Standards for Computers (IPSC).
- e. Electromagnetic Compatibility Standards (EMCS).
- f. Automatic Test Technology Standards (ATTS).
- g. Computer Aided Design and Numerical Control (CDNC).
- h. Configuration Management (CMAN).
- i. Human Factors (HFAC).
- j. Miscellaneous (MISC).
- k. Maintainability (MNTY).
- l. Quality Control/Assurance and Inspection (QCIC).
- m. Reliability (RELI).
- n. Safety (SAFT).
- o. Federal Supply Classification Classes (FSC's).
- p. Federal Supply Classification Groups (FSG's).

30.2 Joint Chiefs of Staff Publications. JCS Pubs such as Pub 1, Pub 10 and Pub 11 may be obtained by writing to:

Secretary, Joint Chiefs of Staff
Attention: Document Division
Washington, DC 20301

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30.3 Reports of the DoD Committee on Interoperability. The reports of the DoD Committee on Interoperability may be obtained from the Committee Recorder as follows:

Defense Communications Agency
Attention: Secretariat
Committee on Interoperability/J110
1860 Wiehle Avenue
Reston, VA 22090

30.4 Allied Communications Publications (ACP's) and Joint Army, Navy, Air Force Publications (JANAP's)

a. The MCEB has direct cognizance over ACP's, general and U.S. supplements thereto and JANAP's. The ACP's and JANAP's are listed in JANAP-201-Status of Non-Cryptographic JANAP's and ACP's.

b. Obtain by requisition, using DD Form 1348, pursuant to paragraph 20.1. (NOTE: Do not use DD Form 1425).

30.5 Federal Telecommunication Standards

30.5.1 Authority. Authority for publishing most, if not all, Federal Government standards is vested in the General Services Administration (GSA) by the Federal Property and Management Regulation 101-29. This authority extends to the Federal Telecommunication Standards (FED-STD's) of the National Communications Systems (NCS), although the FIPS program under NBS is exempted.

30.5.2 Obtaining Standards. Federal telecommunication standards are listed in both the Index of the Federal Specifications and Standards and the DoD Index of Specifications and Standards under the designation "TELE". Federal telecommunication standards may be obtained pursuant to paragraphs 20.1 or 20.2.

30.5.3 Technical Queries. Queries concerning technical aspects of TELE standards may be addressed to:

National Communications System
Attention: Office of Technology and Standards
Washington, DC 20305
Telephone: (202) 692-2124
(AUTOVON 222-2124)

30.6 Federal Information Processing Standards (FIPS)

a. The NBS publishes a list of standards entitled "Federal Information Processing Standards Publications (FIPS PUB) Series".

Requests for single or quantity orders of FIPS PUB's should be sent to:

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National Technical Information Service (NTIS)
U.S. Department of Commerce
Springfield, VA 22161
Telephone (703) 487-4650

Requests for discount prices on quantity orders should also be referred to the above address and telephone number.

Requests for subscriptions to FIPS PUBs should be sent to:

Subscriptions - NTIS
U.S. Department of Commerce
Springfield, Va 22161
Telephone (703) 487-4630

b. Some FIPS, excluding those on data elements, are listed in the DoDISS under Area IPSC on the "Contents" page of the numerical listing catalog. These FIPS may be ordered pursuant to paragraph 20.1.

c. The source of the FIPS PUB's are:

Office of ADP Standards Management
Institute for Computer Sciences and Technology
National Bureau of Standards
Washington, DC 20234
Telephone (301) 921-3157

30.7 National Telecommunications and Information Administration (NTIA) Standards

a. NTIA Standards are published in Chapter 5, Technical Standards, Requirements and Objectives, of the Manual of Regulations and Procedures for Radio Frequency Management. Chapter 5 normally is not available alone. However, the whole manual may be purchased by mail or by placing an order at a GPO store. The price is approximately \$50.00. Refer to symbol MRFM - "Manual of Regulations and Procedures for Radio Frequency Management".

Mail to: Superintendent of Documents
Government Printing Office
Washington, DC 20402

Call Order Desk, GPO Procurement Section
(202)275-3331

30.8 American National Standards Institute (ANSI) Standards

a. The ANSI standards applicable to this handbook are listed by ANSI in their list of "American National Standards for Information Processing". On the back of this list is an order blank and the cost of the standards. Orders may be placed with:

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Department X3
American National Standards Institute, Inc.
1430 Broadway
New York, NY 10018

b. No list of standards is currently available for the ANSI X4 Committee on Office Machines and Supplies, there having been no standards generated, as yet, in this area.

c. Those ANSI standards adopted by the DoD are listed in the DoDISS. These may be ordered pursuant to paragraph 20.1.

30.9 Electronic Industries Association (EIA) Standards

a. EIA publishes an annual "Catalog of EIA and *JEDEC Standards and Engineering Publications". Inquiries may be directed to:

Electronic Industries Association
Standards Sales Office
2001 Eye Street, NW
Washington, DC 20006

b. A few EIA standards are listed in the DoDISS and may be obtained pursuant to paragraph 20.1.

30.10 Institute of Electrical and Electronics Engineers (IEEE) Standards

a. IEEE publishes a "Catalog of IEEE Standards". Inquiries may be directed to:

Institute of Electrical and Electronics Engineers, Inc.
445 Hoes Lane
Piscataway, NJ 08854

b. The headquarters of IEEE is as follows:

Institute of Electrical and Electronic Engineers
Standards Operations
345 East 47th Street
New York, NY 10017

c. A few IEEE standards are listed in the DoDISS and these may be obtained pursuant to paragraph 20.1.

30.11 American Society for Testing and Materials (ASTM) Standards

a. ASTM publishes an "Index of Standards". A list of publications is free, but is of less value than the index. Inquiries may be directed to:

* JEDEC - Joint Electron Device Engineering Council

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American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

b. A few ASTM standards are listed in the DoDISS and these may be obtained pursuant to paragraph 20.1.

30.12 National Fire Protection Association (NFPA) Standards

a. The NFPA publishes the "National Electrical Code". Inquiries for standards, codes, and recommended practices may be directed to:

National Fire Protection Association
60 Batterymarch Street
Boston, MA 02110

b. A few NFPA documents are listed in the DoDISS and these may be obtained pursuant to paragraph 20.1.

30.13 Radio Technical Commission for Aeronautics (RTCA) Standards. The RTCA publishes a catalog entitled "Listing of Available Documents". Inquiries for standards or other available documents may be directed to:

Radio Technical Commission for Aeronautics
Suite 655
1717 H Street, NW
Washington, DC 20006

30.14 Radio Technical Commission for Maritime Services (RTCM) Standards. The RTCM publishes a list of standards and documents. Inquiries may be directed to:

Radio Technical Commission for Maritime Services
P.O. Box 19087
Washington, DC 20036

30.15 North Atlantic Treaty Organization (NATO) STANAGs.

a. NATO STANAGs are listed in reference 2.2, NATO Military Standardization Agreements and Allied Publications (U) AAP-4 (). The publication is published annually. The STANAGs are also listed in DA Pamphlet 310-35, Index of International Standardization Agreements (Ref. 2.49). STANAGs listed in the DoDISS are available, pursuant to paragraph 20.1.

b. The primary U.S. sources of NATO STANAGs are the Central U.S. NATO Registry, located in Room 1B889, Pentagon (telephone (703) 697-5943 or AUTOVON 227-5943), and the NATO Subregistries in the country, so it is impractical, and unnecessary, to list them. Anyone who desires a STANAG should procure it through his Treaty Control Officer, who knows, or can determine, what subregistry to contact.

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c. Additional copies, in English and French, may be obtained upon request from the NATO Military Agency for Standardization. (MAS), 1110 NATO Brussels. Only a limited number of spare copies are kept, and requests for additional supplies must be justified. However, this avenue of approach is open only to the highest echelons. There is no reason to believe that the subregistries cannot obtain what is required.

30.16 American, British, Canadian, Australian (ABCA) Armies Agreements

a. ABCA Armies Quadripartite Standardization Agreements (QSTAGS) are recorded on the Quadripartite Standardization Agreement List (QSAL) and may be obtained from:

Commander
U.S. Army Material and Development and Readiness Command
Attention: DRCIRD
5001 Eisenhower Avenue
Alexandria, VA 22333

b. Those unclassified QSTAGS that have been ratified by the U.S. are listed in the DoDISS and are available pursuant to paragraph 20.1. QSTAGS are also listed in reference 2.49, DA Pamphlet 310-35, Index of International Standardization Agreements.

c. Joint regulation AR 310-70, AFR 66-19, NAVMATINST 5600.11A, MCO 5215.16 and DSAR 4151.9 provides guidance for ordering administrative and technical publications.

30.17 AUS-CAN-UK-US Naval Communications Organization Decisions. No standards, as such, are generated. However, queries in connection with the decisions may be addressed as follows:

a. Command and Control Decisions:

Office of Chief of Naval Operations (OP-942G)
AUS-CAN-UK-US NAVCOMS
C2 Permanent Steering Group
Washington, DC 20350

b. Communications Decisions:

Office of Chief of Naval Operations (OP-941C2)
AUS-CAN-UK-US NAVCOMS
Communications Permanent Steering Group
Washington, DC 20350

30.18 Air Standardization Coordination Committee (ASCC) Standards

a. The ASCC publishes the "Catalog of Air Standards and Advisory Publications". ASCC Standards are also listed in the DoDISS and may be

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obtained pursuant to paragraph 20.1.

b. Inquiries for standards or advisory publications may be made to the U.S. Air Force or U.S. Navy representatives in the Pentagon as follows:

(1) Air Force:

Headquarters
USAF/XOXX
International Standardization Office
Washington, DC 22030

(2) Navy:

Department of the Navy
OP-953D1
Washington, DC 20350

30.19 International Telecommunication Union (ITU) Documents

a. The ITU publishes a "List of Publications, International Telecommunication Union, Geneva". This list includes all of the publications of the ITU and the CCITT, CCIR, and IFRB and provides the prices of all documents. Queries may be addressed to:

International Telecommunication Union
General Secretariat, Sales Service
Place des Nations
CH-1211 Geneva 20 (Switzerland)

b. The list of publications is also available from:

Office of International Communications Policy
Department of State
Washington, DC 20520
Telephone (202) 632-3405

30.20 International Organization for Standardization (ISO) Standards. The ISO publishes a catalog of standards, known as the ISO Catalog. Inquiries may be directed to:

International Organization for Standardization
No. 1 Rue de Varembe
Case Postale 56
CH-1211 Geneva 20 (Switzerland)

30.21 International Electrotechnical Commission (IEC) Standards. The IEC, the electrical arm of the ISO, publishes a catalog of its electrical standards. Inquiries may be directed to:

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International Electrotechnical Commission
No. 1 Rue de Varembe'
Case Postale 56
CH-1211 Geneva 20 (Switzerland)

30.22 International Civil Aviation Organization (ICAO) Documents. ICAO publishes standards, recommendations and guidance in Annexes to their conventions that relate to aircraft in the navigable air space. Queries may be directed to:

International Civil Aviation Organization
Attention: Distribution Officer
P.O. Box 400
Succursale; Place De Aviation Internationale
1000 Sherbrooke St. West
Montreal, Quebec, Canada H3S2R2

APPENDIX E

ACRONYMS AND ABBREVIATIONS

10.0 Acronyms and Abbreviations Used in MIL-HDBK-188. The following listing contains acronyms and abbreviations used in the handbook, along with their meaning.

ABCA	American, British, Canadian, and Australian (Quadripartite organization).
ACP	Allied Communications Publication (Primarily NATO)
ADP	Automatic Data Processing
ADSIA	Allied Data Systems Interoperability Agency (NATO)
AESC	American Engineering Standards Committee, forerunner of ANSI
AF	Air Force
ALLA	Allied Long Lines Agency (NATO)
AMSDL	Acquisition Management Systems and Data Requirements Control List
ANCA	Allied Naval Communications Agency (NATO)
ANSC	American National Standards Committee (of ANSI)
ANSI	American National Standards Institute
AP	Allied Publication (NATO)
ARFA	Allied Radio Frequency Agency (NATO)
ASA	American Standards Association, forerunner of ANSI
ASCA	Allied Communications Security Agency (NATO)
ASCC	Air Standardization Coordinating Committee
ASCI	Assistant Secretary for Communications and Information (Department of Commerce, head of NTIA)
ASD (C ³ I)	Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)

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ASD (I&L)	Assistant Secretary of Defense for Installations and Logistics (not extant)
ASD (M,RA&L)	Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics)
ASD (T)	Assistant Secretary of Defense (Telecommunications) (not extant)
ATCA	Allied Tactical Communications Agency (NATO)
ATTS	Automatic Test Technology Standards (DoD Standardization Area)
ASTM	American Society for Testing and Materials
AUS-CAN-NZ-UK-US	Australia-Canada-New Zealand-United Kingdom-United States
C ² (or C2)	Command and Control
C ³ (or C3)	Command, Control, and Communications
C3S	Command, Control, and Communications Systems
CBEMA	Computer and Business Equipment Manufacturers Association
CCEB	Combined Communications-Electronics Board (Australia, Canada, United Kingdom, United States, New Zealand)
CCIR	International Radio Consultative Committee
CCIS	Command, Control and Information Systems (NATO)
CCLIT	International Telegraph and Telephone Consultative Committee
CF	Canadian Forces
CFR	Code of Federal Regulations
CIA	Central Intelligence Agency
CNAD	Conference of NATO Armament Directors
CNO	Chief of Naval Operations
DCA	Defense Communications Agency
DCS	Defense Communications System

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DepSO	Departmental Standardization Office
DIA	Defense Intelligence Agency
DID	Data Item Description
DLA	Defense Logistics Agency
DO	Design Objective
DoD	Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
DoDISS	Department of Defense Index of Standardization and Specification (see Section 3 of MIL-HDBK-188 Volume I).
DODSSP of	Department of Defense Single Stock Point (see Section 3 MIL-HDBK-188 Volume I)
DOE	Department of Energy
DMSSB	Defense Materiel Standardization and Specification Board
DMSSO	Defense Materiel Specifications and Standards Office
DSARC	Defense Systems Acquisition and Review Council
DSM	Defense Standardization Manual (DoD 4120.3-M)
DSSP	Defense Standardization and Specification Program
DTACCS	Director, Telecommunications and Command and Control Systems (not extant)
ECCM	Electronic Counter-Counter Measures
ECMA	European Computer Manufacturers Association
ECRS	Embedded Computer Resources Standards (DoD Standardization Area)
ED	Engineering Development
EIA	Electronic Industries Association
EMCS	Electromagnetic Compatibility Standards (DoD. Standardization area)

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EPA	Environment Protection Agency
FAA	Federal Aviation Administration
FDIC	Federal Deposit Insurance Corporation
FIPS	Federal Information Processing Standards
FPMR	Federal Property and Management Regulations
FSC	Federal Supply Classification Class
FSG	Federal Supply Classification Group
TSC	Federal Telecommunication Standards Committee
FY	Fiscal Year
GPO	Government Printing Office
GSA	General Services Administration
HDBK	Handbook
HEW	Health, Education and Welfare
HUD	Housing and Urban Development
ICAO	International Civil Aviation Organization
ICST	Institute for Computer Sciences and Technology (NBS)
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IEG's	Information Exchange Groups (ABCA Armies)
IFF	Identification Friend or Foe
IFIP	International Federation of Information Processing
IFRB	International Frequency Registration Board
IMS	International Military Staff (NATO)
IPSC	Information Processing Standards for Computers (DoD Standardization Area)

IRAC	Interdepartmental Radio Advisory Committee
ISO	International Organization for Standardization
ITU	International Telecommunication Union
JANAP	Joint Army, Navy, Air Force Publication
JCS	Joint Chiefs of Staff
JINTACCS	Joint Interoperability of Tactical Command and Control Systems
JSC	Joint Steering Committee
JSG/TCCCS	Joint Standardization Group for Tactical Command and Control and Communications Systems
JTC3S	Joint Tactical Command and Control Communications Systems (Council)
JTIDS	Joint Tactical Information Distribution System
MAS	Military Agency for Standardization (NATO)
MC	Military Committee (NATO) or Monitoring Committee of ASCC
MCEB	Military Communications-Electronics Board
MCEWG	Military Communications-Electronics Working Group (NATO)
MCSTSC	Military Communications System Tactical Standards Committee
MILDEPS	Military Departments
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NASA	National Air and Space Administration
NATO	North Atlantic Treaty Organization
NAVELEX	Naval Electronic Systems Command
NBS	National Bureau of Standards
NCCDPC	NATO CCIS and ADP Committee
NCEB	NATO Communications-Electronics Board

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NCS	National Communications System
NECA	National Electrical Contractors Association
NEWAC	NATO Electronic Warfare Advisory Committee
NFPA	National Fire Protection Association
NMCS	National Military Command System
NPFC	Navy Publications and Forms Center (Philadelphia)
NPPSO	Navy Publications and Printing Service Office (Philadelphia)
NSA	National Security Agency
NTIA	National Telecommunications and Information Administration (NTIA)
OSD	Office of the Secretary of Defense
OTP	Office of Telecommunications Policy (Now NTIA)
OUSDR&E	Office of the Under Secretary of Defense (Research and Engineering)
PSG	Permanent Steering Group (AUS-CAN-UK-US NAVCOMMS)
PSO	Primary Standardization Office (ABCA Armies)
PTT	Post, Telephone and Telegraph (Many foreign countries)
PUB	Publication
QMC	Quadripartite Working Groups Management Committee (ABCA Armies)
QRC	Quadripartite Research Committee (ABCA Armies)
QSAL	Quadripartite (ABCA) Standardization Agreements List
QSTAGS	Quadripartite (America, British, Canadian, Australian) Armies Standard Agreements
QWG's	Quadripartite Working Groups (ABCA Armies)
RAAF	Royal Australian Air Force
RAF	Royal Air Force (United Kingdom)

R&D	Research and Development
RNZAF	Royal New Zealand Air Force
RS	Recommended Standard (e.g., EIA RS-465)
RTCA	Radio Technical Commission for Aeronautics
RTCM	Radio Technical Commission for Marine Services
SD-1	DoD Standardization Directory
SLHC	Standards for Long Haul Communications (DoD Standardization Area)
STANAG	Standardization Agreement (NATO)
STD	Standard
SWP's	Special Working Parties (ABCA Armies)
TACS/TADS	Tactical Air Control Systems/Tactical Air Defense Systems
TCTS	Tactical Communications System Technical Standards (DoD Standardization area)
TEAL	Nickname for Quadripartite (ABCA) Standardization Meetings
TRI-TAC	Joint Tactical Communications Office
TSGCEE	Tri-Service Group on Communications-Electronics Equipment (NATO)
TVA	Tennessee Valley Authority
TWG	Technical Working Group (AUS-CAN-UK-US NAVCOMMS)
UK	United Kingdom
UK MOD	United Kingdom Ministry of Defense
USACECOM	U.S. Army Communications-Electronics Command
USACORADCOM	U.S. Army Communications Research and Development Command
USAEOM	U.S. Army Electronics Command
USAF	U.S. Air Force

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USCG	U.S. Coast Guard
USIA	U.S. Information Agency
USN	U.S. Navy
USPS	U.S. Postal Service
VA	Veterans Administration
WP	Working Parties
WSO	Washington Standardization Officers (ABCAN Armies)
WWMCCS	World Wide Military Command and Control System

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER MIL-HDBK-188	2. DOCUMENT TITLE Volume 1 of 2 Volumes -- Standards Development and Use/Organizational Relationships
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3a. NAME OF SUBMITTING ORGANIZATION

4. TYPE OF ORGANIZATION (Mark one)

☐

VENDOR

☐

USER

☐

MANUFACTURER

☐

OTHER (Specify): _____

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5. PROBLEM AREAS

a. Paragraph Number and Wording:

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MILITARY HANDBOOK

GUIDE FOR DEVELOPERS AND USERS OF
COMMUNICATIONS SYSTEMS STANDARDS IN
THE MIL-STD-188 SERIES

VOLUME II OF 2 VOLUMES
DETAILS CONCERNING STANDARDIZATION
ORGANIZATIONS



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DEPARTMENT OF DEFENSE
WASHINGTON, D.C. 20360

GUIDE FOR DEVELOPERS AND USERS OF COMMUNICATIONS
SYSTEMS STANDARDIZATION DOCUMENTS IN THE MIL-STD-188 SERIES
MIL-HDBK-188

1. This Military Handbook is approved for use by all Departments and Agencies of the Department of Defense.
2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, Defense Communications Agency, ATTN: Code J110, 1860 Wiehle Avenue, Reston, VA 22090, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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FOREWORD

1. In the past three decades, MIL-STD-188, a Military Standard covering Military Communication System Technical Standards, has evolved from applicability to all military communications (MIL-STD-188, MIL-STD-188A, and MIL-STD-188B) to applicability to tactical communications only (MIL-STD-188C).
2. In the past two decades, the Defense Communications Agency (DCA) has published DCA circulars promulgating standards and criteria applicable to the Defense Communications System and to the technical support of the National Military Command System (NMCS).
3. Standards for all military communications are now published as part of a MIL-STD-188 series of documents. Military Communications System Technical Standards are subdivided into Common Long Haul/Tactical Standards (MIL-STD-188-100 series), Tactical Standards (MIL-STD-188-200 series) and Long Haul Standards (MIL-STD-188-300 series).
4. Military communications handbooks are published in the MIL-HDBK-400 series, as a rule. An exception, however, is this handbook (MIL-HDBK-188).
5. An OASD(C³I) memorandum of 10 May 1977 (Reference 2.1; see Appendix A) directed that relevant 188 series of military standards will continue to be mandatory for use by the DoD. Further, they are to be of uniformly high quality, clear and concise as to application and, wherever possible, compatible with existing or proposed national, international and Federal telecommunication standards.
6. This document is intended to assist the achievement of the goals in the 10 May 1977 OASD(C³I) memorandum by providing: (a) basic and fundamental information on the objectives, procedures, programs and activities that impact the development and use of the MIL-STD-188 series, and (b) valuable information and guidance to personnel concerned with the development of, or use of, MIL-STD-188 series standardization documents. The handbook is not intended to be referenced in purchase specifications, except for informational purposes, nor shall it supersede any specification requirements.
7. MIL-HDBK-188 consists of two volumes: Volume I - Standards Development and Use/Organizational Relationships, and Volume II - Details Concerning Standardization Organizations.

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1. SCOPE

1.1 Purpose. The prime purpose of this handbook is to provide, in a single document:

a. Guidance and reference sources for standardization policies, programs and organizations, both national and international, which influence standardization documents in the MIL-STD-188 series.

b. Guidance on the methods and procedures for the development and use of these documents.

1.2 Application. This handbook applies to all personnel that are involved in:

a. The development of standards of the MIL-STD-188 series. However, personnel involved in other communications-electronics or ADP activities will find this handbook useful in many cases.

b. The use of the MIL-STD-188 series for whatever reason, such as in the design of telecommunication/teleprocessing equipments and systems.

1.3 Objectives. The primary objective of this handbook is to provide, in a single document, a reference for developers and users of MIL-STD-188 series and other interested individuals and organizations so that:

a. Development of standards will be enhanced as a result of a more complete understanding of standardization policies, principles, programs and activities.

b. The use of standards will be enhanced for the same reason.

c. Policy makers, administrators, and others will have access to a better understanding of standardization activities with a resultant enhancement of the DoD standardization program.

1.4 General Instruction. The MIL-STD-188 series primarily covers telecommunications and teleprocessing, but telecommunications/teleprocessing standards are increasingly intimately entwined with information processing (otherwise known as automatic data processing (ADP)) standards. Therefore, development of DoD communications standards sometimes requires close coordination with the DoD standardization area of Information Processing Standards for Computers (IPSC) (see Figure 1). Therefore, IPSC and related standardization activities are given considerable deserved attention, along with those for communications standardization.

1.5 MIL-HDBK-188 Organization. MIL-HDBK-188 consists of two volumes: Volume I - Standards Development and Use/Organizational Relationships, and Volume II - Details Concerning Standardization Organizations. MIL-HDBK-188 follows as

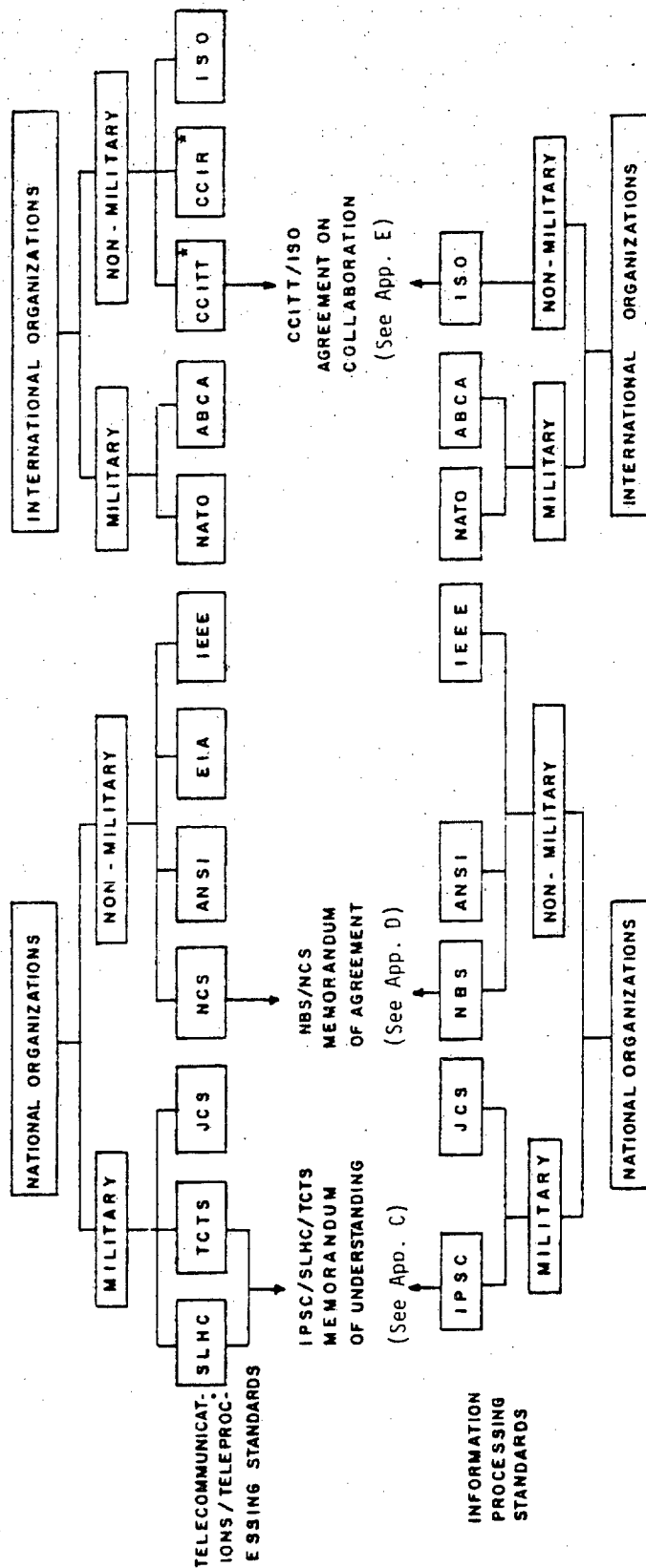


FIGURE 1 PRINCIPAL TELECOMMUNICATION AND INFORMATION PROCESSING STANDARDIZATION ORGANIZATIONS

*These organizations, part of the International Telecommunication Union (ITU), are under the United Nations but have complete independence in their decisions.

closely as possible, the format prescribed in MIL-STD-962 (Ref. 2.2). Accordingly, each Volume contains its scope in Section 1 and referenced documents in Section 2. Other sections are described in the following paragraphs.

1.5.1 Volume I of MIL-HDBK-188.

- a. Section 3 contains definitions of terms used in MIL-HDBK-188.
- b. Section 4 provides general information related to DoD standardization, the MIL-STD-188 series and related activities, as indicated in Figure 1.
- c. Section 5 is concerned with detailed requirements concerning factors involved in MIL-STD-188 series document development and use.
- d. Appendices in this handbook include the OASD(C³I) memo concerning the MIL-STD-188 mandatory status, listings of MIL-STD-188 and related standards documents and projects, an appendix on obtaining documents, and a listing of acronyms and abbreviations which are cited in both volumes.

1.5.2 Volume II of MIL-HDBK-188.

- a. Section 4 of Volume II supports Volume I by providing detailed descriptive information, primarily regarding telecommunication, teleprocessing and information processing standardization bodies and documents.
- b. Appendices to Volume II are:
 - Appendix A - Long Haul/Tactical Communications MOU
 - B - Joint Steering Committee Terms of Reference
 - C - Information Processing and Long Haul/Tactical Communications MOU
 - D - NBS/NCS MOU
 - E - International Data Transmission MOU

2. REFERENCED DOCUMENTS

- 2.1 OASD (C³I) Memo: Mandatory Use of Military Standards in the 188 Series, 10 May 1977 (see Appendix A).
- 2.2 MIL-STD-962, Outline of Forms and Instructions for the Preparation of Military Standards and Military Handbooks, 22 September 1975.
- 2.3 DoD Directive 4630.5, Compatibility and Commonality of Equipment for Tactical Command and Control, and Communications, 28 January 1967 (Being Revised).
- 2.4 JCS Pub 10, Tactical Communications and Control Systems Standards, 11 April 1980.
- 2.5 JCS Pub 11, Tactical Communications Planning Guide, 1 April 1968, Change 2, 7 March 1978.
- 2.6 DoD Directive 4120.3, Defense Standardization and Specification Program, 10 February 1979.
- 2.7 DoD Directive 5158.1, "Organization of the Joint Chiefs of Staff and Relationships with the Office of the Secretary of Defense," 26 January 1980.
- 2.8 JCS SM 768-82, Terms of Reference for the Joint Standardization Group for Tactical Command and Control, and Communications Systems, 10 December 1982.
- 2.9 JCS SM-640-78, Revision of the Terms of Reference for the Joint Tactical Command and Control, and Communications System Council (Being Revised).
- 2.10 JCS Pub 12, Tactical Command and Control Planning Guidance and Procedures for Joint Operations, Volume IV: Joint Interface Operational Procedures.
- 2.11 OASD (DTACCS) Memo: Interoperability of Secure Voice Communications in the 1975-1985 Time Period, 27 February 1973.
- 2.12 DoD Directive 5100.35, Military Communications-Electronics Board, 29 December 1962, with Change 2 of 25 February 1972.
- 2.13 Military Communications-Electronics Board, Organization, Mission and Functions, 1 November 1977, with Change 1.
- 2.14 Cataloging Handbook H2-1, Federal Supply Classification, Part I, Groups and Classes.
- 2.15 DoD Directive 3222.3, Department of Defense Electromagnetic Compatibility Program, 5 July 1967 (Reprinted on 27 September 1972).
- 2.16 MIL-HDBK-454, Standard General Requirements for Electronic Equipment.

- 2.17 Code of Federal Regulations (CFR) 41, Public Contracts and Property Management.
- 2.18 Defense Standardization Manual, DoD 4120.3-M, August 1978 (with Change 3, dated January 1982).
- 2.19 Office of Telecommunications Policy (OTP) Letter to Administrator, General Services Administration (GSA), 22 June 1972.
- 2.20 General Service Administration (GSA) Letter to Executive Agent, National Communications System (NCS), 14 August 1972.
- 2.21 FIPS PUB 12-2, Federal Information Processing Standards Index, 1 December 1974.
- 2.22 Public Law 89-306 (the Brooks Bill).
- 2.23 Manual of Regulations and Procedures for Radio Frequency Management, Executive Office of the President, National Telecommunications and Information Administration.
- 2.24 Communications Act of 1934, as amended; printed in Title 47 to the U.S. Code, beginning with Section 151. (Copies may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.).
- 2.25 The World of EDP Standards (the Green Book) Sperry UNIVAC, November 1978.
- 2.26 IEEE Standards Manual, Published by the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, NY 10017.
- 2.27 NBS Special Publication 417, Directory of United States Standardization Activities.
- 2.28 Radio Technical Commission for Aeronautics Brochures.
- 2.29 1977 RTCM Assembly Meeting, Radio Technical Commission for Marine Services, Washington, D.C.
- 2.30 NATO FACTS and FIGURES, NATO Information Services, 1110 Brussels, Belgium.
- 2.31 NATO Military Standardization Agreements and Allied Publications (U) AAP-4(), published once a year by the NATO Military Agency for Standardization (MAS).
- 2.32 JANAP-201, Status of Non-Cryptographic JANAP's and ACP's.

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2.33 Public Law 94-361 of 14 July 1976, Sec. 802, Sec. 814 (a) as amended in FY 77 by the Culver-Nunn Amendment.

2.34 DoD Directive 2010.6, Standardization and Interoperability of Weapons Systems and Equipment within the North Atlantic Treaty Organization, 5 March 1980.

2.35 DoD Directive 2010.7, Policy on Rationalization of NATO and NATO Member Telecommunication Facilities, 6 July 1981.

2.36 Quadripartite Standing Operating Procedures, February 1976.

2.37 Australia-Canada-United Kingdom-United States Naval Communications Organization Handbook.

2.38 Air Standardization Coordinating Committee (ASCC), Introducing the; Revised, 1975.

2.39 Combined Operating and Administrative Procedures of the Combined Communications-Electronics Board, 24 September 1974.

2.40 From Semaphore to Satellite, Published by the International Telecommunication Union, Geneva 1965.

2.41 International Telecommunications Convention (ITU), 1973.

2.42 Department of State Communications Office.

2.43 CCITT Recommendation A.20, Collaboration with Other International Organizations Over Data Transmission (Geneva, 1964; Madrid Plata, 1968; Geneva, 1972, 1976 and 1980).

2.44 CCITT Recommendation A.21, Collaboration with Other International Organizations on CCITT-Defined Telematic Services (Geneva, 1980).

2.45 Convention on International Civil Aviation, 1975; by the International Civil Aviation Organization.

3. DEFINITIONS, ACRONYMS AND ABBREVIATIONS

3.0 Definitions. Definitions of terms are published in Section 3 of MIL-HDBK-188 Volume I.

3.1 Acronyms and Abbreviations Used in MIL-HDBK-188. Acronyms and abbreviations used in this handbook are explained in Appendix E of Volume I.

4. ORGANIZATIONS FOR TELECOMMUNICATION/TELEPROCESSING AND INFORMATION PROCESSING

4. General. This section covers those standardization activities that are directly involved in, or may very likely impact the MIL-STD-188 series. The activities cover two categories, United States and international activities. Each category is divided into military, other government, and non-government classifications. The objectives/policies, the programs, and the organization of the activity is given. Where available and of interest, the history and the relationship to other organizations are provided. There are hundreds of standardization activities that could possibly have some, perhaps only slight, impact on the MIL-STD-188 series. Only the major ones, shown in Figure 2, are included herein. (Details concerning the MIL-STD-188 series standardization activities, specifically, are published in Volume I of MIL-HDBK-188).

4.1 U.S. Military

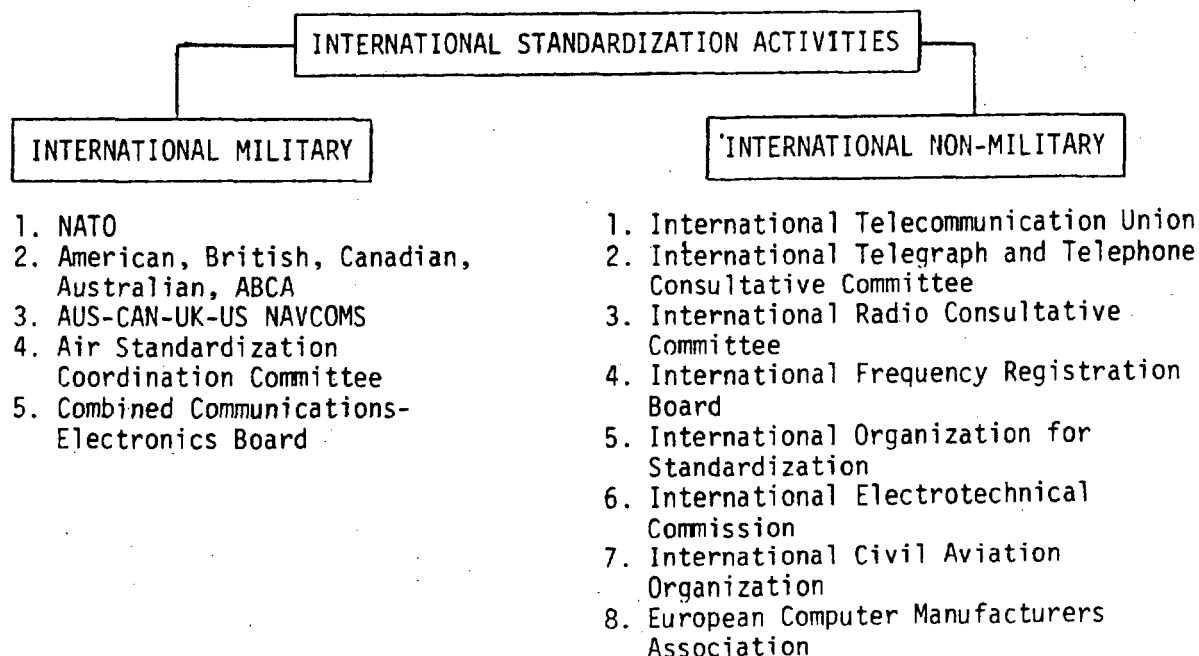
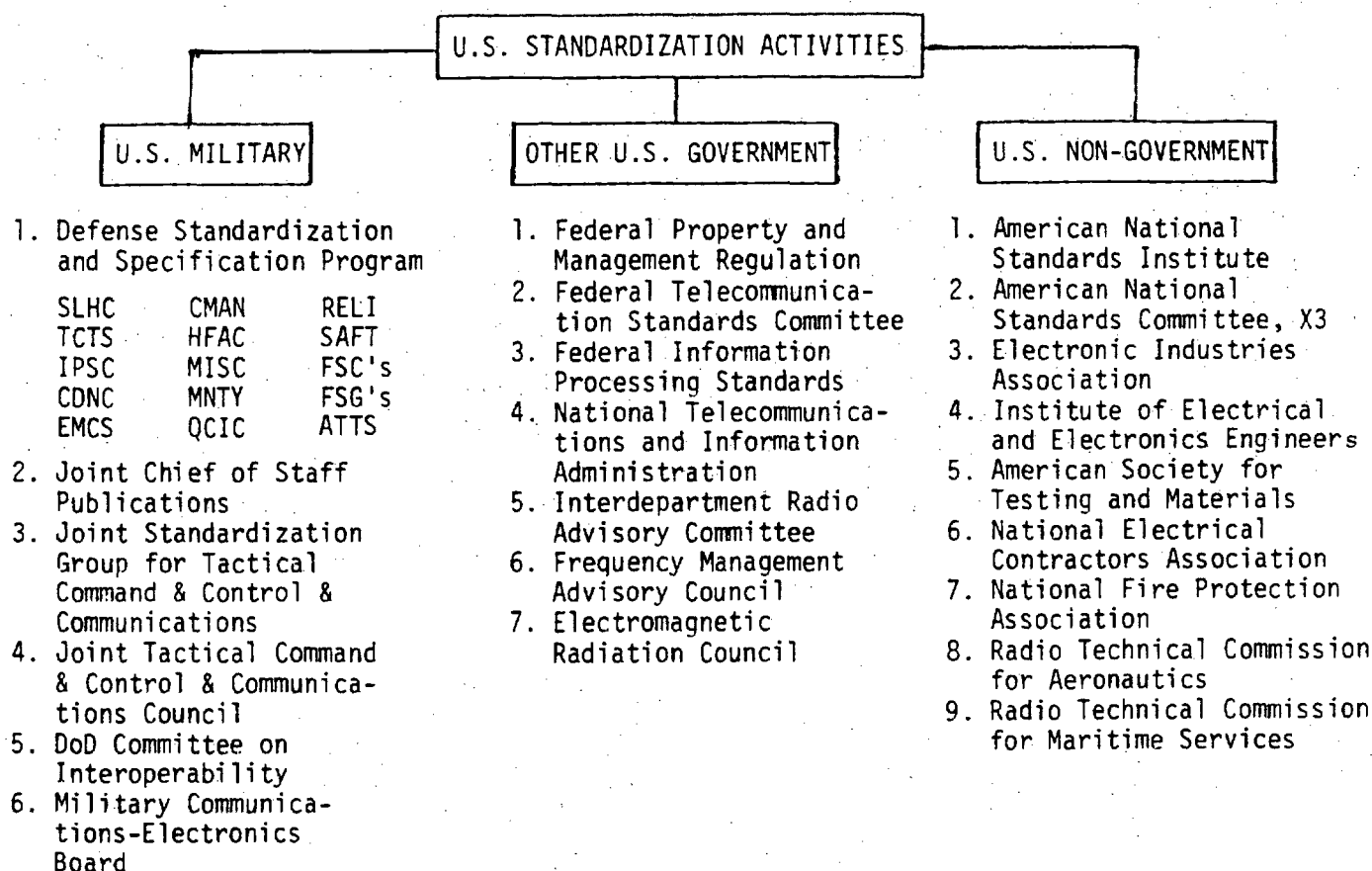
4.1.1 Joint Chiefs of Staff (JCS)

4.1.1.1 Objectives/Policy. Department of Defense Directive 4630.5 (Ref. 2.3) establishes DoD policy and procedures (including those of the JCS) for the purpose of ensuring that tactical command and control, and communications equipments possess that compatibility and commonality essential for joint military operations. The elements of this policy are quoted from reference 2.3, as follows:

"a. To ensure compatibility among tactical command and control systems, the World-Wide Tactical Command and Control Study is to be used as a guide for basic military operational requirements. Similarly, JCS Pub 10 (Ref. 2.4), "Tactical Communications and Control Systems Standards," and JCS Pub 11 (Ref. 2.5), "Tactical Communications Planning Guide," will be used in providing equipment for tactical communications.

b. Equipment for tactical command and control, and communications falling under the scope of DoD Directive 4630.5 (Ref. 2.3) shall not proceed into the engineering or operational system development phases, or be procured from commercial sources without development by the Services, except to fulfill an operational requirement which has been validated by appropriate authority within Military Departments or Services, as appropriate, and coordinated with, or for joint requirements validated by, the Joint Chiefs of Staff.

c. The variety of equipment for tactical command and control, and communications shall be the minimum necessary to support, effectively, the missions of the tactical forces. While an operational need can in some cases be met in an optimum manner by equipment designed especially for it, proliferation of types of equipment can inordinately decrease the flexibility of forces and increase the cost of equipping and maintaining them. Constraining all types of forces to use the same equipment for all functions

FIGURE 2. STANDARDIZATION ACTIVITIES

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is equally undesirable because of the adverse effect on performance. It is, therefore, the objective of the DoD to achieve compatible families of equipment for tactical command and control, and communications which, at anypoint in time, fulfill the needs of the tactical forces in an effective manner and minimize the need to acquire equipment which has only limited or specialized application. An objective shall be to minimize the addition of buffering, translative, or similar devices for the specific purpose of achieving workable interface connections.

d. Equipment for tactical command and control, and communications developed or procured by the Military Departments or Agencies to fulfill operational requirements which are alike or similar shall be either compatible or common, as defined in DoDD 4630.5 (Ref. 2.3). This policy, which is in consonance with the objectives of DoDD 4120.3 (Ref. 2.6), shall be implemented in a manner which permits the development, acquisition and introduction into the tactical forces of modern equipment which meets their operational needs as expressed by military commanders. The determination of whether equipments shall be compatible only, or common, shall be by analyses of military effectiveness, costs and time urgency in each case."

4.1.1.2 Program. The program of the JCS is based upon the following responsibilities assigned and procedures delineated by DoDD 4630.5 (Ref. 2.3):

4.1.1.2.1 Responsibilities

a. Maintain JCS Pub 10, "Tactical Communications and Control Systems Standards," which shall, among other things, describe the criteria and standards to achieve compatibility between automated communications and control systems and equipments employed in joint operations.

b. Maintain JCS Pub 11, "Tactical Communications Planning Guide," which shall, among other things, designate categories of tactical communications within which the equipment shall be either compatible or common. In updating this document, consultation with appropriate offices of the Secretary of Defense will be maintained.

c. Receive and validate requirements for tactical command and control, and communications capabilities submitted to them by the Unified and Specified commands and for joint tactical command and control, and communications requirements submitted to them by the Military Departments or Services.

d. Provide guidance to the Military Departments and Services in the formulation of, and supervise the coordination of, requirements for tactical command and control, and communications equipments directed herein, and provide guidance and recommend action necessary to implement the policy expressed in paragraph a. above.

e. Supervise the coordination of objectives and plans of the Services as given in paragraph 4.1.1.2.2.b below.

f. Modify Joint Chiefs of Staff issuances to incorporate the requirements of the Military Departments, the JCS and the Unified and Specified commands.

4.1.1.2.2 Procedures

a. Coordination of all operational requirements for equipments for tactical command and control, and communications:

(1) Provide guidance as appropriate on requirements submitted by a Military Department or Service which may be in conflict with those of another Military Department or Service.

(2) Ensure that requirements submitted by the Unified and Specified commands receive the same coordination as those originated in the Military Departments.

(3) Designate the categories of tactical communications within which the equipment provided shall be either compatible or common.

(4) Consider the comments and recommendations received from the Commanders of Unified and Specified commands in the maintenance of JCS Pub 11, "Tactical Communications Planning Guide."

(5) Comply with DoDD 5158.1 (Ref. 2.7) on matters that cannot be resolved by the Joint Chiefs of Staff.

b. Coordination of objectives and plans for tactical command and control equipment:

(1) The World-Wide Tactical Command and Control Study provides the guidance and establishes the requirements for compatibility among tactical command and control systems.

(2) The Joint Chiefs of Staff shall update the World-Wide Tactical Command and Control Study on a continuing basis.

(3) The Joint Chiefs of Staff shall coordinate necessary expansion and further detailed definition of the requirements in the World-Wide Tactical Command and Control Study and provide for their translation into system standards, such as: standardized message formats, standardized message procedures and standard transmission characteristics needed to ensure the required technical and operational compatibility. Where appropriate, these system standards shall be incorporated in JCS Pub 10.

(4) Coordination of objectives and plans for tactical communications equipment. The Joint Chiefs of Staff shall maintain JCS Pub 11, "Tactical Communications Planning Guide." This Guide shall be maintained in consultation with appropriate offices of the Office of the Secretary of Defense and Defense Agencies. It shall contain guidance, which complements

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the communications portions of other joint plans, for the development of plans and programs within the Military Departments or Services. It shall contain at least the following:

1 The identification of tactical communications categories within which the equipments are required to be compatible or common.

2 A description of each military qualitative operational requirement, applicable to the categories described above, which has been submitted by a Commander of a Unified and Specified command or by a Service. This description will include a statement regarding whether or not the requirement has been considered as a joint requirement as a result of the coordinating process.

3 Definitive statements of joint technical objectives applicable to each category described above and technical criteria as established under paragraph 4.1.1.2.2.b(3) (or references to other documents which contain them).

4 A listing of types of major end items of tactical equipments and of development projects which are considered to be compatible and applicable to implementing the policy expressed in DoDD 4630.5 (Ref. 2.3).

c. Organization. The JCS is organized to accomplish its compatibility and commonality objectives by the use of the Joint Standardization Group for Tactical Command and Control, and Communications Systems (JSG/TCCCS) and the Joint Tactical Command and Control, and Communications Systems (JTC3S) Council. These organizations are discussed in the following paragraphs.

4.1.1.1.1 Joint Standardization Group for Tactical Command and Control, and Communications Systems (JSG/TCCCS). The organization of the JSG/TCCCS is shown in Figure 3. The terms of reference of the JSG/TCCCS (Ref. 2.8) are:

4.1.1.1.1.1 Objectives/Policy. The Joint Standardization Group for Tactical Command and Control, and Communications Systems (JSG/TCCCS) is responsible to the Joint Chiefs of Staff through the Director for C3 Systems (C3S), Joint Staff. In addition, the JSG/TCCCS assists the Joint Tactical Command, Control, and Communications Systems (JTC3S) Council in its responsibilities. The JSG/TCCCS has three primary responsibilities designed to insure that tactical C2 and supporting communications systems and equipment have the compatibility, commonality, standardization, and interoperability necessary for joint and combined military operations (including interface with strategic systems). These responsibilities are: (a) to recommend policy and procedures to the Joint Chiefs of Staff; (b) to give guidance to DoD organizations involved in developing tactical C3 systems, equipment compatibility criteria, and interoperability standards; and (c) to provide a forum for resolution of issues concerning compatibility and interoperability of tactical C3S programs.

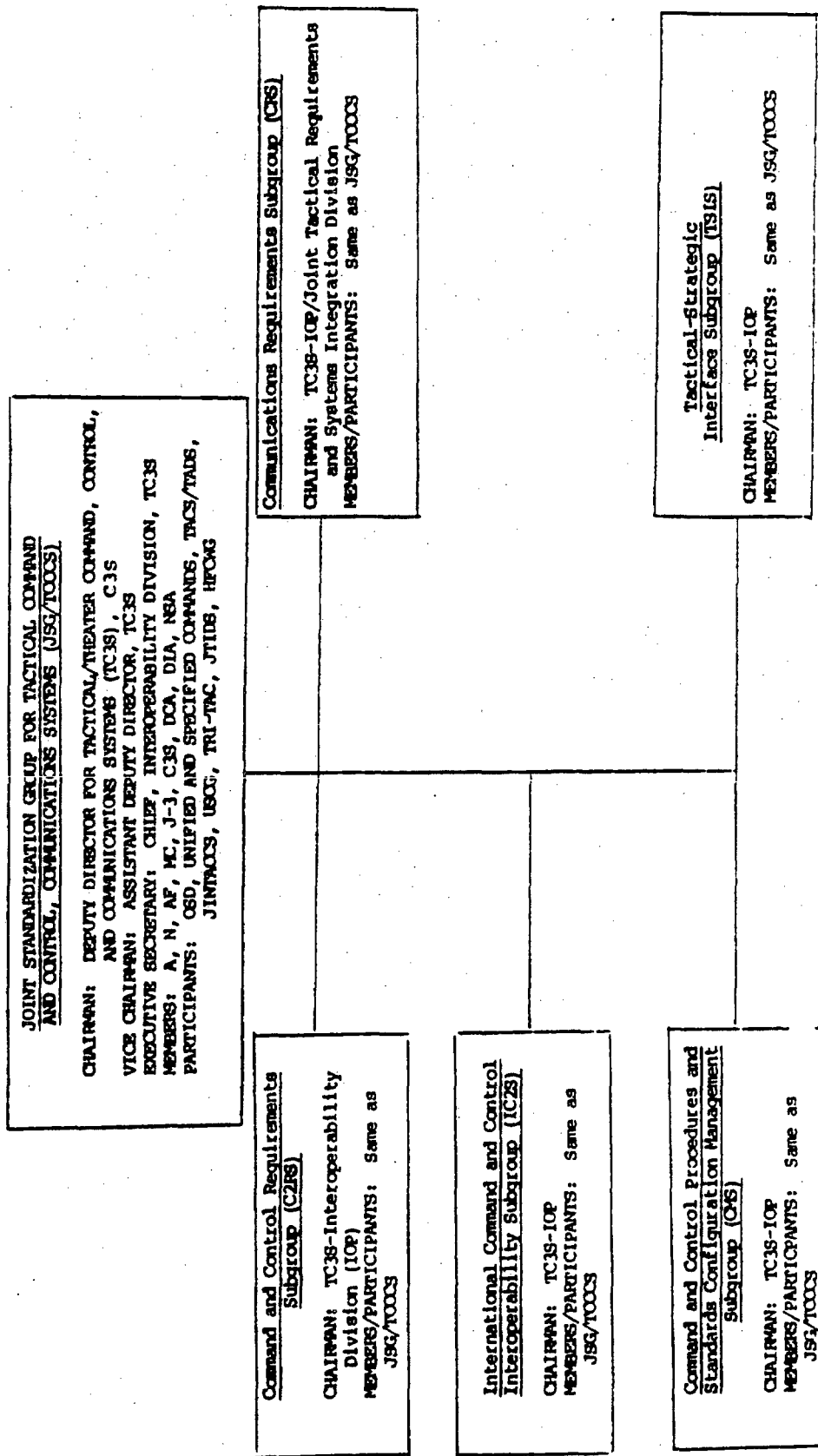


FIGURE 3. JOINT STANDARDIZATION GROUP FOR TACTICAL COMMAND AND CONTROL AND COMMUNICATIONS SYSTEMS (JSG/TCCCS)

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4.1.1.1.1.2 Program

4.1.1.1.1.2.1 Source of Assignments. Items to be considered by the JSG/TCCCS may be referred by the JTC3S Council, by the Joint Chiefs of Staff through the Director for C3S, or directly by members of the group.

4.1.1.1.1.2.2 Membership. The Chairman of the JSG/TCCCS will be the Deputy Director for Tactical/Theater Command, Control, and Communications Systems, C3S Directorate. As the Chairman, he is responsible to the Joint Chiefs of Staff through established channels. The Vice Chairman will be the Assistant Deputy Director for Tactical/Theater Command, Control and Communications Systems, C3S Directorate. The members will consist of a representative from each of the Services, DCA, DIA, NSA and the Joint Staff (one each from the operations and C3S Directorates).

4.1.1.1.1.2.3 Participation. Each of the following may provide one nonvoting participant:

- a. Office of the Secretary of Defense.
- b. Unified and specified commands.
- c. US Coast Guard.
- d. Executive Agent for the Joint Interoperability of Tactical Command and Control Systems (JINTACCS) Program.
- e. Executive Agent for the Tactical Air Control Systems/Tactical Air Defense Systems (TACS/TADS) Program.
- f. Executive Agent for the Joint Tactical Information Distribution System (JTIDS) Program.
- g. Joint Tactical Communications (TRI-TAC) Office.
- h. Joint Logistics Commanders High Frequency Coordinating Working Group (HFCWG).

4.1.1.1.1.2.4 Functions. The JSG/TCCCS will:

- a. Recommend policy and procedures to the JTC3S Council to insure that tactical C2 and supporting communications systems and equipment have the compatibility, commonality, standardization, and interoperability necessary for joint and combined military operations (including interface with strategic systems).
- b. Assist the JTC3S Council in accomplishing those functions related to:

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(1) Operational requirements for tactical C2 and supporting communications systems and equipment.

(2) Compatibility and interoperability among tactical C2, its supporting communications, and strategic systems.

(3) Interface standards and operating procedures.

(4) Program review of JINTACCS and other joint tactical C2 programs as appropriate.

(5) Resolution of issues in joint tactical C2 and supporting communications programs.

c. In accordance with established policy, give guidance to designated executive agents involved in the development of interface design standards for developmental tactical C2 and supporting communications systems.

d. In accordance with direction from the Joint Chiefs of Staff, control development and configuration management of the Interface Design Standards (IDS) and Interface Design Handbooks (IDH) for operational tactical C2 interfaces. (The IDS are JCS Pub 10, portions of JCS Pub 25, and applicable volumes of JCS Pub 12. The IDH supplement the IDS.)

e. Monitor the status of the TACS/TADS joint training program and take necessary action to insure that objectives are met at the earliest practicable date.

f. Exercise oversight of US participation in NATO panels addressing the interoperability of tactical C2 and supporting communications systems for those panels in which US participation is not controlled by the Office of the Secretary of Defense or the Military Communications-Electronics Board.

4.1.1.1.2.5 Methods of Work

a. JSG/TCCCS meetings will be held approximately once a month, normally on the last Tuesday, or at the call of the Chairman, JSG/TCCCS (hereinafter referred to as the Chairman).

b. The following standing subgroups have been established to support the JSG/TCCCS:

- (1) Communications Requirements Subgroup (CRS).
- (2) Command and Control Requirements Subgroup (C2RS).
- (3) International Command and Control Interoperability Subgroup (IC2S).

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(4) Command and Control Procedures and Standards Configuration Management Subgroup (CMS).

(5) Tactical-Strategic Interface Subgroup (TSIS).

c. The Chairman may form ad hoc study or working groups as necessary to perform specific tasks of limited duration, and may appoint chairmen for such groups.

d. The Chairman may ask the Joint Chiefs of Staff for guidance on matters of roles and missions, and ask the Military Services, Defense Agencies, and the unified and specified commands for information on operational requirements.

e. JSG/TCCCS decisions will be made by vote of the members. Majority vote will carry unless a member declares the issue substantive, in which case a unanimous vote will be required. If the group cannot reach a unanimous decision, they will refer the issue to the JTC3S Council or the Joint Chiefs of Staff for resolution, as appropriate.

4.1.1.1.2.6 Tasks. The JSG/TCCCS will:

a. Review, and recommend to the Joint Chiefs of Staff, criteria and technical and procedural standards for achieving and maintaining compatibility and interoperability of tactical command and control and supporting communications systems and equipment for which the Joint Chiefs of Staff have decided that compatibility and interoperability are required.

b. Consult with appropriate OSD and Defense agencies on interoperability and interface standards.

c. Maintain close liaison with military and civilian organizations involved in interoperability and standardization to insure coordination and to avoid duplication of effort.

d. Approve or disapprove proposed changes to the IDS and IDH for operational C2 interfaces.

e. Develop and recommend changes to update JCS Pub 11, "Tactical Communications Planning Guide (U)," as necessary (Ref. 2.5).

f. Receive and draft joint operational requirements for tactical C2 and supporting communications systems and process them for validation.

g. Maintain descriptions of tactical C2 and supporting communications systems assets of the Military Services and Defense Agencies that are interoperable under the provisions of JCS Pubs 10 and 11 and Volume IV of JCS Pub 12.

h. Under the direction of the Joint Chiefs of Staff, serve as the DoD action office for developing and coordinating US military positions on issues being considered in allied/NATO tactical C2 panels for which Joint Chiefs of Staff oversight has been established.

i. Review the operational aspects of US positions being developed for consideration by the Allied Tactical Communications Agency and its Air and Land Working Groups. Make recommendations as appropriate.

j. In developing the US military position for NATO forums, insure that proposals by joint interoperability programs concerned with NATO tactical C2 and supporting communications are considered.

k. Identify, and recommend to the Joint Chiefs of Staff, joint and combined interface requirements for new tactical data systems. Recommend that joint interface and joint test programs be initiated to insure that systems are compatible and interoperable and that they can exchange data securely.

l. Advise the Joint Chiefs of Staff or the JTC3S Council when ongoing joint compatibility and interoperability programs need more emphasis, better support, or more effective management.

m. Advise the Joint Chiefs of Staff or the JTC3S Council on the need to validate compatibility and interoperability requirements not previously validated.

n. Serve as the JTC3S Council's agent for maintaining active liaison with other military and civilian activities concerned with standardization, compatibility, commonality, and interoperability. The JSG/TCCCS will provide a nonvoting representative to JTC3S Council meetings.

o. Review Service and Defense agency operational requirements on a systematic basis to insure that joint and combined interoperability and interface standards are considered early in the development process, and provide the JTC3S Council with the results of such reviews.

p. Review the JINTACCS quarterly report, nominate issues for inclusion on the JTC3S Council agenda, and forward copies of the report to the council.

4.1.1.1.2 Joint Tactical Command and Control, and Communications Systems (JTC3S) Council. The terms of reference of the JTC3S Council (Ref. 2.9) are:

4.1.1.1.2.1 Objectives/Policy. The Joint Tactical Command and Control, and Communications Systems Council (hereinafter referred to as the Council) is responsible to the Secretary of Defense through the Joint Chiefs of Staff, for:

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a. Providing a forum for the resolution of issues in OSD and JCS tactical command and control and communications programs not requiring the attention of higher authority.

b. Overseeing the program to achieve the Joint Interoperability of Tactical Command and Control Systems (JINTACCS) and other joint programs, as appropriate.

c. Providing direction and guidance for the development of tactical command and control and communications architecture.

d. Insuring attention to the interoperability of the tactical/strategic interface.

4.1.1.1.2.2 Program

4.1.1.1.2.2.1 Functions. The Council:

a. Provides direction and guidance for the development and maintenance of a tactical command and control architecture and the architecture for the necessary supporting communications to sustain joint and combined tactical operations.

b. Reviews Service, joint, and combined plans and programs for tactical command and control and the necessary supporting communications referred to the council, to insure their sufficiency for implementation of the tasks cited in paragraph 4.1.1.1.2.2.2.

c. Insures attention to the strategic/tactical command and control systems interface.

d. Resolves issues in the joint tactical command and control and communications programs referred by the Services, the Joint Chiefs of Staff, DCA, DIA, NSA, joint program directors, or the JSG/TCCCS.

e. Oversees the program for the JINTACCS and other joint programs as appropriate.

4.1.1.1.2.2.2 Tasks. The Council:

a. Monitors DoD efforts toward compatibility and interoperability between the tactical command and control and communications systems and strategic systems.

b. Monitors the efforts of DoD agencies involved in the development of tactical command and control and the necessary supporting communications systems which may be used in joint or combined military operations.

c. Reviews joint operational requirements for tactical command and control and the necessary supporting communications systems and equipment submitted by the Military Services/Defense agencies or commanders of Unified and Specified Commands.

d. Brings to the attention of appropriate activities of the OJCS or OSD those aspects of joint compatibility and interoperability plans and programs that are in need of increased emphasis, support, or restructuring which are beyond the capability of the Council to resolve.

e. Establishes and maintains active liaison with the WWMCCS Council.

f. Establishes and maintains liaison with other appropriate military and civilian activities concerned with standardization, compatibility, commonality, and interoperability of tactical command and control and necessary supporting communications systems and equipment.

g. Reviews reports submitted to the Joint Chiefs of Staff by the JSG/TCCCS and other joint interoperability organizations.

h. Provides to the participating activities reports or approved minutes of all proceedings.

4.1.1.1.2.2.3 Methods of Work

a. Council meetings are held approximately once every 3 months or at the call of the Chairman.

b. The Council Chairman tasks the JSG/TCCCS as he deems necessary.

c. The Council Chairman forms ad hoc study groups, subject to the concurrence of the majority of the Council.

d. The Council Chairman requests guidance from the Joint Chiefs of Staff on matters of roles and missions and information from the Military Services and the Unified and Specified Commands on operational requirements.

e. Decisions made by the Council are determined by a majority vote of the members. The Council may refer an issue to the Joint Chiefs of Staff or to OSD, as appropriate, for necessary action. However, funding or other program issues, normally the prerogative of OSD, are referred directly to the appropriate office in OSD for resolution.

f. Issues referred to the Council may be referred by the Council Executive Secretary to the JSG/TCCCS for review and recommendation prior to Council action with the Council membership so advised. When

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agreement can be reached by the JSG/TCCCS, the issue can be cleared secretarily with a report to the Council.

4.1.1.1.2.3 Organization

4.1.1.1.2.3.1 Administration. The Deputy Director for Operations (WWMCCS and Telecommunications) provides administrative support for the Council.

4.1.1.1.2.3.2 Membership

a. Council members are of grade 07/08 or civilian equivalent, with an alternate for each. Two OSD members and respective alternates are designated - one each by the Deputy Under Secretary of Defense for Research and Engineering and the Deputy Under Secretary of Defense for Policy. A member and alternate are designated by each of the Services; the Directorate of Operations, Joint Staff; DCA; DIA; and NSA. Members are responsible for providing the official position of their respective organizations on all matters considered by the Council.

b. The Chairman of the Council is the Director for Operations, who is responsible to the Joint Chiefs of Staff, through the Director, Joint Staff.

c. The Executive Secretary is the Deputy Director for Operations (WWMCCS and Telecommunications), who is responsible for publishing the Council agenda, recording the minutes, and originating correspondence and maintaining necessary files in support of the Council.

d. Senior representatives of the following organizations/programs participate in a nonvoting status:

- (1) Joint Tactical Communications (TRI-TAC) Office.
- (2) Joint Standardization Group for Tactical Command and Control, and Communications Systems (JSG/TCCCS).
- (3) Interoperability Program for Tactical Air Control Systems/Tactical Air Defense Systems (TACS/TADS).
- (4) JINTACCS.
- (5) Program for the Joint Tactical Information Distribution System (JTIDS).
- (6) WWMCC System Engineering Organization (WSEO).
- (7) GUARDSMAN.
- (8) Battlefield Exploitation and Target Acquisition (BETA) Program (as invited).

4.1.1.1.2.3.3 Observers. Other organizations, such as the US Coast Guard and Military Communications-Electronics Board (MCEB), may be granted observer status as deemed appropriate by the Chairman.

4.1.2 DoD Committee on Interoperability for Telecommunications (Ref. 2.11)

4.1.2.1 History

a. In order to permit the changing DCS to effectively interoperate with tactical, commercial and allied communications systems, it is necessary to first obtain DoD-wide agreement on techniques and performance values related to key design concepts and parameters at the system architectural level which must be common or compatible in all communications systems which are to interoperate without complex and expensive interface devices. By providing system planners, as early as possible, performance values which are predictable for future telecommunication systems, it will be possible to minimize potential interoperability problems at the design stage prior to system and equipment development. In recognition of this problem, the Director, Telecommunications and Command and Control Systems (DTACCS), in a 27 February 1973 memorandum (Interoperability of Secure Voice Communications in the 1975-1985 Time Period (Ref. 2.11)), directed that the Directors, DCA, TRI-TAC and NSA, in collaboration with the Military Departments, plan to establish common or compatible system parameters for communications security, automatic key distribution, Continuously Variable Slope Delta (CVSD) modulation characteristics, signaling and supervision, numbering plans and routing schemes, etc., to further the interoperability effort. As a consequence of this direction, a joint ad hoc Committee on Interoperability of DoD Telecommunications was established and is comprised of representatives from DCA, TRI-TAC, NSA, and MILDEPS and JCS (J3) (serving as an observer/advisor). A study conducted by the Committee was intended to resolve, in definitive engineering terms, the critical issues and parameters associated with the effective interoperation of telecommunications systems used by the DoD with primary emphasis on secure voice communications in the 1975-1985 time period.

b. The Final Report of the Committee on Interoperability, containing recommended future performance values and techniques for various system parameters, was forwarded to DTACCS for approval in September 1973. In February 1974, DTACCS approved the report for guidance in the design of future telecommunications systems and specified that system parameters recommended in the Final Report, having a confidence level of 75% and above, should be utilized as preferred planning standards by elements responsible for establishment of telecommunications architectures and designs. Further, it was directed that the Committee follow through on its initial work by undertaking studies of system parameters recommended in the Final Report. This follow-on effort was begun in April 1974 and was completed in November 1979. At that time, a new report, updating parameters in the 1973 Final Report completed DoD-wide coordination and was prepared as a final document. In May 1980, the Directors of the Defense Communications Agency, National

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Security Agency and the Joint Tactical Communications Office met to discuss the latest report. Their decision was to sign the report and forward it to ASD(C³I). It is expected that ASD(C³I) will promulgate the Report by the Committee on Interoperability for distribution through DoD.

4.1.2.2 Objectives/Policy. The immediate objective of the DoD Committee on Interoperability for Telecommunications is to promulgate recommendations and guidance which will permit system developers to produce systems that will interoperate with other systems in the U.S. and Allied command and control environment. These recommendations establish the intersystem parameters that are required for interoperability.

4.1.2.3 Program. Interoperability Committee activity has been carried out in response to a request by the ASD(T), now ASD(C³I). The scope of the work was extended to the goal of achieving worldwide secure communications among all telecommunications systems that must interact in a military command and control environment. These include strategic and tactical systems employed by the United States and Allied forces. The Interoperability Committee was to identify all systems which must interoperate to achieve the goal, identify and describe intersystem interfaces and protocols, and recommend parameters which will achieve full interoperability among the identified systems. The methodology employed by the committee can be summarized as follows:

- a. General guidance regarding command structures and systems of interest is issued by the main Committee.
- b. The working groups develop the recommendations which pertain to their areas of expertise for incorporation into the Report.
- c. Individual participating agencies and departments are tasked to provide inputs where appropriate.
- d. Recommended parameters are reviewed on a Service/Agency basis at the working group level.
- e. Inputs are forwarded to the Technical Support Staff for review and integration into the draft Report.
- f. The Draft Report is reviewed in depth by the Main Committee. Formal coordination with Services/Agencies is accomplished through Committee action.

4.1.2.4 Organization. The Interoperability Committee was composed of a main committee, five technical working groups, and a technical support staff which coordinated the technical activities of the five working groups. Members were drawn from the National Security Agency, Defense Communications Agency (which also furnished a recorder), Joint Tactical Communications Office, the Military Departments, and the Office of the Joint Chiefs of Staff. The NSA, DCA, and TRI-TAC alternately chaired the committee. The five working groups which were established are:

a. Security - Responsible for description of COMSEC doctrine, concepts, protocols, and parameters relating to interoperable secure DoD telecommunication systems.

b. Networks - Responsible for defining and describing the characteristics of all major system elements and their interfaces, comprising the overall DoD telecommunication system.

c. Call Set-Up - Responsible for the numbering plans, signaling and protocols used in establishing connectivity within the DoD telecommunication systems.

d. Transmission Considerations - Responsible for defining and describing transmission parameters, including multiplex hierarchy, for the DoD telecommunication systems.

e. System Control - Responsible for defining parameters by which health and status of the DoD telecommunication systems can be established and controlled.

Membership in the five working groups, as well as the Technical Support Staff (TSS), is drawn from all participating agencies and departments.

4.1.3 Military Communications-Electronics Board (MCEB). DoD Directive 5100.35 (Ref. 2.12) prescribes the mission, composition, function, and responsibilities of the MCEB. Ref. 2.13 provides further details.

4.1.3.1 History. The history of the MCEB (per Ref. 2.13) follows:

a. The US Joint Chiefs of Staff chartered the United States Joint Communications Board (JCB) on 14 July 1942. The JCB was charged with the cognizance of communications-electronics pertaining to matters for which the JCS was responsible. The membership of this Board consisted of four members, two each from the US Army and US Navy.

b. The JCB continued to function throughout World War II and until 1948, when it was reconstituted as the Joint Communications-Electronics Committee (JCEC). The new charter stated its structural organizational responsibility regarding electronic matters and provided for membership from the recently formed US Air Force. The membership of the JCEC consisted of:

- (1) The Chief Signal Officer of the US Army
- (2) The Chief of Naval Communications
- (3) The Chief of Air Communications.

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c. On 9 August 1949, the Secretary of Defense approved a revised charter for the JCEC to provide for membership by the Director of Communications-Electronics, JCS.

d. In 1958, two major events occurred concurrently which affected the communications-electronics community:

(1) The reorganization of the Joint Chiefs of Staff organization.

(2) The abolishment of Department of Defense committees. Therefore, on 7 June 1958, the JCEC was disestablished. Its pending actions were assumed by the Joint Communications-Electronics Group (JCEG) of the Joint Chiefs of Staff.

e. The JCEG utilized the JCEC Panel structure until the establishment of the JCS Joint Staff and the formulation of the Military Communications-Electronics Board (MCEB). The primary purpose of the MCEB was to utilize a reservoir of technical talent and experience available in the staffs of the Military Departments, not only to work on inter-service matters, but also to assist the Director of Communications-Electronics (Joint Staff), and thus minimize the number of personnel which would otherwise be required for assignment to communications-electronics duties on the Joint Staff.

f. On 13 October 1958, the Acting Secretary of Defense, by a memorandum to the Joint Chiefs of Staff, approved the formal establishment of the MCEB as an adjunct to the Joint Staff. The Board functioned under the Chairmanship of the Director for Communications-Electronics (J-6).

g. On 22 October 1958, by memorandum from the Secretary, Joint Chiefs of Staff to the Military Services and Director, Communications-Electronics (J-6), Joint Staff, the MCEB was formally established.

h. On 10 November 1962, by memorandum, the Secretary of Defense acknowledged the Director, Defense Communications Agency as the Chief Communications-Electronics Officer in the Department of Defense and appointed the Director as the Chairman of the MCEB. This same memorandum forwarded a draft version of DoD Directive 5100.35 (Ref. 2.12) which expanded the scope of the MCEB.

i. On 19 December 1962, the Secretary of Defense, by DoD Directive 5100.35, Military Communications-Electronics Board (MCEB) (Ref. 2.12), established the MCEB as a Department of Defense component to function under the policies and direction of the Secretary of Defense and Joint Chiefs of Staff, acting under the authority and direction of the Secretary of Defense. The composition of the MCEB was increased by adding the Defense Communications Agency and the National Security Agency. Additionally, the new directive assigned the responsibility for the Chairmanship of the MCEB to the Director of the Defense Communications Agency, and raised the level of the Board to

that of an advisory body serving the Secretary of Defense, thereby making its expertise available to the entire defense establishment.

j. The MCEB, by memorandum, assumed the US membership to the NATO C-E Board.

k. The Director, Communications-Electronics (J-6), Joint Staff, by memorandum was designated as the Alternate Chairman, MCEB, during the absence of the Chairman.

l. Recognizing the need for active cooperation and coordination between the National Communications System (NCS) and the USMCEB in areas of mutual interest, the Chairman, MCEB, who was also the Manager, NCS, provided for such action by a Joint NCS Memorandum, MCEB-CM 7-66, dated 21 December 1966.

m. The Director, TRI-TAC was invited to actively participate in the deliberations of the MCEB and, on 10 June 1976, a Joint MCEB/TRI-TAC Memorandum, MCEB-CM 9-76, was issued providing for TRI-TAC Representation to the MCEB.

n. On 1 July 1976, the Director for Communications-Electronics (J-6), Joint Staff was reorganized and redesignated as the Deputy Director for Operations (WWMCCS and Telecommunications). The reorganization established a provision for an OJCS Principal and Coordinator. Further participation from within the Joint Staff was limited to that necessary to appropriately support the interests of the Joint Staff concerning actions pending in the MCEB. The Deputy Director for Operations (WWMCCS and Telecommunications) was designated by MCEB-CM 24-76, dated 27 August 1976, to preside at meetings of the MCEB in the absence of the Chairman. The alternate Chairman is now the Director, Command, Control and Communications (C3S), as established by the Charter of the Command, Control, and Communications Directorate of the Joint Staff, dated 30 May 1979.

o. The MCEB continues to function under its current terms of reference and there have been no significant organizational changes since 1968, with the exception of an internal realignment within the Secretariat.

4.1.3.2 Objectives/Policy. The mission of the MCEB is to:

a. Achieve coordination on military communications-electronics matters among DoD components, between DoD and other governmental departments and agencies, and between DoD and representatives of foreign nations.

b. Provide DoD guidance and direction in those functional areas of military communications-electronics for which the MCEB is assigned responsibility.

c. Furnish advice and assistance, as requested, on military communications-electronics matters to the Secretary of Defense, the Joint Chiefs of Staff, the military departments, and other DoD components.

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4.1.3.3 Program

a. The program of the MCEB consists of action items assigned to the panels by the Secretariat. The panel chosen is based upon its knowledge of the subject. Often, more than one panel acts upon an action item. This is done by assigning one panel as the principal panel and one or more other panels as collaborating panels or coordinating panels. The process of collaboration is a more close and thorough process of panel cooperation than is coordination.

b. Action items may be joint or combined. Joint action items are of interest only to the U.S. Service and Agencies. Combined action items are those of interest to the countries of the Combined Communications-Electronics Board (CCEB) (see paragraph 4.4.1.5). A joint position on any combined action item is always obtained before proceeding in the combined forum.

c. Action items are obtained from many sources, such as from the Services and Agencies, the Secretariat, panel members, the CCEB, or NATO elements.

4.1.3.4 Organization. The organization of the MCEB is given in Figure 4, including the Chairman, Principals, Coordinators, Secretariat, and Panels.

4.1.3.4.1 Coordinators

a. The MCEB Coordinators are established to act for and in the name of the Board on matters not requiring the collective attention of the principal members of the Board.

b. The MCEB Coordinators include one primary member and alternate member from the US Army, the US Navy, the US Air Force, the US Marine Corps, the OJCS, the Defense Communications Agency, and the National Security Agency. The National Communications System (NCS) and TRI-TAC provide representation at the Coordinator level. Other DoD components and US Government agencies may participate when approved by the Chairman, MCEB.

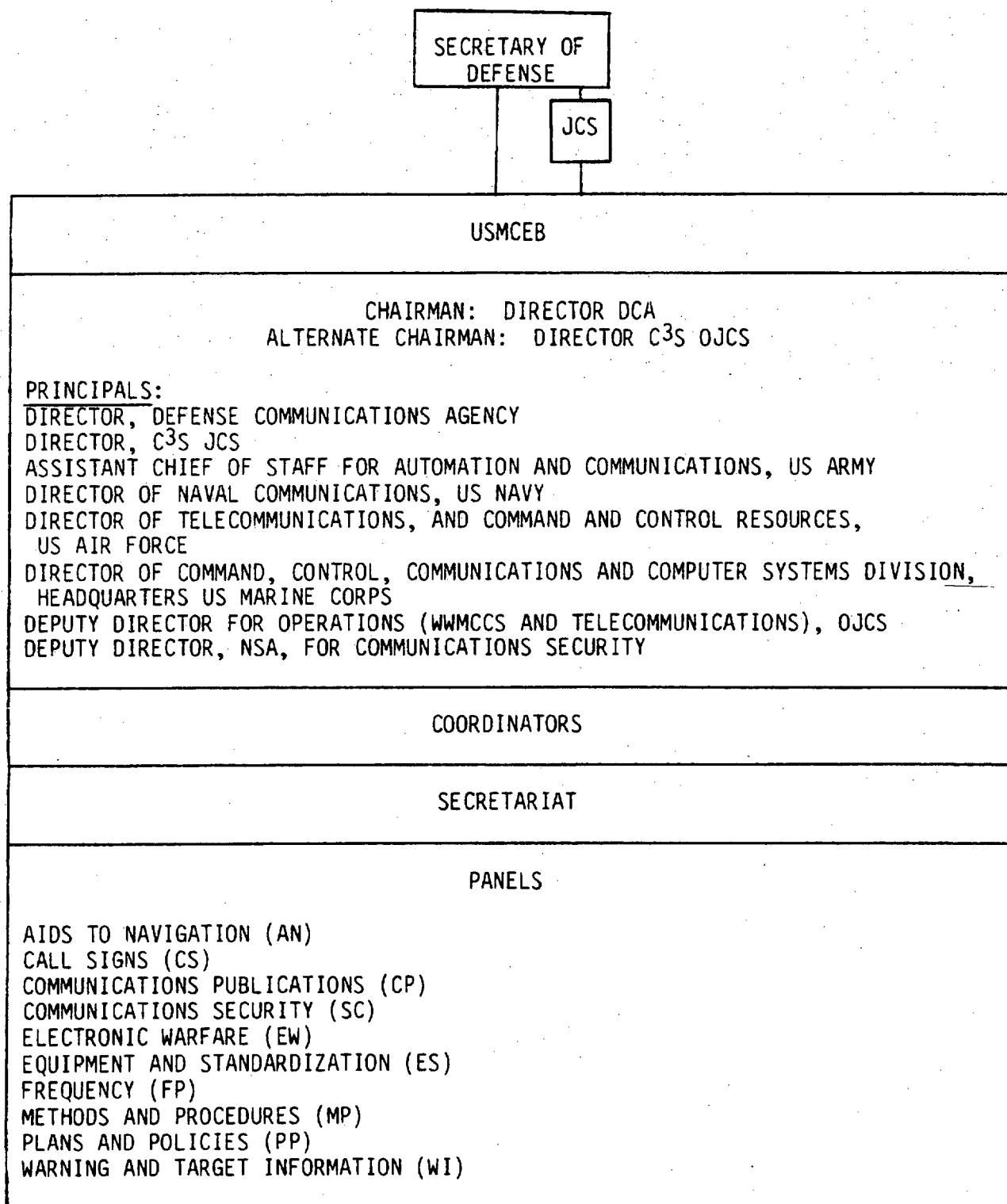
c. The MCEB Coordinators, as representatives of their respective Service/Agency, normally provide the Service/Agency point of contact for the informal staffing of MCEB actions.

d. The Military Secretary of the MCEB is designated as Chairman of the Coordinators.

4.1.3.4.2 MCEB Secretariat

a. The MCEB Secretariat consists of military and civilian personnel as indicated by the current Joint Table of Distribution (JTD).

b. The senior officer assigned to the MCEB Secretariat serves as the Military Secretary, MCEB. He is responsible to the Chairman, MCEB for:

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- (1) Assuring expeditious handling of Board actions.
- (2) Functioning of the MCEB Secretariat.
- (3) Acting as the U.S. Coordinator to the Combined Communications-Electronics Board (CCEB).
- (4) Providing a liaison point for the Office of the Secretary of Defense, other U.S. Government Agencies, the CCEB, and U.S. Member, Military Communications-Electronics Working Group (MCEWG), on MCEB matters.
- (5) Preparing agenda for, and minutes of, meetings of the MCEB Coordinators and Principals.
- (6) Developing administrative procedures for the MCEB.
- (7) Assuring that the activities of Panels and ad hoc groups are continuously monitored.
- (8) Determining and taking action on matters referred to the MCEB.

4.1.3.4.3 Assistant Military Secretaries, MCEB. The incumbents of these positions serve as Assistant Military Secretaries to the MCEB (with one position being designated "Assistant Military Secretary for Allied Affairs"), and monitor the functioning of the Panels and ad hoc groups. They are responsible for:

- a. Assisting the Military Secretary in carrying out his responsibilities.
- b. Attending meetings of the MCEB, as appropriate.
- c. Advising and assisting the Panels in conforming to their charters.
- d. Furnishing the Panels with appropriate information and assistance.
- e. Being familiar with the structure and procedures of Panels.
- f. Assuring the accomplishment of general administrative coordination, procedural supervision, and document authentication with respect to activities of their Panels.
- g. Developing or contributing in the development of MCEB positions/recommendations for approval by the Military Secretary of the MCEB.
- h. In addition to the above responsibilities, the Assistant Military Secretary for Allied Affairs:

(1) Supervises and coordinates, as appropriate, the processing of information between the communications-electronics office of U.S. Military Delegations to Allied Treaty Organizations and the U.S. MCEB.

(2) Maintains, as appropriate, a current repository, in the Secretariat, of all Allied Treaty Organization actions and documentation for use and reference purposes by the MCEB.

4.1.3.4.4 Panels

a. Membership consists of duly accredited personnel from the Military Services and Defense Agencies within the composition of the MCEB who have an interest in the activities of the Panels, and personnel from such other DoD Components as the Chairman, MCEB, may designate. Other Government Agencies may be authorized to have representatives or observers.

b. An Assistant Military Secretary and a Panel Secretarial Aide are assigned to each Panel from the MCEB Secretariat.

4.1.3.4.5 Working Group

a. Panels may establish working groups for the conduct of business assigned to Panels. These working groups may be of the following types.

(1) Ad hoc for a specific item under consideration by the panel, or

(2) Permanent. Terms of Reference for Permanent Working Groups shall be maintained by the Military Secretary. A copy of any Panel-agreed Terms of Reference for Permanent Working Groups which may exceed the Panel Charter will be submitted to the MCEB Coordinators for their approval within thirty days after the establishment of the Permanent Working Group.

b. An individual is designated by a Panel member or representative to assist in the conduct of Panel business. The Working Group Member is generally designated for special qualifications or expertise and need not be drawn from within the Panel membership.

4.1.4 Related DSSP Activities. There are several DoD standardization activities which impact, or may impact, the development of MIL-STD-188 documents. DoD Federal Supply Classification Classes (FSC,s) cover commodity classes as established in the Cataloging Handbook H 2-1, Federal Supply Classification, Part I, Groups and Classes (Ref. 2.14). DoD Standardization Areas cover subjects not applicable to a single FSC or FSG (comprising several FSC's); additionally, area assignments are made for broad engineering disciplines and practices.

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4.1.4.1 Related DoD Standardization Area Assignments

4.1.4.1.1 Information Processing Standards for Computers (IPSC). See paragraph 4.5.1.1 of Volume I.

4.1.4.1.2 Electromagnetic Compatibility Standardization (EMCS). The EMCS Area was established by DoD Directive 3222.3 of 5 July 1967 (Ref. 2.15). The Lead Service is the Naval Electronic Systems Command. The scope of the EMCS area encompasses electromagnetic compatibility (EMC) prediction, measurement and validation, as well as electromagnetic radiation hazards as related to personnel, ordnance, fuels and electronic hardware. The EMCS area includes EMC of components, circuits, equipment, subsystems and systems, and standards for techniques and procedures relating to grounding, bonding and shielding.

4.1.4.1.3 Automatic Test Technology Standards (ATTS). The ATTS area establishes standard methods, procedures, techniques and design criteria for providing automatic test capability in defense systems and equipments.

4.1.4.1.4 Computer Aided Design Numerical Control (CDNC). The CDNC Area is related to all engineering designs which may be enhanced with the aid of computer techniques, as well as to all automated production techniques involving control of machine tools and manufacturing processes, whether directly by a computer or by means of computer-generated outputs and controls.

4.1.4.1.5 Configuration Management (CMAN). The CMAN Area is related to: (1) configuration engineering change control procedures, deviations and waivers for military systems, equipments and computer program software and firmware; (2) configuration item identification documentation; (3) configuration item physical and functional audits; (4) configuration item status accounting; and (5) configuration management plans.

4.1.4.1.6 Human Factors (HFAC). The HFAC Area is related to: (1) the human-interface design and test criteria (space, weight, shape, color, texture, visibility, surface temperature, energy emission, etc.) used for the design of military equipments, systems, components and facilities; (2) the human factor engineering program requirements and plans; and (3) human comfort factors for operational environments (sound, light, heat-cold, space, radiation density, force, vibration, acceleration, velocity, stability, etc.).

4.1.4.1.7 Miscellaneous (MISC). The MISC Area covers standardization activity which is not appropriate in any other area category. One particular product of interest is MIL-STD-454, Standard General Requirements for Electronic Equipment (Ref. 2.16).

4.1.4.1.8 Maintainability (MNTY). The MNTY Area covers equipment design characteristics relating to the ease, economy and speed of maintenance and repair. Design criteria, analysis methods, prediction, verification, demonstration and evaluation are area subdivisions.

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b. General Services Administration (GSA) Letter to Executive Agent, NCS, 14 August 1973 (Ref. 2.20).

4.2.1.1.2 Objectives/Policy

a. Objectives are:

(1) Develop Federal Standards required to achieve compatibility among telecommunication networks of the NCS.

(2) In concert with the National Bureau of Standards (NBS), develop Federal standards for data transmission and the computer-telecommunication interface (See Appendix D).

(3) Increase the effectiveness of Federal telecommunication community participation in national/international standards development efforts and in the Federal Information Processing Standards (FIPS) of the NBS (see paragraph 4.2.1.2).

b. Policy is to:

(1) Eliminate unnecessary differences between Federal Telecommunication Standards and existing or evolving industrial/national/international standards.

(2) Maximize use of expertise available in appropriate industry/national/international standards to develop required Federal Standards.

4.2.1.1.3 Program

a. The program, carried out by the Federal Telecommunication Standards Committee (FTSC), which meets once a month, results in the following types of products:

(1) Federal Telecommunication Standards published by GSA pursuant to Federal Property and Administrative Services Act of 1949.

(2) Joint Federal Telecommunication and Federal Information Processing Standards published by both GSA and NBS.

b. The technical work of the FTSC is performed by subcommittees that are established for the purpose of developing telecommunications standards, as the need for these is perceived.

c. Thorough coordination procedures are in effect as follows:

(1) Federal Telecommunication Standards are formally coordinated with State, DoD, GSA, NASA, FAA, CIA, Commerce, DOE, Interior,

USAI, HEW, Justice, Agriculture, Treasury, HUD, Transportation, Labor, VA, EPA, USPS, TVA, FDIC, and Federal Reserve. They are also published in the Federal Register for public comment.

(2) Joint Federal Telecommunication Standards and FIPS are coordinated as above, plus with 65 FIPS points of contact.

4.2.1.1.4 Organization

a. Program Manager: Office of the Manager, National Communications System, Washington, DC 20305

b. Program Executor: Assistant Manager, NCS (Technology and Standards) in capacity as Chairman of the Federal Telecommunication Standards Committee (FTSC).

c. FTSC Membership: NCS, State, DoD, GSA, NASA, FAA, CIA, Commerce, DOE, HEW, NSA, NBS, NTIA (Advisory) and Library of Congress.

4.2.1.1.5 Relation to Other Organizations. The FTSC interfaces with industrial, national and international standards organizations as follows:

a. Electronic Industries Association

- (1) Technical Committee TR29 (Digital Facsimile)
- (2) Technical Committee TR30 (Data Transmission)
- (3) Technical Committee TR41 (Voice Telephone Terminals)

b. American National Standards Institute

- (1) Committee X3 (Computers & Information Processing).
- (2) Technical Committee X3S3 (Data Communications) and 5 task groups.
- (3) Technical Committee X3T5 (OSIC) and task groups.

c. International Standards Organization

- (1) Technical Committee 97, Subcommittee 6 (Data Communications).
- (2) Technical Committee 97, Subcommittee 16 (Computers and Information Processing/Open Systems Interconnection).

d. International Telecommunication Union, International Telegraph and Telephone Consultative Committee.

- (1) U.S. CCITT National Committee
- (2) U.S. Study Group D
- (3) International Study Group VII (Data communication networks)
- (4) International Study Group XVII (Data communication over the telephone network)

4.2.1.2 Federal Information Processing Standards (FIPS) (Ref. 2.21)

4.2.1.2.1 History. The National Bureau of Standards was established in 1901 when the Office of Weights and Measures located within the Treasury Department was redesignated the National Bureau of Standards. When the Department of Commerce and Labor was established in 1903, NBS was transferred to the new Department. When a separate Department of Labor was established by Congressional action in 1913, the National Bureau of Standards remained with the Department of Commerce. NBS's involvement in electronic computing machines began as part of the Bureau's program of technical assistance to other agencies. In 1946, two agencies asked NBS to provide scientific and advisory services and to act as contracting officer in the procurement of electronic computing machines. During the years that followed, NBS designed and developed the SEAC, SWAC, DYSEAC, MIDAC, and FLAC for its own use or for various governmental agencies. In 1965, Congress passed the Brooks Act (Ref. 2.22) which extended, explicitly to computers, NBS basic responsibilities specified by the NBS Organic Act. Responsibilities for implementation of the Brooks Act were assigned to three agencies. The Office of Management and Budget was assigned responsibility for exercising fiscal control and providing policy guidance in the ADP area; the General Services Administration was made responsible for ADP equipment procurement and maintenance functions; and the Department of Commerce was authorized: (1) to provide scientific and technological advisory services to other agencies with regard to automatic data processing and related systems; (2) to make appropriate recommendations to the President concerning the establishment of uniform Federal automatic data processing standards; and (3) to undertake research in computer science and technology as needed to fulfill the above responsibilities. The Secretary of Commerce delegated these responsibilities to NBS. In response to the new responsibilities given it under this legislation, NBS brought together several units in 1966 to form the nucleus of the Center (now Institute) for Computer Sciences and Technology.

4.2.1.2.2 Objectives/Policy

a. The objectives of the NBS, as related to standards for computers and information processing, are basically those expressed in the Brooks Act and assigned as the responsibility of the Institute for Computer Sciences and Technology, and listed in the history paragraph above. The continuing objective is to facilitate the increased interchange and sharing of data, programs, and equipment by Federal agencies and the public, improved performance and quality of ADP products and services developed by or acquired by Federal agencies, and increased awareness by government and industry of the need for standards to achieve compatibility and enhance the effective utilization of ADP products and services in the preparation and delivery of public services.

b. It is recognized that information processing standards are being developed nationally under the auspices of the American National Standards Institute (ANSI) and internationally under the auspices of the

International Organization for Standardization (ISO). It is important that Federal computers and information systems be compatible not only with each other, but with those of State and local governments, the private sector of the economy and those of other nations. Accordingly, standards developed to meet Federal requirements should, to the extent practicable, be consistent with corresponding ANSI and ISO standards. In order that Federal interests are adequately reflected in such standards, NBS in its standards management role is responsible for assuring Federal participation in their development; for considering them as Federal standards in those cases where they meet the requirements of the Federal Government; or for initiating independent development actions in cases where ANSI and ISO efforts do not exist, are too slow, or are leading to results which will not satisfy the Government's needs. The ADP Standards program is directed to the problem of reducing existing costly incompatibilities between computer systems, networks, and computer-produced information through adherence to Federal Information Processing Standards (FIPS) and to voluntary national standards.

4.2.1.2.3 Program

a. The FIPS program is responsible for technical work related to standardization in computers and information processing. Much of the program is carried out by Task Groups made up of individuals from various departments and agencies of the Government. Task Groups are usually ad hoc in nature, each being deactivated when its work is completed.

b. Groups participate as qualified experts having knowledge of their agencies' interests in the areas assigned to each Task Group. However, an agency is not bound by the individual view of its task group representative. Upon completion of the assigned task, a Task Group is dissolved by the NBS.

c. The Federal Information Processing Standards Register serves as the official source of information throughout the Federal Government pertaining to the approval, implementation, and maintenance of Federal Information Processing Standards resulting from the provisions of Public Law 89-306 (the Brooks Act). The intended use of the Register is to provide a single source of timely information concerning standards for use by agency managers. The Register contains information on standards classified by five categories: Hardware, software, applications, data, and ADP operations.

4.2.1.2.4 Organization. The National Bureau of Standards reports to the Assistant Secretary of Commerce for Science and Technology. NBS is composed of four organizational components or institutes, each of which covers broad program areas of research and services. These are the Institute for Computer Sciences and Technology (ICST), the Institute for Basic Standards, the Institute for Materials Research, and the Institute for Applied Technology. Only the ICST is concerned directly with Federal Standards for ADP equipment. It provides scientific and technical guidance to the effective use of computers and automation technology in the Federal Government. The ICST develops Federal Information Processing Standards and is responsible for

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managing the Federal Standards program for ADP equipment. The Institute works with special interest communities in the development of voluntary standards for computer usage, provides technical support in the formulation of international policy involving computers, and conducts research in computer sciences as required to fulfill its role of technical advisor to the Federal Government in effective utilization of computers. The Institute also operates the NBS central computer facility.

4.2.1.2.5 Relation to Other Organizations. NBS is primarily concerned with Federal standards, but it takes an active part in all national and international standardization efforts. The Federal Government is a major contributor to the work of the American National Standards Institute (ANSI). The Director of the National Bureau of Standards is a member of the ANSI Board of Directors. Representatives from various Government departments and agencies participate through the councils, boards, committees, subcommittees, and task groups of the ANSI, International Electrotechnical Commission (IEC) and International Standards Organization (ISO).

4.2.1.3 Common Federal Telecommunication Standards/Federal Information Processing Standards

a. In addition to its responsibility for uniform Federal automatic data processing standards relating to equipment, techniques, and computer languages, NBS has a mutual responsibility with the National Communications System (NCS) for the development and coordination of technical and procedural standards for data transmission and the computer telecommunications interface. The program is coordinated by the Federal Telecommunication Standards Committee (FTSC), an interagency body established for that purpose as discussed in paragraph 4.2.1.1.

b. Paragraph 5.2.2.2 points out the fact that NBS and NCS have made an agreement on their mutual standards responsibilities and those standards responsibilities exclusive to each. This agreement is given in Appendix D.

c. The FTSC is used by NCS to develop those telecommunications standards that are the exclusive responsibility of NCS and is used by NBS and NCS to develop those standards that are the mutual responsibility of both. NBS and NCS jointly approve the scope and program of work for the development project for each proposed standard. Letters requesting Federal agency comments may be transmitted either by NBS or by NCS, depending on the assigned responsibility for a given standard. A fully coordinated standard is considered to be a joint recommendation from the two agencies and is forwarded simultaneously to the Administrator of General Services Administration through the Office of Science and Technology Policy for approval. An approved standard is issued as a single document that is clearly identified as belonging to both the Federal Information Processing Standards Series and the Federal Telecommunication Standards Series.

4.2.2 National Telecommunications and Information Administration (NTIA) (Ref. 2.23)

4.2.2.1 History. The National Telecommunications and Information Administration (NTIA) came into being and was assigned to the Department of Commerce on 27 March 1978 by Executive Order 12046. The two most recent predecessors in reverse order of time were the Office of Telecommunications Policy (OTP) and the Office of Telecommunications Management (OTM), both in the Executive Office of the President.

4.2.2.2 Objectives/Policy

a. The formulation and enunciation of national telecommunication policies designed to ensure achievement of the national objectives is an essential element of the role of the Federal Government. Telecommunication policies are made by the Congress, by the Court, by the President and the Department of Commerce, Assistant Secretary for Communications and Information of NTIA with respect to the agencies and establishments of the Federal Government, and by the Federal Communications Commission for the public. Policy is made through treaties to which the United States adheres with the advice and consent of the Senate, through the executive agreements, by executive departments and agencies in the discharge of their telecommunication responsibilities, and by custom and precedent. These policies may be separated into three categories: National Telecommunication Policy; Telecommunication Policy applying to the agencies and establishments of the Federal Government; and Federal Communications Commission Telecommunication Policy.

b. The President, by the Reorganization Plan No. 1 of 1970, established the Office of Telecommunications Policy (OTP), now NTIA in the Department of Commerce, and in doing so asserted, among other things, that the office would:

"...serve as the President's principal adviser on telecommunications policy, helping to formulate government policies concerning a wide range of domestic and international telecommunications issues and helping to develop plans and programs which take full advantage of the nation's technological capabilities.

"...help formulate policies and coordinate operations for the Federal government's own vast communications systems.

"...enable the executive branch to speak with a clearer voice and to act as a more effective partner in discussions of communications policy with both the Congress and the Federal Communications Commission."

c. The primary objective of NTIA is frequency management pursuant to delegated authority of Section 305 of the Communications Act of 1934, as amended (Ref. 2.24).

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4.2.2.3 Programs

a. The natures of the programs are implied in the general functions listed in Ref. 2.23 for the Assistant Secretary for Communications Information, Department of Commerce; namely NTIA, as follows:

(1) Serve as the President's principal adviser on telecommunications.

(2) Develop and set forth plans, policies, and programs with respect to telecommunications that will promote the public interest, support national security, sustain and contribute to the full development of the economy and world trade, strengthen the position and serve the best interests of the United States in negotiations with foreign nations, and promote effective and innovative use of telecommunications technology, resources and services. Agencies shall consult with the Director to ensure that their conduct of telecommunications activities is consistent with the Director's policies and standards.

(3) Assure that the executive branch views are effectively presented to the Congress and the Federal Communications Commission on telecommunications policy matters.

(4) Coordinate those interdepartment and national activities which are conducted in preparation for U.S. participation in international telecommunications conferences and negotiations, and provide to the Secretary of State advice and assistance with respect to telecommunications in support of the Secretary's responsibilities for the conduct of foreign affairs.

(5) Coordinate the telecommunications activities of the executive branch and formulate policies and standards, including considerations of interoperability, privacy, security, spectrum use and emergency readiness.

(6) Evaluate by appropriate means, including suitable tests, the capability of existing and planned telecommunications systems to meet national security and emergency preparedness requirements, and report the results and any recommended remedial actions to the President and the National Security Council.

(7) Review telecommunications research and development, system improvement and expansion programs, and programs for the testing, operation, and use of telecommunications systems by Federal agencies. Identify competing, overlapping, duplicative or inefficient programs, and make recommendations to appropriate agency officials and to the Director of the Office of Management and Budget concerning the scope and funding of telecommunications programs.

(8) Coordinate the development of policy, plans, programs, and standards for the mobilization and use of the Nation's telecommunications resources in any emergency, and be prepared to administer such resources in any emergency under the overall policy direction and planning assumption of the Director of the Office of Emergency Preparedness.

(9) Develop, in coordination with the Federal Communications Commission, a comprehensive long-range plan for improved management of all electromagnetic spectrum resources.

(10) Conduct and coordinate economic, technical, and systems analyses of telecommunications policies, activities, and opportunities in support of assigned responsibilities.

(11) Conduct studies and analyses to evaluate the impact of the convergence of computer and communications technologies; recommend needed actions to the President and to the departments and agencies.

(12) Coordinate Federal assistance to State and local governments in the telecommunications area.

(13) Contract for studies and reports related to any aspect of his responsibilities.

b. A primary program, from the viewpoint of this handbook is standards as provided for in paragraph 4.2.2.3.a(8) above. NTIA technical standards are published in Chapter 5 of reference 2.23. Chapter 5 contains, in addition to technical standards, minimum performance requirements and design objectives applicable to transmitters, receivers, and antennas used in Government radio stations. The standards contained therein are restricted to items relating to frequency management. These items fall into two major groups:

(1) Those associated with the potential impact of any system or equipment on the normal operation of other systems or equipments (such as transmitter and antenna operating parameters), and

(2) Those associated with providing interference immunity of equipment and systems from the normal operation of other equipments or systems (such as receiver performance parameters).

4.2.2.4 Organization

a. The organization of NTIA is given in Figures 5 and 6. The Assistant Secretary for Communications and Information (ASCI) of the Department of Commerce heads NTIA.

b. The ASCI discharges his radiocommunication and frequency management functions under the Secretary of the Department of Commerce with

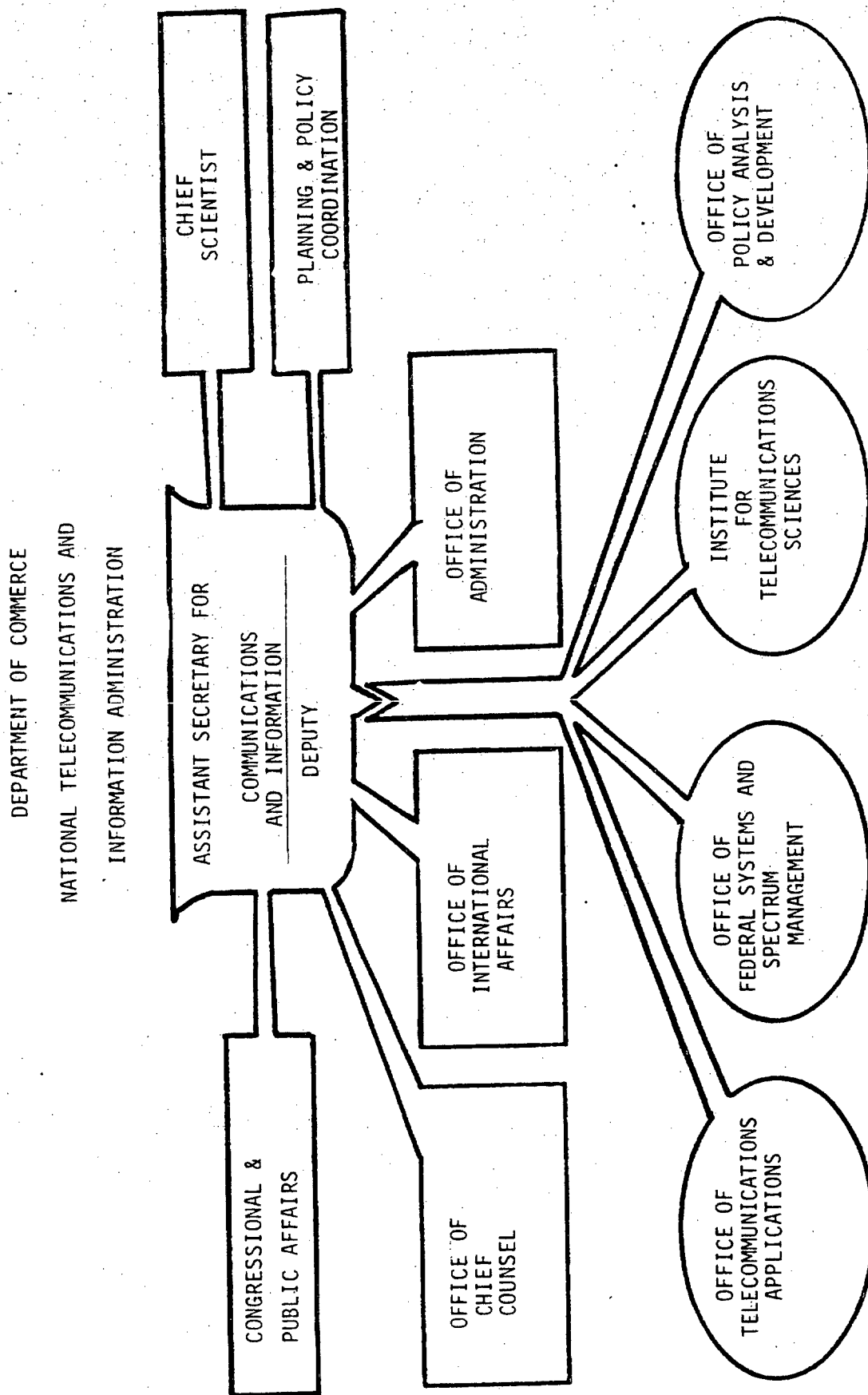
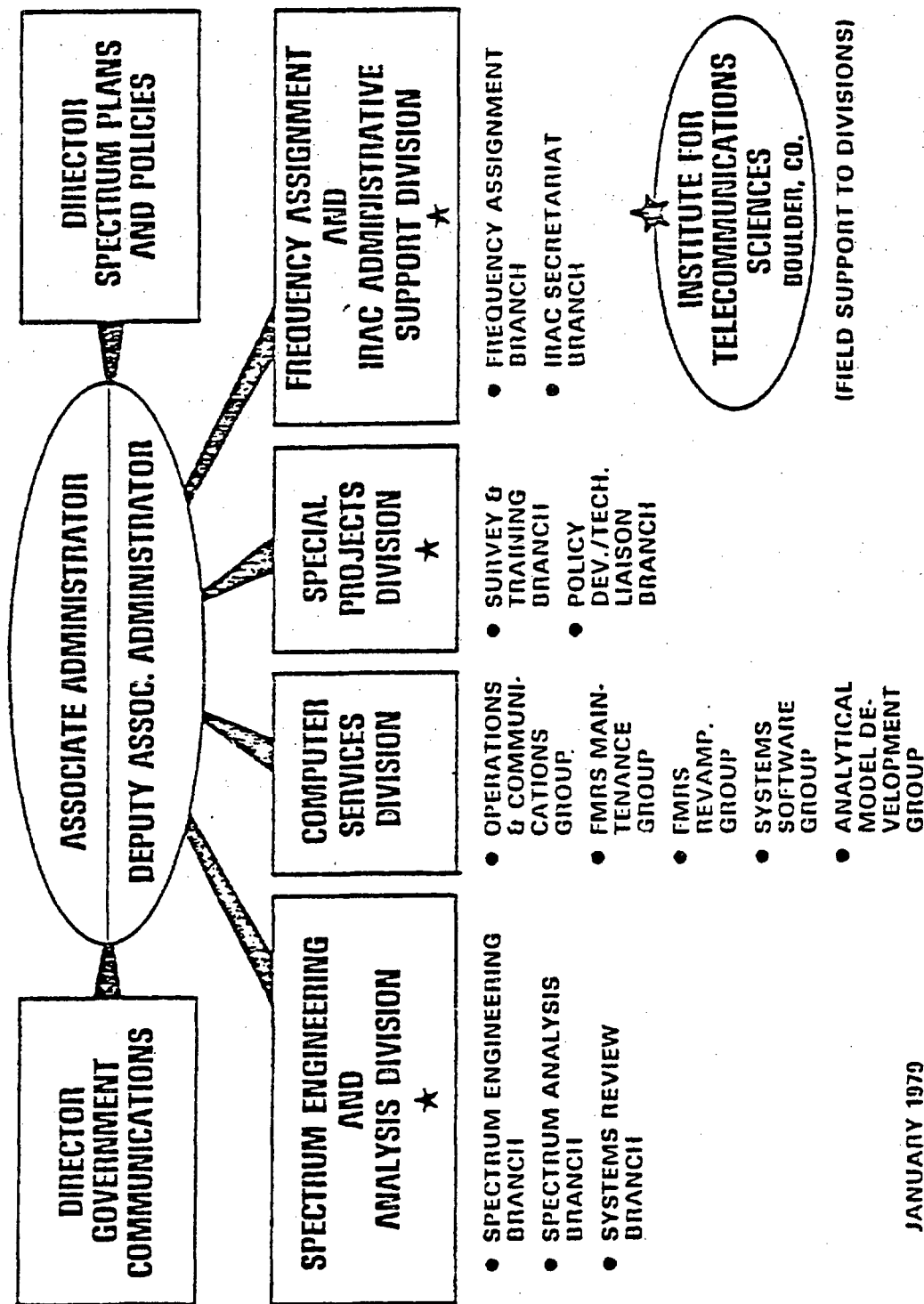


FIGURE 5. DEPARTMENT OF COMMERCE NATIONAL TELECOMMUNICATIONS AND
INFORMATION ADMINISTRATION

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NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION FEDERAL SYSTEMS AND SPECTRUM MANAGEMENT



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FIGURE 6. National Telecommunications And Information Administration Federal Systems And Spectrum Management

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the aid of the Interdepartment Radio Advisory Council, and the Electromagnetic Radiation Council.

4.2.2.4.1 Interdepartment Radio Advisory Committee (IRAC) (Ref. 2.23)

4.2.2.4.1.1 History. The IRAC was organized by mutual agreement of the Government departments concerned on 1 June 1922, and reconstituted on 6 October 1952 with status, mission and functions officially defined on 10 December 1964. It was continued by the Director of the Office of Telecommunications Policy (OTP) and again on 27 March 1978 by the ASCI (NTIA).

4.2.2.4.1.2 Objectives/Policy

a. The mission of the IRAC is to assist the ASCI in the discharge of his responsibilities pertaining to the use of the electromagnetic spectrum.

b. Consistent with our international treaty obligations and with due regard for the rights of other nations, the national objectives for the use of the radio spectrum are to make effective, efficient, and prudent use of the spectrum in the best interest of the Nation, with care to conserve it for uses where other means of communication are not available or feasible. Specifically, in support of national policies and the achievement of national goals, the primary objectives are:

- (1) To enhance the conduct of foreign affairs;
- (2) To serve the national security and defense;
- (3) To safeguard life and property;
- (4) To support crime prevention and law enforcement;
- (5) To support the national and international transportation systems;
- (6) To foster conservation of natural resources;
- (7) To provide for the national and international dissemination of educational, general, and public interest information and entertainment;
- (8) To make available rapid, efficient, nationwide, and worldwide radiocommunication services;
- (9) To promote scientific research, development, and exploration;
- (10) To stimulate social and economic progress; and

(11) In summary, to improve the well being of humans.

4.2.2.4.1.3 Program. The basic functions of the IRAC are to assist the ASCI in assigning frequencies to the U.S. Government radio stations and in developing and executing policies, programs, procedures, and technical criteria pertaining to the allocation, management, and use of the spectrum.

4.2.2.4.1.4 Organization

a. Composition

(1) The IRAC consists of a representative appointed by each of the following member departments and agencies:

Agriculture	Interior
Air Force	International Communica-
Army	tions Agency
Coast Guard	Justice
Commerce	National Aeronautics
Department of Energy	and Space Admini-
Federal Aviation	stration
Administration	National Science
General Services	Foundation
Administration	Navy
Health, Education, and	State
Welfare	Treasury
	Veterans Administration

together with such other departments and agencies as the Assistant Director for Frequency Management may designate.

(2) The following nonmembers are represented, at their request, through the IRAC Representatives of the member shown:

<u>Agency</u>	<u>Represented by</u>
Federal Reserve System	Treasury
International Boundary and	Interior
Water Commission (U.S.	
Section)	
Tennessee Valley Authority	

b. Substructure. The IRAC's substructure consists of the Frequency Assignment Subcommittee (FAS), the Spectrum Planning Subcommittee (SPS), the Technical Subcommittee (TSC), the International Notification Group (ING), and the Secretariat. In addition, the IRAC has, from time to time, various ad hoc groups. The substructure of the FAS consists of the

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Aeronautical Assignment Group (AAG), the Military Assignment Group, and from time to time various working groups. The substructure of the TSC consists of five permanent working groups.

4.2.2.4.2 Frequency Management Advisory Council (Ref. 2.23)

4.2.2.4.2.1 Objectives/Policy. The objective of the Frequency Advisory Council is to advise the ASCI on radio frequency spectrum allocation matters and means by which the effectiveness of the Federal Government frequency management may be enhanced.

4.2.2.4.2.2 Program. The Council's program is advisory in nature and includes:

- a. The review, as appropriate, of recommendations of the Interdepartment Radio Advisory Committee;
- b. The review of the progress of electromagnetic compatibility programs; and,
- c. The development of proposed United States positions on spectrum matters with respect to International Telecommunication Union Conferences.

4.2.2.4.2.3 Organization. The ASCI designates the chairman of the council. Meetings are held at approximately two-month intervals at the call, or with the approval of the Administrator or his representative.

4.2.2.4.3 Electromagnetic Radiation Council (Ref. 2.23)

4.2.2.4.3.1 Objectives/Policy. The objective of the Electromagnetic Radiation Council is to advise the ASCI of side effects and adequacy of control of electromagnetic radiations arising from telecommunications activities. It reviews, evaluates, and recommends measures to investigate and mitigate potential undesirable effects on the environment.

4.2.2.4.3.2 Program. The council's program is advisory in nature and includes:

- a. The review of Government and non-Government activities bearing upon the adequacy of control of electromagnetic applications which may involve directly or indirectly the production of radiant energy in any portion of the spectrum capable of causing either harmful biological effects, or harm to equipment and material. (The spectrum is presumed to consist of the electromagnetic spectrum range from electrostatic and constant magnetic fields through the radio frequency to the optical spectrum, including the use of coherent optical radiation (lasers), and x-rays produced by electrical or electromagnetic devices).

b. The review, as required, or matters relating to nonelectromagnetic radiation phenomena (such as infrasonic and ultrasonic radiation) which may derive from the use of electronic equipment or be under the purview of these agencies of the Government concerned with the electromagnetic spectrum.

4.2.2.4.3.3 Organization. The Administrator, NTIA designates the chairman of the council. Meetings are held at approximately two month intervals at the call, or with the approval, of the administrator or his representative.

4.3 U.S. Non-Government

4.3.1 American National Standards Institute (ANSI) (Ref. 2.25)

4.3.1.1 History

a. ANSI was originally organized in 1918 by five engineering societies as the American Engineering Standards Committee (AESC). The founding organizations were the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, the American Society of Civil Engineers, the American Society of Mining and Metallurgical Engineers, and the American Society for Testing and Materials.

b. The AESC was formed to provide a national organization for coordinating the development of national standards. Three Federal Government Departments were invited to join as founding members: the War Department, the Navy Department, and the Department of Commerce, all of which accepted the invitation. In 1920, trade associations as well as several technical and professional societies were invited to join. The need for a more workable structure resulted in the organization of the American Standards Association (ASA) in 1928.

c. In 1966, the ASA became the United States of America Standards Institute (USASI) under a new constitution and bylaws. In 1969, the present name, American National Standards Institute, was adopted. At that time, ANSI was reorganized and, more recently, has undergone several modifications to its structure. The effect was to broaden the membership base and encourage user involvement.

4.3.1.2 Objectives/Policy. Five of the major purposes of the American National Standards Institute are:

a. To serve as the national coordinating institution for the development of national standards so as to insure the development of needed standards.

b. To provide an independent mechanism for approval and promulgation of voluntary national standards.

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c. To provide a focal point for industry and Government coordination in the field of standardization.

d. To provide the mechanism for managing and coordinating programs of national standards.

e. To represent the USA in international standardization organizations of a non-governmental nature.

4.3.1.3 Program. ANSI does not, in itself, develop standards; its only function is to provide the organization through which standards can be developed and approved. The institute has Standards Management Boards to foster development of standards, a review board to determine that consensus has been reached, and a board for accepting and approving proposed standards.

4.3.1.4 Organization

a. The American National Standard Institute is a federation of approximately 180 organizations representing trade, professional, commercial, organized labor, and consumer interests. Membership is divided into six classes: organizational, governmental, company, sustaining, individual and honorary. All but the last two categories have voting privileges.

b. The principal officers are the President, who serves as the Chairman of the Board of Directors, and three Vice Presidents. The Board of Directors designates a Managing Director, who serves as Secretary of the Institute and is its chief administrative officer.

c. The Board of Directors is comprised of the President, the immediate past President, three Vice Presidents, the Director of the National Bureau of Standards, the Chairman of the Organizational Member Council, the Chairman of the Company Member Council, the Chairman of the Consumer Council, the Chairman of the International Standards Council, the Chairman of the Executive Standards Council, the Chairman of the Board of Standards Review, the Chairman of the Certification Committee, and the Chairman of the Government Liaison and Support Committee. In addition to the above elected or ex officio members, twelve directors are nominated by organizational members, twelve by the company members, nine by the Government Liaison and Support Committee (from Federal Government members and other representatives of Government organizations qualified for membership), three by the Consumer Council, and three directors-at-large are nominated by the Nominating Committee of the Board.

d. Five Councils, the Board of Standards Review, and the Certification Committee make up the operating arms of ANSI. The Councils are: Organizational Member Council, Company Member Council, Executive Standards Council, Consumer Council, and International Standards Council.

e. Board of Standards Review. Approval of ANSI standards is delegated to the Board of Standards Review (BSR) by the Board of Directors. Essentially the BSR's function is a judicial one of determining that a consensus exists among those substantially concerned with the scope and provisions of a proposed standard.

The Board consists of nine to eighteen members appointed by the President of the Institute with the approval of the Board of Directors. Members of the Board of Standards Review serve as individuals, and not as members or representatives of any organization.

The primary responsibilities of the Board are to:

(1) Implement procedures for the approval and withdrawal of standards as American National Standards and adjudicate questions or conflicts that develop in the approval procedure.

(2) Determine whether standards submitted to the Institute for approval or withdrawal as American National Standards meet the requirements of the Institute, and act on all requests for approval, reaffirmation, revision, and withdrawal of American National Standards.

(3) Be watchful of the interests of those who may be affected by a particular standard so that their views are given full and adequate consideration.

(4) Scrutinize evidence of the technical quality of the proposed American National Standard.

f. Certification Committee. The Certification Committee has a voting membership of not less than six nor more than fifteen appointed by the President with the approval of the Board of Directors. The Committee is responsible for advising the Board of Directors and administering all national activities of the Institute in the field of certification.

4.3.1.5 Relation to Other Organizations. ANSI is the Official Member Body of ISO, and through its affiliate, the U.S. National Committee, is recognized as the official U.S. member of the IEC. The Pacific Area Standards Congress was formed by ANSI for the purpose of strengthening the ability of the nations in the Pacific to participate in international standardization activities.

ANSI provides management, leadership, coordination, financial and administrative support for effective U.S. participation in the international standardization effort. The Institute pays the total dues to ISO and IEC and helps in governing the ISO through the Institute's membership on the ISO Council and on the Executive and Planning Committees. In its capacity as Secretariat, ANSI directs the work of many ISO Technical Committees and Subcommittees.

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4.3.1.6 American National Standards Committee X3, Information Systems (Ref. 2.25)

4.3.1.6.1 Membership. Members are organizations with substantial interests in developing standards in the assigned scope of the Committee. Members are classified into three categories: Producers, Consumers, or General Interest; no one of these categories is allowed to have a majority of members. Membership is divided into three categories as (1) Regular Member, (2) Ex-Officio Member, and (3) Liaison Member and Observer. A regular member (principal and alternate) is one who seeks membership and demonstrates a valid and continuing interest in the work of X3. A regular member or his alternate has full voting privileges. Ex-officio members are the chairmen of the technical committees, who may attend X3 meetings and who have the right of full participation except for voting privileges. Liaison members and observers are classified as those individuals, organizations or representatives of other standards committees who have an interest in the work of X3. Liaison members and observers do not have a vote.

4.3.1.6.2 History. At an ISO meeting in early 1960, Sweden recommended that a new ISO Technical Committee be formed for standards for information processing. Additionally, it was suggested that the United States accept the Secretariat.

Upon return from the ISO meeting, the heads of manufacturing concerns in the United States and officials of CBEMA (then the Business Equipment Manufacturers Association) were invited to a meeting. At this special meeting, it was recommended that an organization be formed to develop standards in the computing field. As a result of this recommendation, the X3, X4 and X6 Sectional Committees were formed. In 1965, the X6 Committee was disbanded and its work was taken over by an Electronic Industries Association (EIA) group.

The announcement of the formation of X3 was made in September of 1960, at which time COBOL and codes were emphasized as the standards to be developed. At the first organizational meeting of X3 which was held in February 1961, seven major topics were identified as: optical character recognition, magnetic ink character recognition, data transmission, programming languages, terminology, problem definition and analysis, and codes. The activities on standards for keyboards and office machines became a separate committee known as X4. CBEMA accepted the Secretariat (at that time this function was called a sponsorship) of both Committees.

In 1969, X3 was reorganized so that the administrative and technical review responsibilities were absorbed by two standing committees. In addition to this, the technical committees were realigned under the categories of hardware, software, and systems.

In 1982, X3 and X4 were combined into X3.

4.3.1.6.3 Objectives/Policy ANSC X3 operates under the general objectives of the American National Standards Institute and is responsible for fulfilling the responsibilities of ANSI for the domestic standards within its stated scope: standardization in the areas of computers and information processing and related peripheral equipment, devices and media.

4.3.1.6.4 Program. The program of work is accomplished by the following technical committees:

- X3A1 - Optical Character Recognition
- X3A7 - Magnetic Ink Character Recognition
- X3B1 - Magnetic Tape
- X3B5 - Magnetic Tape Cassettes
- X3B6 - Instrumentation Tapes
- X3B7 - Magnetic Disks
- X3B8 - Flexible Disks
- X3H1 - Operating System Command and Response Language
- X3H2 - Data Base Management Systems
- X3H3 - Graphics
- X3H4 - Information Resource Management Dictionary
- X3J1 - Program Language
- X3J2 - Basic Language
- X3J3 - FORTRAN
- X3J4 - COBOL
- X3J6 - Computer Language for Processing of Text
- X3J7 - APT Programming Language
- X3J8 - ALGOL
- X3K1 - Project Description
- X3K2 - Flow Charts
- X3K5 - Vocabulary
- X3K6 - Network Oriented Project Management.
- X3S3 - Data Communications
- X3T1 - Encryption
- X3T5 - Open Systems Interconnection
- X3T9 - I/O Interfaces

4.3.1.6.5 Organization. The Computer and Business Equipment Manufacturers Association (CBEMA) is designated by ANSI as the Secretariat for American National Standards Committee (ANSC) X3. Secretariat CBEMA provides the essential administrative support.

The Chairman and the Vice Chairman are appointed by the Secretariat for a period of three years. The Chairman appoints a Recording Secretary and may appoint such other officers as are required for the conduct of ANSC X3 business.

The Standing Committees. Assisting X3 in discharging its responsibilities are two standing committees which advise X3 relative to the administration, evaluation, allocation and scheduling of standards projects.

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The responsibilities are vested in the International Advisory Committee (IAC) the Standards Planning and Requirements Committee (SPARC).

International Advisory Committee. The International Advisory Committee (IAC) is responsible for coordinating the work of ANSC X3 with respect to international affairs so as to assist ANSI in executing the responsibilities associated with its participation in ISO, IEC and other national, regional, and international standards bodies. The IAC is responsible for policy statements on issues rather than for technical positions.

Standards Planning and Requirements Committee. SPARC is an advisory committee responsible for the evaluation of the need for new standards and for review of proposed standards. SPARC audits the progress of standards development from the point of view of functional and economic, as opposed to technical, requirements. The Committee is also responsible for the review of proposed standards in regard to their conformance to their original objectives. SPARC may organize study groups, as required, to assist it in its responsibilities for the evaluation of the potential of proposed standardization activities.

SPARC consists of not more than 16 members, including the Chairman. The Chairman, the Vice Chairman and the majority of the members must be from the user group. Candidates for membership may be proposed by SPARC or by any member of ANSC X3; all officers and members are appointed by the Chairman of ANSC X3.

4.3.1.6.6 Relation to Other Organizations. ANSC X3 relates to ISO through the American National Standards Institute on matters pertaining to ISO issues and the international aspects of developing standards for computers and information processing. All United States comments on international topics, administrative or technical, are forwarded to ANSI for transmittal to the proper Secretariats.

X3 reports to ANSI through the Information Systems Standards Management Board. X3 Technical Committees maintain liaison with their ECMA, IFIP, CCITT, and ISO counterparts on both formal and informal bases with the approval of ANSI and the X3 Secretariat.

4.3.2 Electronic Industries Association (EIA) (Ref. 2.25)

4.3.2.1 History. The Association was organized in 1924 under the name of Radio Manufacturers Association and went through two changes of name before its present name was adopted in 1957. In 1965, the EIA absorbed the Magnetic Recording Industry Association, and in 1973 the Eastern and Central Divisions of the Association of Electronic Manufacturers were merged with the Distributor Products Division of EIA. The Electronic Industries Association is a national trade organization, representing the full spectrum of manufacturers of electronic products in the United States.

4.3.2.2 Objectives/Policy

a. Objectives. As a national organization, EIA confines its activities to the area of legitimate public interest objectives under the policy direction of its Board of Governors. The following are some of the major objectives of EIA:

(1) Advance the growth and technological progress of the industry.

(2) Coordinate and convey the view of Association members to appropriate bodies on legislated regulations, and allied industry organizations.

(3) Provide a forum for industry representatives to discuss matters affecting the interests of the industry and to implement the policies of the Association.

(4) Assist the Department of Defense and the Army Services in obtaining the most advanced and reliable products and scientific development from industry through an interchange of information and ideas.

b. Policy. The following statement of policy, reflecting the basic objectives of all standardization programs, shall be included in all EIA standards:

(1) EIA engineering standards are designed to serve the public interest by eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for his particular need. Existence of such standards shall not in any respect preclude any member or non-member of EIA from manufacturing or selling products not conforming to such standards.

(2) Standards are proposed or adopted by EIA without regard to whether their proposal or adoption may in any way involve patents or articles, materials, or processes. By such action, EIA does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting EIA standards.

4.3.2.3 Program. To accomplish work in the data processing area, EIA's Engineering Department set up three committees and designated them as TR-29, TR-30, and TR-37. TR-30 holds joint meetings with X3S3 (Committee of the American National Standards Institute (ANSI)) on a regular basis with several individuals holding dual memberships.

a. TR-29, Facsimile Systems and Equipment. Scope: To develop and maintain standards for the interface between communication equipment and facsimile terminal equipment, and other standards that describe the characteristics of the facsimile terminal equipment.

b. TR-30, Data Transmission and Equipment. Scope: To develop and maintain standards for the interface between data communication and data terminal equipment, including work on data signaling speeds and on the interface between digital data terminal equipment and signal converters, data sets, or modems. Provides liaison and cooperation with ANSC X3S3 on Data Transmission and supports U.S. participation in international standardization activity in this area.

c. TR-37, Communications Interfaces. Scope: To develop and maintain standards for the interface between common carrier-provided communication equipment and systems, and customer-provided equipment and systems. This includes work on data, graphic, and voice communication systems. The work program is oriented around the existing common carrier regulations which permit the connection of customer-provided equipment to the network through common carrier-provided connecting arrangements.

4.3.2.4 Organization. EIA is headed by a Board of Governors, with the management function vested in the President of the Association, several Vice Presidents, a Treasurer, and a General Counsel and Secretary. The Association fulfills its responsibilities to its membership through ten Divisions, each of which is structured to serve the needs specific to the product lines manufactured by the member companies. Nine of these Divisions are product-oriented and include the Consumer Electronics Group which comprises three Divisions (Audio, Video, and Calculator), the Government Products Division, the Communications Division, the Industrial Electronics Division, the Solid State Products Division, the Parts Division, and the Tube Division. The tenth Division, Distributor Products, represents the manufacturers who market their products through distributors of electronic parts.

Two Departments, Marketing Services and Engineering, provide support services to the ten product-oriented Divisions. The Marketing Services Department publishes, on a regular basis, data on all facets of the electronics industry. The data are accumulated from information on sales and production voluntarily supplied to the Association by more than 500 companies. Indicative of the kinds of data published are a few selective titles, such as the Electronic Market Data Book, Electronic Market Trends, and Sources of Electronic Market Information.

The engineering and technical activities of the Association are conducted through its Engineering Department. Over 4,000 industry and government representatives participate in approximately 225 of the Department's committees engaged in the development of EIA Standards and Engineering Bulletins. These committees prepare technical positions and recommendations on proposed government specifications and standards, as well as on revision of existing specifications and standards. This Department also manages the public review and comment resolution phase in the standards development process. Through its Technical Advisory Groups, the Engineering Department is responsible for directing the Association's international standardization activities, which interface with the International

Electrotechnical Commission (IEC) and the International Organization for Standardization (ISO). During 1975, the EIA provided the Secretariat for 12 IEC Technical Committees, subcommittees, and Working Groups, and served as the administrator of the U.S. National Committee for 29 of the 177 IEC Committees and Subcommittees.

4.3.2.5 Relation to Other Organizations. The EIA relates to other standards making bodies through the technical engineering committees of its Engineering Department, as noted above. The responsibility for the data communication standards program in the United States is shared by the Technical Committees of EIA and American National Standards Committee (ANSC) X3S3. These efforts are coordinated with those of the International Telegraph and Telephone Consultative Committee (CCITT), International Organization for Standardization (ISO), and International Electrotechnical Commission (IEC). Several EIA standards have been approved as ANSI standards.

4.3.3 Institute of Electrical and Electronics Engineers (IEEE) (Ref. 2.26)

4.3.3.1 History. In a 1968 membership attitude survey, it was found that a large percentage of IEEE members felt that issuing of technical standards was an important means by which IEEE could carry out its objectives. This implied directive from a significant percentage of members was accepted by the Standards Committee, resulting in a modification and strengthening of the standards activity. In 1973, the former Standards Committee was redesignated as the IEEE Standards Board.

4.3.3.2 Objectives/Policy

a. The main objective of the IEEE as stated in its constitution is the advancement of the theory and practice of electrical engineering, electronics, radio, allied branches of engineering or the related arts and sciences. The scope of the standardization activities falls within the foregoing technological field. The IEEE strives to generate standards publications that will have the broadest potential international acceptance.

b. Purpose of IEEE Standardization. IEEE standardization provides a common ground for communication between those using the standards. It also provides criteria for the acceptable performance of equipment or materials pertinent to the electrical engineering field. IEEE standards are published to record a consensus of the engineers who are substantially concerned with the scopes of these standards. It is the purpose of the review by the IEEE Standards Board to ensure that all approved standards are truly representative of the best thinking of the experts of the Institute, and that proper procedures have been carried out in their formulation.

c. An IEEE standard gives an authoritative reference to the state-of-the-art, which is kept up to date through review at least every five years by the sponsor responsible for its preparation. All IEEE standards are routinely submitted to the American National Standards Institute (ANSI) for

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adoption as American National Standards. Similar action is taken with respect to other national standards organizations, as requested by such organizations.

4.3.3.3 Program. IEEE, as a scientific, engineering and educational society, develops and publishes standards in such categories as definitions and terminology, methods of measurement and test, rating structures, temperature limits, application guides, recommended practices, and safety. IEEE, as a professional society, does not develop standards on specific devices or hardware which characterize their commercial sizes, arbitrary ratings, or performance associated with warranties. Rating and dimensional information may be developed by IEEE and included in an IEEE Standard, provided such information results from technical considerations and is not developed by IEEE on an arbitrary basis. Arbitrary rating information developed by other competent organizations may be included in IEEE standards provided that, in IEEE's judgment, it is consistent with good engineering practice.

4.3.3.4 Organization

a. The IEEE Standards Board is established by IEEE Bylaw 310.4(4) which reads:

The Standards Board shall consist of not more than twenty-six Institute members, including a Chairman, a Vice-Chairman, and the immediate Past Chairman, plus a Secretariat assigned from the Headquarters Staff by the General Manager. The Standards Board is responsible on an Institute-wide basis for encouraging and coordinating the work of formulating and revising IEEE standards. The Board shall give final approval to IEEE standards prior to publication. It shall consider and investigate all matters relating to units and standards in the fields of electrical engineering, electronics, radio, and the allied branches of engineering or the related arts and sciences. It shall represent the IEEE in cooperation with other standardizing bodies in matters relating to units and standards.

The Standards Board is empowered to establish and appoint committees, subcommittees and councils.

The responsibilities of the Standards Board include:

- (1) Encouraging, coordinating and supervising the development of IEEE standards.
- (2) Reviewing all proposed IEEE standards and supporting material to insure that the proposed standard conforms to the requirements of this manual and that a consensus has been achieved in favor of the proposed standard within the IEEE.
- (3) Encouraging, coordinating and supervising standards activities with all other standards organizations outside of the IEEE in which the IEEE has a substantial interest.

b. The Standards Board has established the following committees to assist in the conduct of administrative functions:

- (1) Administrative Committee (ADCOM)
- (2) Procedures Committee (PROCOM)
- (3) New Standards Projects Committee
- (4) International Liaison Committee
- (5) Awards Committee (ACOM)
- (6) Finance Committee (FINCOM)
- (7) Standards Council

4.3.3.5 Relation to Other Organizations

a. When appropriate, IEEE will cooperate with standardizing groups throughout the world in the preparation of standards involving an area of interest within its scope. In this connection, approval by the IEEE signifies that the IEEE believes the document to be consistent with good engineering practices. Ratings contained in such documents are approved on the basis of engineering merit and consistency only. A statement to this effect is included in the preface of documents published by IEEE containing rating information developed by other organizations.

b. The International Liaison Committee is responsible for coordinating IEEE standardization efforts with those of the International Electrotechnical Commission (IEC) and the International Organization for Standardization (ISO).

c. The IEEE works with the American National Standards Institute (ANSI) to get the IEEE standards issued as ANSI standards. The American National Standards Institute is a nonprofit corporation consisting of a federation of approximately 160 national organizations and some 1000 company members. The Institute itself does not write standards; it makes use of the combined technical talent and expertise of its organizational members, technical, professional and trade associations, as well as the companies and industrial firms that comprise the federation. The standards developed by these organizations become American National Standards after the Institute determines that they have been developed in accordance with its procedures, and that consensus of agreement among interested and affected parties has been achieved.

4.3.4 American Society For Testing and Materials (ASTM) Ref. 2.27)

4.3.4.1 History. ASTM was founded in 1898, formally incorporated in 1902 and has an international membership of over 20,000.

4.3.4.2 Objectives/Policy. ASTM is a non-profit corporation formed for the development of standards on the characteristics and performance of materials, products, systems, and services, and the promotion of related knowledge. In

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ASTM terminology, standards include test methods, definitions, recommended practices, classifications and specifications.

4.3.4.3 Program

a. As of July 1973, over 4900 standard specifications, methods of tests, and definitions were in effect and hundreds of research projects were underway, involving some 13,500 of the country's leading engineers, scientists, research workers and educators. All of this activity is of tremendous import to American industry, municipal, state and Federal governments, and other bodies and nations. ASTM standards and other products are used throughout the world.

b. Proposed standards or revision of existing standards originate in the committee having jurisdiction in that particular field. Actions affecting the proposed standard are subject to a nine-tenths approval by letter ballot vote of the entire committee. Each standard, before adoption by the society, is then submitted to a letter ballot vote of the entire society membership, and a nine-tenths favorable vote of those voting is necessary before adoption.

c. Research and standardization go hand-in-hand. The society's first president and pioneer in the development of specifications, after enumerating certain requirements for a workable specification for a material stated that "above all it should embody within itself the results of a latest and best studies of the properties of the material which it covers". Painstaking investigation and study of experience accumulated over years of service are often required before an adequate specification can be prepared.

4.3.4.4 Organization

a. In both phases of activity, standardization and research, the ASTM standing technical committees occupy a most important position. These committees are the heart of the ASTM. All activity is of a cooperative nature, and all members of committees serve voluntarily. Each committee is made up of three main classes of membership - producers, users, and general interests. It is recognized that no specification covering the quality and methods of testing a material or product will come into wide usage unless it is satisfactory to both the consumer and producer. The ASTM setup is, thus, fundamental in its standardization procedure, whereby the producers and consumers are brought together on an equal footing.

b. Of the more than 20,000 regular members of the society, about 2,600 are corporate memberships, and in the remainder are individuals, universities, technical schools, technical societies and libraries, 15 percent of which are from outside the United States. Of these members, approximately 13,500 occupy 44,000 berths on the society's 120 main and 1300 subcommittees.

4.3.4.5 Relation to Other Organizations. The ASTM has cooperated with such bodies as the American Society of Mechanical Engineers, American Foundrymen's Society, Society of Automotive Engineers, American Society of Civil Engineers, Soil Society of America, and many others. Among other societies and activities in which the ASTM is officially represented are the National Research Council, Metal Properties Council, Textile Research Institute, National Safety Council, International Union of Testing and Research Laboratories for Materials and Structure, Inter-Society Color Council and others.

4.3.5 National Electrical Contractors Association (NECA) (Ref. 2.24)

4.3.5.1 History. The NECA, which was founded in 1901, is the nationwide trade association representing the electrical contracting industry. Standards activities are under the guidance of the Association's Codes and Standards Committees.

4.3.5.2 Objectives/Policy. Objectives are:

- a. The prevention and reduction of accidents to electrical workers. This has always been important to electrical contractors. More recent Federal legislation on occupational and health have made it a necessity.
- b. To act as a stabilizing force in the electrical construction industry. The National Electrical Code sets the basic standards for electrical equipment and materials and the methods of their installation.
- c. The promotion of better wiring standards and the development of standards of adequacy.
- d. To facilitate the estimation of costs and the installation of electrical products.

4.3.5.3 Program

a. NECA provides representation of electrical contractors as follows:

- (1) On the group responsible for the development of the National Electrical Safety Code.
- (2) In the American National Standards Institute, in connection with the development of electrical material and equipment standards.
- (3) In the American National Standards Institute and other associations such as the Construction Specifications Institute, in connection with adequate and clear electrical specifications and drawings.

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b. The promotion of better wiring standards requires technical standards, whether the application is residential, commercial or industrial. Developing standards of adequacy is the function of the NECA Technical Service which maintains competent representation on inter-industry and other standards agencies.

4.3.5.4 Organization

a. Electrical contractors, through NECA, have representation on the Correlating Committee and code making panels of the National Electrical Code Committee of the National Fire Protection Association which is responsible for the development, revision and promotion of the National Electrical Code. NECA also represents electrical contractors on the group responsible for the development of the National Electrical Safety Code, which is concerned with outside construction.

b. Electrical contractors are represented on related committees of the American National Standards Institute through NECA representation on such committees and on committees of other associations.

4.3.6 National Fire Protection Association (NFPA) (Ref. 2.27)

4.3.6.1 History. The NFPA is a non-profit, technical and educational organization established in 1896. It now enjoys a membership which includes 180 national and regional organizations and approximately 25,000 individuals, firms, and corporations.

4.3.6.2 Objectives/Policy. The objective of NFPA is to promote the science and to improve the methods of fire protection.

4.3.6.3 Programs

a. There are two primary programs, as follows:

(1) The standards field under which codes, standards and recommended practices are developed as guides to engineered protection for reducing loss of life and property by fire.

(2) The education of the public in fire prevention to reduce fires caused by people.

b. The fire safety code has broad applications, and the standards formulated and adopted by the association cover a wide range of subjects. The standards, recommended practice, manuals, guides and model laws are combined and published yearly as National Fire Codes, constituting 16 volumes. Volume 6 covers electrical standards, including the National Electrical Code. A number of these standards, such as the National Electrical Code, are submitted to and approved by the American National Standards Institute.

4.3.6.4 Organization. The standards activity is handled by more than 150 committees and sectional committees whose membership is comprised of over 2,000 individuals representing qualified international, national and regional organizations. In addition, committees may have liaison or advisory members, and corresponding members. The latter group is composed chiefly of individuals who live outside of the North American continent and who are in a position to assist in the committee work only through correspondence.

4.3.6.5 Relation to Other Organizations. NFPA is an international organization with members in more than eighty countries and participates in the International Organization for Standardization and the Canadian Electrical Code Committee. Many agencies of the Federal Government serve on the technical committees of the association.

4.3.7 Radio Technical Commission for Aeronautics (RTCA) (Ref. 2.28)

4.3.7.1 History

a. The Radio Technical Commission for Aeronautics (RTCA) is a non-profit cooperative association of government and non-government organizations. For 41 years, the RTCA has provided an open, continuing and essential forum for the discussion of technical matters relating to aeronautical navigation, communications and traffic control. Many important aeronautical systems now in worldwide use were developed and adopted as a result of RTCA initiatives.

b. It all started in 1935, when leaders from government and from the burgeoning electronics industry, together with their counterparts in industry, realized that some coordinating body was urgently needed. At the invitation of the Department of Commerce, selected U.S. agencies, both government and civil, met in June 1935 and formed the Radio Technical Committee for Aeronautics as a coordinating agency. The name was later changed to Radio Technical Commission for Aeronautics.

4.3.7.2 Objectives/Policy. RTCA is dedicated to the advancement of aeronautics by providing an open, continuing forum, engaging in project studies, providing guidance to industry and government, and operating as a source of information with respect to common problems and requirements, developments, and potential applications within the state-of-the-art.

4.3.7.3 Program

a. RTCA's scope of activities is in the field of aviation electronics and telecommunications, and in other closely allied fields. Some examples of areas of interest are:

- (1) Determination of common operational requirements.
- (2) State-of-the-art developments and applications.

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- (3) Minimum Operational Performance Standards for airborne systems.
- (4) Environmental test procedures for electronic/electrical instruments.
- (5) Operational and technical characteristics of systems.
- (6) Aeronautical frequency spectrum utilization.
- (7) Other problems associated with air traffic control, navigation, communications, and efficient utilization of airports and airspace.

b. Much of RTCA's most visible work in recent years has been the development of Minimum Performance Standards and Minimum Operational Characteristics for various equipments. These standards are published for automatic distribution to member organizations and are also sold as a service to the public.

c. Another aspect of RTCA is its status as an Advisory Committee to government agencies. Each working meeting is announced in the Federal Registry and is open to the public.

4.3.7.4 Organization. RTCA consists of four major elements; the Assembly, the Executive Committee, the Special Committees and the Secretariat.

a. The assembly is the total membership, consisting of Delegates and Alternate Delegates representing over 100 government and industry organizations.

b. The Executive Committee manages the affairs of RTCA.

c. The Special Committees, numbering about 130, perform the actual technical work.

d. The Secretariat consists of the Director of Technical Services, a technical staff officer and a clerical stenographic staff.

4.3.7.5 Relation to Other Organizations

a. RTCA coordinates with the International Civil Aviation Organization (ICAO), which performs for the entire world some of the functions performed by RTCA for the U.S. aviation community.

b. RTCA also closely coordinates with the European Organization for Civil Aviation Electronics (EUROCAE).

4.3.8 Radio Technical Commission for Marine Services (RTCM) (Ref. 2.29)

4.3.8.1 History. The Radio Technical Commission for Marine Services, a non-profit association of government agencies, industry organizations and associations, was formed in 1947 as a coordinating body.

4.3.8.2 Objectives/Policy

a. The objective of the RTCM is to advance the art and science of marine telecommunications through study, investigation, appropriate recommendations to the Federal Government and industry and the promotion of ideas and exchange of information.

b. The RTCM is the only organization which provides a continuing forum for open discussion by Government and industry in the field of maritime electronics, telecommunications and closely allied fields.

4.3.8.3 Programs

a. The programs of the RTCM consist of:

(1) Promotion of ideas and exchange of information pertinent to its purpose.

(2) Coordination between government and non-government views on matters consistent with its purpose.

(3) Study of marine telecommunication practices, needs, and present and projected media and systems, toward improvement in present facilities and/or new facilities.

(4) Making of recommendations and/or findings to the Federal Government and industry, reflecting the expertise and experience of its members, their representatives, and others that are suitably qualified.

b. When the Executive Committee decides that a particular question must be answered, a Special Committee is constituted. It would be impossible for any individual organization to purchase the talent which the RTCM Special Committees succeed in rounding up for their technical studies which may take from 3 months to over 3 years.

4.3.8.4 Organization (Figure 7, RTCM Organization Chart)

a. The business of the RTCM is conducted by the Assembly, Executive Committee, and approved Special Committees supported by a Secretariat.

b. The Assembly is constituted by representatives (known as Delegates and Alternates) who are designated by member organizations, both government and non-government. At annual meetings, the Assembly elects the RTCM officers and transacts necessary administrative business, in addition to exchanging technical information at the technical sessions.

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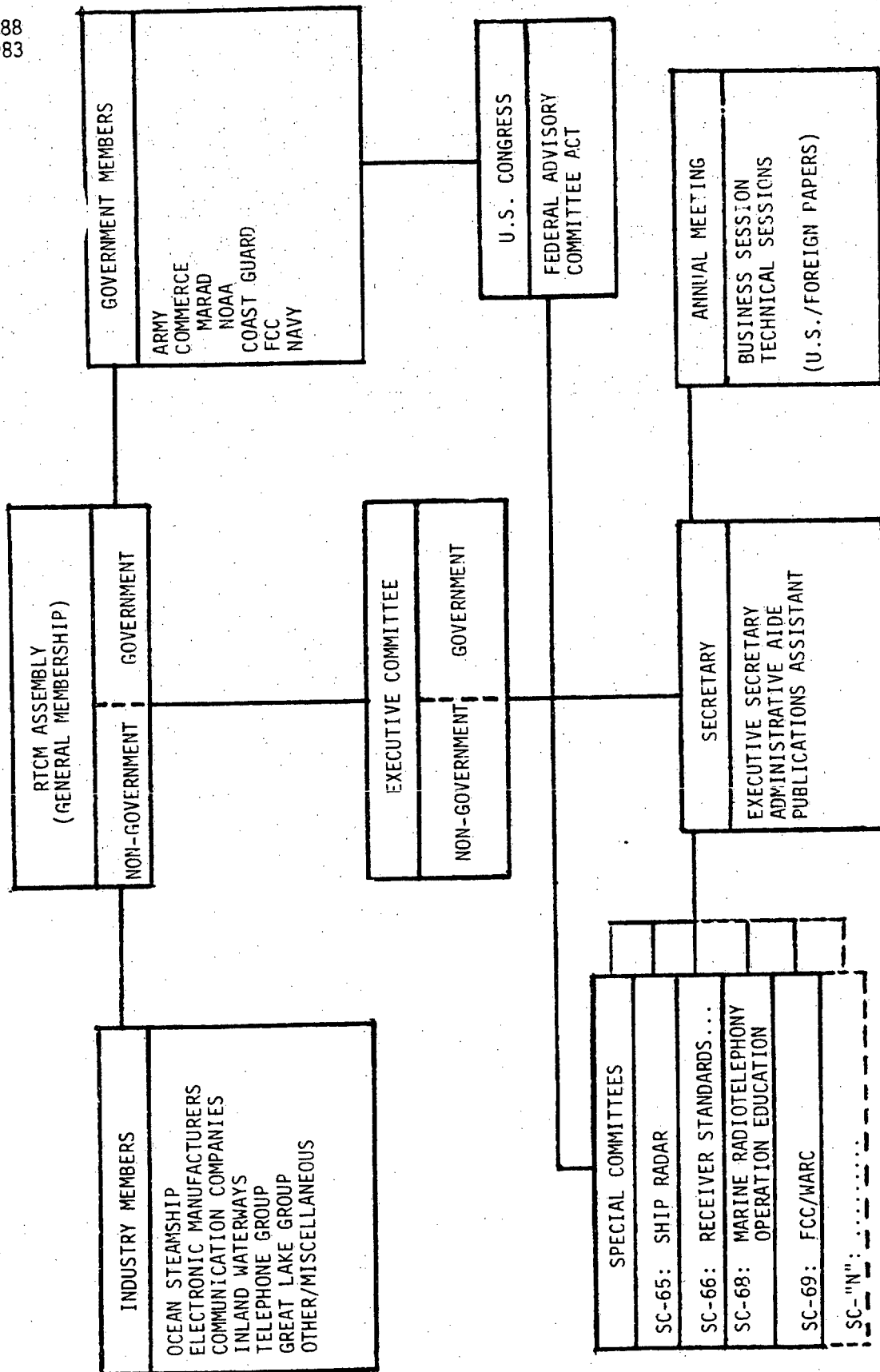


FIGURE 7. RTCM ORGANIZATION CHART

4.4 International Standardization Activities. The activities covered in this subparagraph are divided into three classes as follows:

- a. International Military
- b. International (Foreign) Government Activities, Other than Military
- c. International Non-Government.

4.4.1 International Military. This portion of the study includes NATO and four quadripartite organizations. The quadripartite organizations are those of Australia, Canada, United Kingdom and the United States with New Zealand having various degrees of participation. There are four activities: an Army, a Navy, an Air Force and the Combined Communications-Electronics Board. Although all four organizations involve the same countries, the titles of each are entirely different.

4.4.1.1 North Atlantic Treaty Organization (NATO) (Ref. 2.30)

4.4.1.1.1 Objectives/Policy. The primary objective of NATO is the mutual defense of the NATO countries. The objectives of standardization within NATO are identical to those given in paragraph 4.3.1, namely interoperability, compatibility and commonality, but, in this case, among the NATO countries and the NATO Integrated Communications Systems, etc. The primary purpose is to enable the NATO forces to operate together in the most effective manner.

4.4.1.1.2 Programs. NATO has numerous programs, but from the standpoint of the MIL-STD-188 series of standards, only the following NATO programs apply.

a. The Standard Agreement (STANAG) program. The definition of a STANAG is given in paragraph 3 of MIL-HDBK-188 Volume I. A list of STANAGs is given in reference 2.31. Only the Communications-Electronics STANAGs impact the MIL-STD-188 series. These are usually the 5000 series of STANAGs. An updated list of the 5000 series of STANAGs is provided quarterly by the NATO Military Communications Electronics Working Group (MCEWG) and the NATO Military Command, Control and Information Systems Working Group (MCCISWG) working together on this summary. STANAGs are promulgated by the NATO Military Agency for Standardization (MAS) (See Figure 8). The U.S. Military Communications-Electronics Board (MCEB) ratifies* STANAGs for the U.S. By so doing, the U.S. agrees to abide by the STANAG except in those areas of the STANAG on which the U.S. has made a reservation.

b. Allied Publications (AP's) are produced by the Military Committee (MC), and the Defense Support Division. AP's are NATO manuals covering tactics, intelligence, doctrine, training and exercise procedures, security rules, technical or administrative matters. AP's are of two types:

*The term "ratify" is applied by NATO, but the U.S. MCEB uses the term "subscribe" because only the Congress ratifies foreign documents.

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- (1) Those which are informative in nature.
- (2) Those which require action on the part of nations.

c. Allied Communications Publications (ACP's). Allied Communications Publications are defined in Section 3 as documents that contain communication instructions and are issued for guidance and use of allied forces. The U.S. MCEB acting for the U.S. JCS has direct cognizance over the sponsorship, development and promulgation of ACP's, general supplements and U.S. supplements thereto. However, NATO and any NATO country may issue a supplement to any of the ACP's for its own use. NATO supplements are sponsored and promulgated by the Command, Control and Communications Division of the NATO Military Committee. A list of ACP's may be found in Joint Army, Navy, Air Force Procedures (JANAP-201) (Ref. 2.32). ACP's are AP's that are communications oriented.

4.4.1.1.3 Organization

a. The military NATO structure is given in Figure 8. Within this structure, the Military Committee (MC) is the highest military authority in NATO. It is composed of the Chief of Staff of each member nation, except France. In order for the committee to function on a continuous basis, each nation appoints a permanent Military Representative of its Chief of Staff as a member of the Military Committee in Permanent Session.

b. The International Military Staff (IMS), under the MC, comprises about 150 officers, 150 enlisted men and 70 civilian employees. It is headed by a Director of three-star rank.

c. In addition to its other responsibility, the MC is charged with the direction of several agencies, two committees, and a board, all of which have a telecommunications standards function. These organizations are discussed as follows:

(1) Military Agency for Standardization (MAS). Organized in London in 1951, MAS is the principal agency for standardization within NATO. In January 1970, the agency moved to Brussels. The purpose of MAS is to facilitate military standardization, both procedural and material, among member nations to enable the NATO forces to operate together in the most effective manner. Cooperation between the international technical expert groups and the agency in regard to defense equipment is effected by liaison with the International Staff. The MAS consists of an Army Board, a Navy Board and an Air Board.

(2) Communications Agencies. Five specialized multinational communications agencies provide the Military Committee with expert technical advice on all military matters within each one's field of competence. These are:

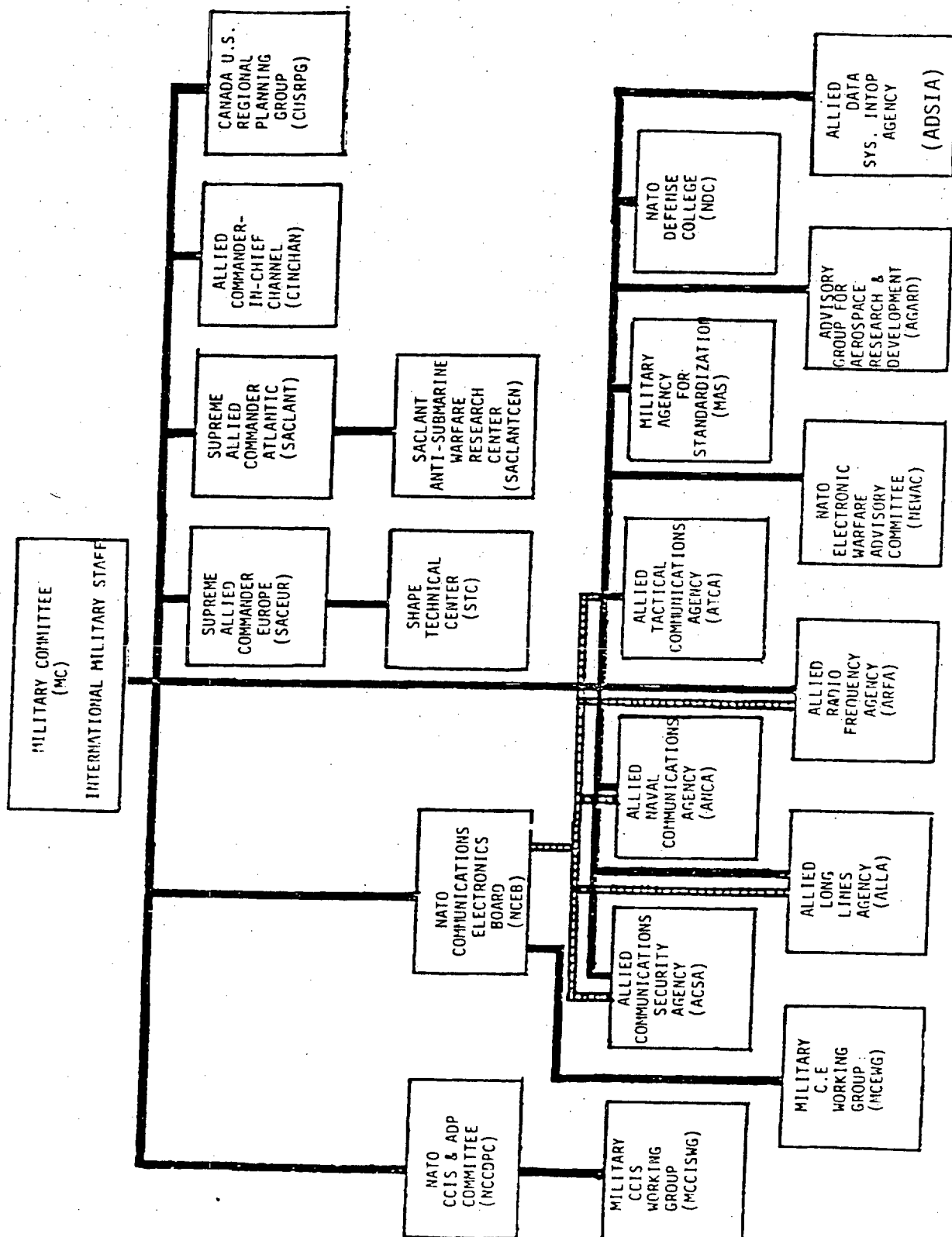


FIGURE 8. THE NATO MILITARY STRUCTURE

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- (a) Allied Radio Frequency Agency (ARFA)
- (b) Allied Long Lines Agency (ALLA)
- (c) Allied Communications Security Agency (ACSA)
- (d) Allied Naval Communications Agency (ANCA)
- (e) Allied Tactical Communications Agency (ATCA)

The permanent staff of ARFA, ALLA, ACSA and ATCA, drawn from the NATO International Military Staff, is collocated in Brussels. The ANCA staff is located in London.

(3) Data Agency. The Allied Data Systems Interoperability Agency (ADSIA).

(4) Committees

(a) The NATO CCIS and ADP Committee. CCIS stands for Command, Control and Information Systems; ADP for automatic data processing. The acronym for the committee, as shown in Figure 8, is NCCDPC, using parts of the above acronyms. This committee has five subgroups as follows:

- 1 SG/1 Maritime Data Links, dealing with message standards.
- 2 SG/2 Air Defense Data Links.
- 3 SG/3 Army Data Links (Inactive).
- 4 SG/4 Joint Data Links.
- 5 SG/5 MIS Codes, Abbreviations and Message Formats.

(b) NATO Electronic Warfare Advisory Committee (NEWAC).

(5) Board. NATO Communications-Electronics Board (NCEB) with its subsidiary Military C-E Working Group (MCEWG).

d. Another NATO group is involved in standardization activities but is under the direction of the Conference of NATO Armament Directors (CNAD). The CNAD is on the civil side of NATO and is of equal rank with the MC. Both report to the Defense Planning Committee. The group is known as the Tri-Service Group on C-E Equipment (TSGCEE) AC-302. AC-302 formerly had seven subgroups but now has six, as follows:

- (a) SG-1 - Tactical Area Communications
- (b) SG-2 - Tactical Radio Communications
- (c) SG-3 - Multifunctional Information Distribution Systems

- (d) SG-4 - Navigation and Position Finding
- (e) SG-5 - Identification
- (f) SG-6 - Future Identification Systems.

4.4.1.1.4 U.S. Obligation

a. Public Law 94-361 of 14 July 1976, Sec. 802, (Ref. 2.33), of the Defense appropriations Authorization Act was amended in FY 77 by the Culver-Nunn Amendment to read as follows: "It is the policy of the United States that equipment procured for the use of personnel of the Armed Forces of the United States stationed in Europe under the terms of the North Atlantic Treaty should be standardized or at least interoperable with equipment of other members of the North Atlantic Treaty Organization. In carrying out such policy, the Secretary of Defense shall to the maximum feasible extent initiate and carry out procurement procedures that provide for the acquisition of equipment which is standardized or interoperable with equipment of other members of the North Atlantic Treaty Organization whenever such equipment is to be used by personnel in Europe under the terms of the North Atlantic Treaty."

b. Furthermore, the Secretary of Defense in the memorandum to the services, et al, of 8 November 1975 stated that the Defense Systems Acquisition and Review Council (DSARC) will ensure that all major services development and procurement programs, including logistic support planning, will include NATO standardization and interoperability goals as fundamental considerations. In cases where unique U.S. specifications are a major impediment to U.S. adoption of an otherwise cost-effective Allied system or Allied adoption of a U.S. system, such specifications shall be explicitly reviewed by DSARC.

c. DoD Directive 2010.6 (Ref. 2.34) implements the foregoing policy as follows:

(1) "...the Department of Defense shall initiate and carry out methods of cooperation with its Allies in defense equipment acquisition to improve NATO's military effectiveness and to provide equitable economic and industrial opportunities for all participants. The Department of Defense will also seek greater compatibility of doctrine and tactics to provide a better basis for arriving at common NATO requirements. The goal is to achieve standardization of entire systems, where feasible, and to gain the maximum degree of interoperability throughout Alliance military forces." (Paragraph D.1, Objective.)

(2) "Priorities for the Department of Defense are established annually in the Consolidated Guidance. In addition, five top priority areas for interoperability and standardization have been established by the Joint Chiefs of Staff (JCS) and endorsed by the NATO Military Committee. The first

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four areas are: command, control, and information systems; cross-servicing of aircraft; ammunition; and compatible battlefield surveillance/target designation/acquisition systems. The fifth, interoperability and standardization of components and spare parts, is a goal in all programs." (Paragraph D.2, Priorities.)

(3) "The need for U.S. forces to meet worldwide commitments is not a basis for failure to maximize interoperability and standardization of systems within NATO. The majority of U.S. general-purpose forces are planned and equipped for a European conflict. In such a conflict, U.S. units shall normally be employed under the operational command of NATO and shall fight as a part of multinational formations. This operational concept makes alliance interoperability and standardization imperative." (Paragraph D.3, Consideration of Worldwide Requirements).

d. DoD Directive 2010.7 (Ref. 2.35) implements the policy of para. 4.4.1.1.4.a above, as follows: "DoD Components shall adhere to U.S.-ratified NATO standardization agreements (STANAGs) when designing or procuring telecommunications equipment. The Deputy Under Secretary of Defense for Research and Engineering (Communications, Command, Control and Intelligence (DUSDR&E(C³I))) may grant exceptions for a specific time period where unique U.S. specifications are a major impediment to U.S. adoption of an otherwise cost-effective allied system." (Paragraph E.1, Policy)

e. The foregoing paragraphs delineate the U.S. responsibility in connection with NATO interoperability standardization.

4.4.1.2 American, British, Canadian*, and Australian (ABCA) Armies Standardization Agreement (Ref. 2.36)

4.4.1.2.1 Objectives/Policy

a. The objectives of this agreement are:

(1) To ensure the fullest cooperation and collaboration among the American, British, Canadian* and Australian Armies.

(2) To achieve the highest possible degree of interoperability among the signatory Armies through materiel and non-materiel standardization.

(3) To obtain the greatest possible economy by the use of combined resources and effort.

b. The following policies are in effect:

*As part of the unification of the Canadian Forces, the Canadian Army was absorbed into the Canadian Forces.

(1) To keep each Army fully informed of research and development taking place in the other Armies.

(2) To guide research and development, whenever possible, along lines compatible with the requirements of all four Armies.

(3) To record and maintain formal agreements in both the materiel and non-materiel fields on items or concepts acceptable to two or more Armies.

(4) To ensure such formal agreements are not modified without consultation.

c. The standardization objectives of the 1964 Basic Standardization Agreement are:

(1) Operational compatibility of equipment between Armies which implies a stated degree of functional and physical interchangeability of major items.

(2) Interchangeability of ammunition, fuel and other bulk items of supply.

(3) Interoperability of communications, electronic and automatic data processing equipment.

(4) Identical end items of equipment.

(5) Common procedures and techniques.

(6) Common or compatible tactical doctrine and concepts.

(7) Identical engineering and quality assurance standards.

4.4.1.2.2 Program

a. Quadripartite Standardization discussions are held at intervals of 12-18 months in each country in turn at the Vice/Deputy Chief of Staff or equivalent level. The nickname "TEAL" is applied to these discussions.

b. The program of standardization and collaboration is pursued simultaneously in the following fields:

(1) Non-Materiel. Includes studies on tactical concepts and doctrine, organization, training, operations, administration and logistics.

(2) Materiel. Includes materiel matters, and related technical procedures and studies.

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(3) Research. Includes scientific investigations and studies.

c. The culmination of the ABCA programs is the Quadripartite Standardization Agreements (QSTAGS) series. QSTAGS record the degree of standardization achieved and to be maintained for any item of equipment, and on operational, logistical, administrative and technical procedures. These agreements are recorded on the Quadripartite Standardization Agreements List (QSAL) and are reviewed by the Armies and Quadripartite Working Groups for currency and validity on a continuing basis.

4.4.1.2.3 Organization

a. The organization of the ABCA Armies Standardization Program is given in Figure 9. Each ABCA Army designates a senior officer, on duty in Washington, as its representative. These officers meet as a group, known as the Washington Standardization Officers (WSO). The WSO coordinates and expedites the standardization program.

b. Each ABCA Army places a military representative on duty in the Primary Standardization Office (PSO) in Washington, under the WSO. The PSO has, among other functions, the important duty of keeping the Quadripartite Standardization Agreements List (QSAL), including copies of all Quadripartite Standardization Agreements (QSTAGS).

c. Each ABCA country has an office in its own capital to coordinate the ABCA Army Standardization Program within its own Army. An officer, known as the Senior Standardization Representative, is designated by each Army in the capital city.

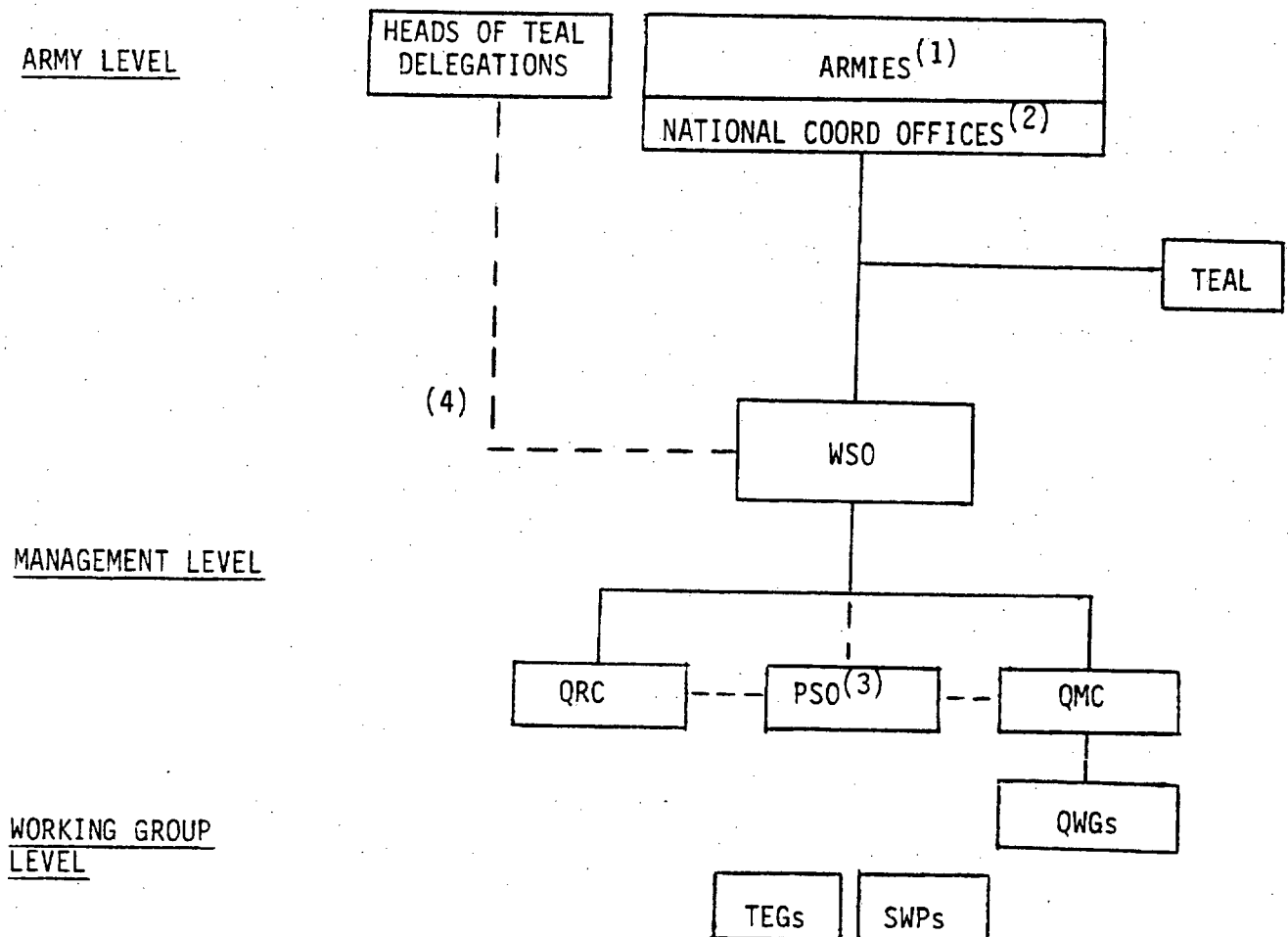
d. Standardization research conducted by the Armies is managed by a standardization committee known as the Quadripartite Research Committee (QRC).

e. A Quadripartite Working Groups Management Committee (QMC) manages the activities of the Quadripartite Working Groups (QWG's).

f. The Quadripartite Working Groups deal with specific areas defined in their terms of reference. Quadripartite Working Groups are:

<u>Title</u>	<u>Abbreviation</u>	<u>Army Providing Standing Chairman</u>
Army Operational Research	AOR	US
Air Defense	AD	UK
Armor	Armor	CA
Aviation	Avn	US
Command and Control	Comd & Con	UK
Combat Communications	Comms	CA
Combat Development	CD	UK
Electrical Power Sources	EPS	US
Engineers	Engr	AS

ORGANIZATION ABCA

ARMIES STANDARDIZATION PROGRAM

WSO - WASHINGTON STANDARDIZATION OFFICERS
 QRC - QUADRIpartite RESEARCH COMMITTEE
 PSO - PRIMARY STANDARDIZATION OFFICE
 QMC - QUADRIpartite WORKING GROUP MANAGEMENT COMMITTEE
 QWG - QUADRIpartite WORKING GROUPS
 IEG's - INFORMATION EXCHANGE GROUPS
 SWP's - SPECIAL WORKING PARTIES

- NOTES: (1) NEW ZEALAND IS AFFILIATED WITH THE PROGRAM THROUGH AUSTRALIA.
 (2) STANDARDIZATION REPRESENTATIVES FROM OTHER ARMIES ARE ACCREDITED TO THE NATIONAL OFFICES OF EACH ARMY.
 (3) THE PSO PROVIDES STAFF SUPPORT TO THE WSO AND STANDARDIZATION COMMITTEES.
 (4) WSO MAY COMMUNICATE DIRECTLY WITH HEADS OF DELEGATIONS BETWEEN TEAL MEETINGS.

FIGURE 9. ORGANIZATION ABCA ARMIES STANDARDIZATION PROGRAM

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Engineering Standardization	ES	US
Electronic Warfare	EW	US
Infantry	Inf	AS
Logistics	Log	CA
Medical Materiel	MM	AS
Nuclear, Biological & Chemical Defense	NBCD	US
Proofing, Inspection & Quality Assurance	PIQA	AS
Surveillance, Target Acquisition and Night Observation	STANO	US
Surface-to-Surface Artillery	S-S Arty	UK

g. Special Working Parties (SWP's) may be established to carry out specific tasks, requiring detailed examination by experts, which cannot be accomplished within the existing organization.

h. When it is clear that the desired standardization objective may be achieved by an exchange of information, Information Exchange Groups (IEG's) may be established to allow designated individuals to keep each other informed of the progress of their work by direct and informal correspondence.

4.4.1.3 AUS-CAN-UK-US Naval Communications Organization (Ref. 2.37)

4.4.1.3.1 History. About 1960, the AUS-CAN-UK-US Naval Communications Organization came into being, which was placed at the top of an AUS-CAN-UK Supervisory Operational Communications Board. On 30 October 1978, this board was reformed to become the AUS-CAN-UK-US Command and Control and Communications Supervisory Board. A C² organization was also added, parallel to the original communications organization that was retained.

4.4.1.3.2 Objectives/Policy. This organization, consisting of representatives from Australia, Canada, the United Kingdom and the United States, has the objective of monitoring C³ capabilities to ensure maximum possible interoperability among the four navies.

4.4.1.3.3 Program. (Reference is made to Figures 10 and 11).

a. The AUS-CAN-UK-US Naval Command and Control and Communications (C³) Supervisory Board meets its objective by the following actions:

(1) Reviews the interoperability requirements in command and control and communications to satisfy NATO and AUS-CAN-UK-US-NZ operational concepts.

(2) Determines requirements for C³ interoperability after reviewing areas of noninteroperability and their effect on AUS-CAN-UK-US-NZ and NATO naval operations as reported by the Naval Communications Board and Naval Command and Control Board.

(3) Reports to relevant higher authorities those areas where unresolved problems of C³ interoperability affect AUS-CAN-NZ-UK-US and NATO naval operations, and recommend possible courses of action to resolve such problems.

b. Meetings of the C³ Supervisory Board are normally in Washington, DC, although the decision as to location is made by the Board. The need for and frequency of meetings is also decided by the Board.

c. The AUS-CAN-UK-US Naval Communications Board (NAVCOMS Board) meets its objective by the following actions:

(1) Reviews all matters relating to Naval Communications as required by combined operational concepts, taking cognizance of those areas in which intercommunication must be maintained and the degree to which this intercommunication is necessary.

(2) Reviews the technical system plans and progress of each Navy in those areas where the necessity for intercommunication has been established. This review is to be in sufficient detail to expose current and potential areas of incompatibility.

d. Meetings of the NAVCOM Board are held annually and are hosted in rotation by the four countries in order.

e. The AUS-CAN-UK-US Command and Control Board (C² Board) meets its objectives by the following actions:

(1) Promotes the development of the maximum practical degree of command and control interoperability.

(2) Monitors the development of National Naval Command and Control Systems to ensure the requisite degree of interoperability between AUS-CAN-UK-US navies.

(3) Provides detailed advice to the AUS-CAN-UK-US C³ Supervisory Board as appropriate.

(4) Advises the Naval Communications Board of communications requirements to support command and control.

f. Meetings of the C² Board are normally held annually. Its venue may rotate among the nations, at the discretion of the members.

g. The Naval Communications Committee meets annually, as directed by the Naval Communication Board, but the Board and Committee meetings are staggered six months apart. Committee meetings are held in Washington, DC, but are hosted in rotation by the four countries.

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h. The Naval Communications Permanent Steering Group (PSG) is located in Washington. Meetings take place as directed by the Chairman, normally once a month. Two of these meetings are with the Board and Committee, alternately.

i. The Technical Working Group (TWG) supports the Board, Committee and PSG. The TWG meets twice a year, alternately before the Board and Committee meetings.

j. AUS-CAN-UK-US Command and Control Permanent Working Group (C² PSG) normally meets in Washington, as directed by the Chairman.

4.4.1.3.4 Organization

a. The AUS-CAN-UK-US Naval C³ Organization is shown in Figure 10. The NAVCOMS Organization is given in Figure 11.

b. The four members of the C³ Supervisory Board are operational representatives of their respective navies and are of flag rank.

c. Reporting to the C³ Supervisory Board are the Naval Communications Board and the Naval Command and Control Board. The U.S. Navy is represented on the Naval Communications Board by OP-941 (Director, Naval Communications Division) and the Naval Command and Control Board by OP-942.

d. Only the C² Permanent Steering Group reports to the C² Board. The U.S. Navy is represented on the Group by OP-942G2.

e. Reporting to the Naval Communications Board is the Naval Communications Committee and a Permanent Steering Group (PSG). The U.S. Navy is represented on the Committee by OP-941C who is also the chairman and on the PSG by OP-941C2.

f. The Technical Working Group supports the Naval Communications Board, Committee and PSG. The U.S. Navy is represented by the Naval Electronic Systems Command.

4.4.1.4 Air Standardization Coordination Committee (ASCC) (Ref. 2.38)

4.4.1.4.1 History. The Air Standardization program originated in 1947, when it was agreed that the air forces of the United States, the United Kingdom and Canada should have a capability to conduct combined operations. The ASCC was formed in January 1948. In 1964, the Royal Australian Air Force and, in 1965, the Royal New Zealand Air Force became signatories to the agreement.

4.4.1.4.2 Objectives/Policy. The objective of the ASCC is to achieve standardization among the air forces of the ASCC in order to:

a. Ensure that in the conduct of combined air operations there will be a minimum of operational and technical obstacles to full cooperation among the ASCC member air forces.

AUS-CAN-UK-US-NZ NAVAL C3 ORGANIZATION

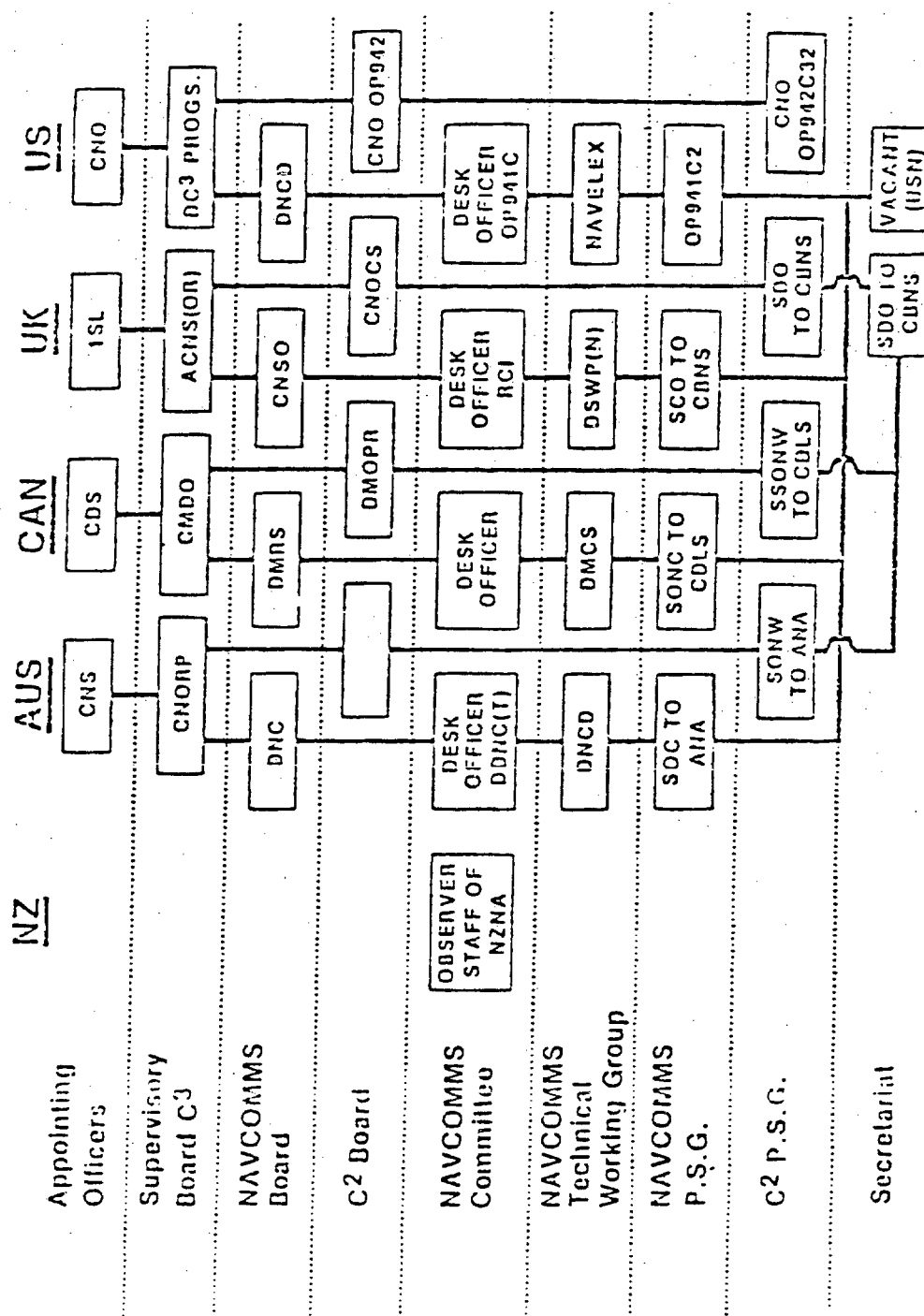
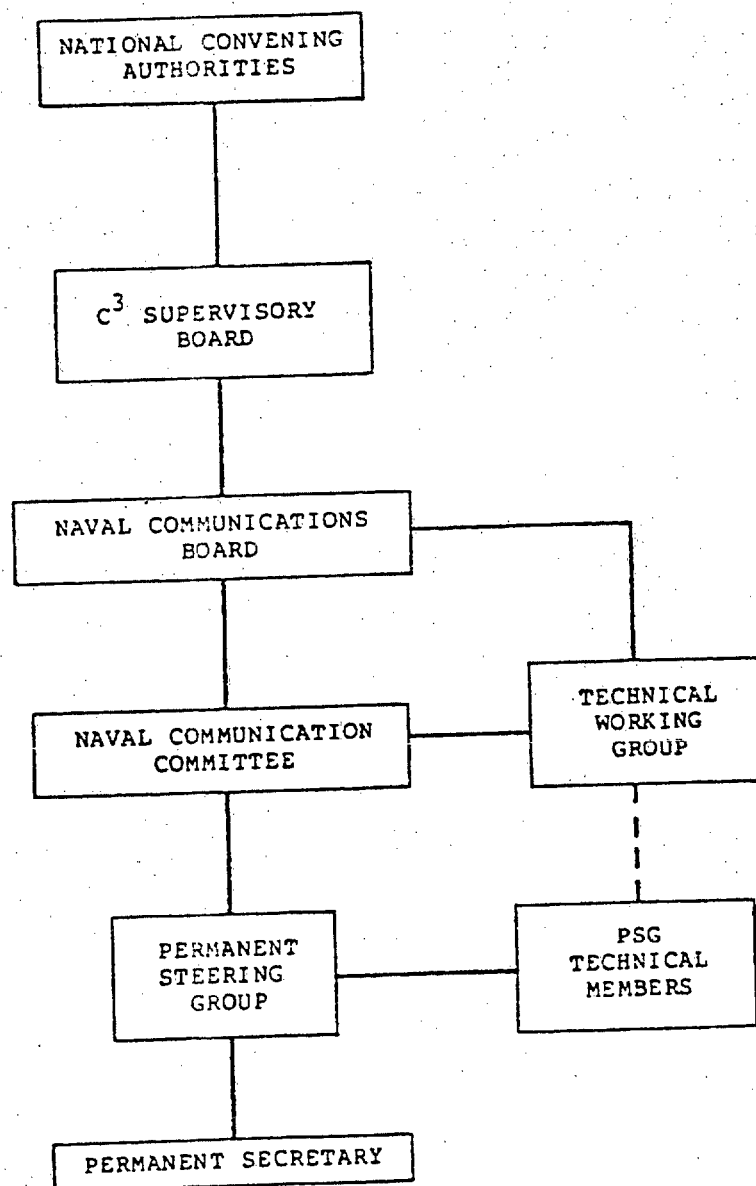


FIGURE 10. AUS-CAN-UK-US Naval C3 Organization

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AUS-CAN-UK-US NAVCOMMS
ORGANISATION



- - - Informal Technical Liaison

FIGURE 11. AUS-CAN-UK-US NAVCOMMS Organization

b. Provide essential aircraft cross-servicing facilities for aircraft of the other ASCC member air forces.

c. Render justifiable logistic support to aircraft of the other ASCC member air forces.

d. Promote economy in the use of national resources.

4.4.1.4.3 Program

a. To attain the foregoing objective, the primary method used is for member nations to negotiate formal agreements between their respective air forces, known as Air Standards and Advisory Publications, covering a wide field of operational and technical subjects which are then implemented nationally.

b. In the process of negotiating these agreements, member nations:

(1) Exchange information in approved areas.

(2) Adopt standard or similar methods, procedures, tactics, techniques, materiel and terminology.

(3) Establish the design of adaptors for cross-servicing of aircraft.

c. The level of standardization that can be achieved in any particular area may be limited by practical considerations and, since the process is voluntary, will be determined individually by nations. Nevertheless, the aim remains the attainment of operational compatibility among air forces of the ASCC member nations in the operational technical, materiel and statistical fields.

4.4.1.4.4 Organization

a. The ASCC includes an officer of General, or equivalent rank from each of the USAF, RAF, CF, RAAF, and RNZAF, and the UK Ministry of Defense (MOD). This group constitutes a committee that generates policy direction.

b. The day to day administration and coordination of ASCC activities is handled on behalf of the policy committee by an international secretariat in permanent session in the HQ USAF. This is known as the Monitoring Committee (MC) and is composed of an officer from each of the ASCC member nations and the USN.

c. The detailed and specialized work of standardization is conducted through the medium of Working Parties, which meet about once per year and conduct business by correspondence between meetings. The interval

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between WP meetings may be increased or decreased, according to the urgency of the work in hand. Among about twenty-two working parties, number 19, Airborne Electronic Systems, is the only one that may impact MIL-STD-188 series activities.

4.4.1.4.5 Relation to Other Organizations. Copies of ASCC Air Standards are passed, by the MC, to regional standardization agencies, so that the latter may benefit from ASCC deliberations and agreements. In NATO, ASCC Air Standards often form the basis for the development of similar NATO STANAGs.

4.4.1.5 Combined Communications-Electronics Board (CCEB) (Ref. 2.39)

4.4.1.5.1 History

a. The Combined Communications-Electronics Board (CCEB) is a five-nation military communications-electronics organization whose mission is to discuss and coordinate any military C-E matter which is referred to it by a participating nation. The five nations represented in the CCEB are Australia, Canada, New Zealand, the United Kingdom and the United States.

b. As far as is known, the first high-level proposals for a structure to formulate combined communications policy were exchanged between Air Marshal Harris, RAF, and General Arnold, USA, in the early stages of the Second World War. Discussions in 1941 led to approval of the Combined Communications Board (CCB) on 16 July 1942. The CCB was a highly successful organization. However, on 14 October 1949, the Combined Chiefs of Staff Organization and the CCB were dissolved. Nevertheless, the UK and US continued to work together, inviting the participation of Australia, Canada and New Zealand, where appropriate. This arrangement continued until 1951, when Canada joined as a full member and the organization came to be known as the CAN-UK-US Joint Communications-Electronics Committees.

c. On 18 December 1969, formal Terms of Reference were ratified, introducing Australia as a full member of the organization which was reconstituted as the Australia-Canada-United Kingdom-United States Military Communications-Electronics Board (AUS-CAN-UK-US CEB). New Zealand became a full member at the Principals' Third Meeting in Ottawa on 20 September 1972. The title of the organization became the Combined Communications-Electronics Board (CCEB).

4.4.1.5.2 Objectives/Policy. The CCEB is primarily concerned with the C-E interoperability between the forces of the member nations and their allies.

4.4.1.5.3 Program

a. The CCEB is responsible for discussing and coordinating any military communications-electronics matter which is referred to it by a participating nation, such as:

- (1) C-E policies and plans.
- (2) Operating methods and procedures.
- (3) Positions to be taken in negotiations with other C-E organizations.
- (4) Military characteristics for systems and equipment.

b. Certain continuous functions of the CCEB are carried out by Permanent Steering Groups, some of which employ special coordination procedures. These groups are designated permanent action items, as follows:

- (1) Task Force Designator Coordination Committee, charged with coordinating and recording all aspects of task force designator allocation among Allies.
- (2) Permanent Identification Working Group, concerned with IFF and other identification systems.
- (3) Frequency Allocations and Assignments.

4.4.1.5.4 Organization

a. Principals. The Combined Communications-Electronics Board has five members, individually known as the Principals, who are:

- (1) Australia - Director, Joint Services Communications.
- (2) Canada - Director, General Communications and Electronics Engineering, and Maintenance.
- (3) New Zealand - Director, Defense Communications.
- (4) United Kingdom - Assistant Chief of Defence Staff Communications.
- (5) United States - Chairman, United States Military Communications-Electronics Board.

b. Coordinators. The everyday work of the CCEB is conducted by National Staffs located in Washington, DC. These staffs are headed by the Coordinators, who act for and in the name of the Board on matters requiring the collective attention of the Principals.

c. Chairmanship of the Coordinators. Chairmanship of the Coordinator passes in succession in the order of New Zealand, Canada, United States, United Kingdom and Australia.

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d. Secretaries. Each nation provides, from its Washington Staff, one officer to act as a National Secretary to the CCEB.

e. Executive Secretary. The National Secretary of the nation holding Chairmanship of Coordinators acts as the Executive Secretary.

f. Steering Groups. The detailed staffing of routine CCEB work is carried out by steering groups. Except for the permanent steering groups detailed in paragraph 4.4.1.5.3.b, above, a steering group is set up for each individual item.

4.4.1.5.5 Relation to Other Organizations

a. The CCEB has agreed that coordination between the CCEB and the single-service forums is considered mandatory. One coordinator is appointed to act as CCEB contact officer for each of these organizations, as follows:

(1) AUS-CAN-UK-US NAVCOMMS (see paragraph 4.4.1.3).

(2) ABCA Armies (see paragraph 4.4.1.2).

(3) Air Standardization Coordinating Committee (see paragraph 4.4.1.4).

4.4.2 International Standardization Organizations (Non-Government) (Ref. 2.25)

a. International standards are becoming an increasingly significant factor in world trade. Multinational companies find that differing national technical requirements have joined trade tariffs as significant factors in world-wide marketing. Different national regulations and standards may require a company to produce costly and unnecessary variants of a product. Development of international standards helps resolve these technical barriers to trade.

b. International standards are assuming a new role in world trade, where the absence of approved standards may lead to conflicting regulations in different countries. It is neither desirable nor intended that standards should be applied with the force of law. However, the policy of legislating by "reference to standards" is becoming more and more frequent as technology develops and trade expands. Both the ISO and IEC Councils have adopted a code of principles concerning appropriate action required on the part of ISO, IEC, and various governmental bodies for the effective implementation of the "reference to standards" technique. The technique requires that legislation and regulations be drafted in the form of general requirements which contain reference to a standard or a group of standards which, in turn, provide more detailed explanation of the general requirements, as well as illustrations of the means of meeting the requirements.

c. Development of standards in the modern technological environment requires a complex maze of organizations, areas of interest, operational

procedures, and treaty agreements. Best known to the computing and telecommunications communities are the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), and the International Telegraph and Telephone Consultative Committee (CCITT) and the International Radio Consultative Committee (CCIR) of the International Telecommunication Union (ITU).

d. If all standards originated at the national level and moved in an orderly fashion to the international level in one organizational structure, few complexities would exist. However, standards originate in many areas and from many organizations and thus involve liaison with many other organizations. As an example, working together to develop data communications standards are:

- (1) International Organization for Standardization
Technical Committee TC97, Computers and Information
Processing/SC6 Subcommittee on Data Communications/
SC16 Subcommittee on Open Systems Interconnection
- (2) American National Standards Institute,
ANSI X3 Computer and Information Processing
X3S3 Subcommittee on Data Communications
- (3) Electronic Industries Association,
EIA TR29 Facsimile Systems and Equipment
EIA TR30 Data Transmission Systems and Equipment
EIA TR37 Communications Interfaces
- (4) European Computer Manufacturers Association (ECMA)
TC9 Data Transmission
- (5) International Telegraph and Telephone Consultative Committee
Study Groups: Data Transmission; New Data Network;
Tariff Principles; Telegraph Techniques
- (6) U.S. State Department
- (7) U.S. Federal Communications Commission
- (8) Federal Telecommunication Standards Committee
- (9) National Telecommunications and Information Administration
- (10) International Civil Aviation Organization

Participating in the deliberations of these organizations are representatives of the telecommunications administrative bodies, the private telecommunications enterprises of each country, the standards bodies of each country, the Common Market countries, and many others.

4.4.2.1 International Telecommunication Union (ITU)

4.4.2.1.1 History. A short history of the ITU is given in Reference 2.40, as follows:

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a. The International Telecommunication Union (ITU) is the oldest of the intergovernmental organizations which have become specialized agencies in relation with the United Nations. It was born with the spread of one of the great inventions of the 19th century, the telegraph, which crossed national frontiers to link major cities in Europe. International action was essential to establish an international telegraph network. It was necessary to reach agreement on the technical systems to be used, on uniform methods of handling messages, and on the collection of charges. A procedure of international accounting had to be set up.

b. First came bilateral understanding between bordering countries, then international agreement between regional groups of countries, ending in an inter-European association. Extra-European countries were progressively drawn in, and a truly international organization came into being. In 1865, the International Telegraph Union was created in Paris by the first International Telegraph Convention. The Member countries agreed to a set of basic telegraph service regulations. These were modified later, as a result of practical operating experience. At Vienna, in 1868, a permanent international bureau was created and established in Berne.

The international telephone service came much later and its progress was much slower. It was not until 1927, when radio provided the means to carry the human voice across the ocean from continent to continent, that this service became worldwide; nevertheless, in 1885, in Berlin, the first provisions concerning the international telephone service were drawn up.

c. When, at the end of the 19th century, wireless (radiotelegraphy) became practicable, it was seen at once to be an invaluable complement of telegraphy by wire and cable, since radio alone could provide telecommunication between land and ships at sea. The first International Radiotelegraph Convention was signed in Berlin, in 1906, by twenty-seven maritime states. The International Radiotelegraph Conference in Washington, in 1927, was a landmark in the development of radio, since it was at this Conference that the Table of Frequency Allocations was first devised.

d. In 1932, two Plenipotentiary Conferences were held in Madrid: A Telegraph and Telephone Conference and a Radiotelegraph Conference. On that occasion, the two existing Conventions were amalgamated in a single International Telecommunication Convention, and the countries that signed and acceded to it at the same time renamed the Union the International Telecommunication Union to indicate its broader scope. Four sets of Regulations were annexed to the Convention: Telegraph, Telephone, Radio, and the Additional Radio Regulations.

e. A Plenipotentiary Conference met in Atlantic City in 1947 to revise the Madrid Convention and it introduced radical changes in the organization of the Union; new permanent organs of the Union were created, the ITU became the specialized agency in relation to the United Nations in the sphere of telecommunications, and its headquarters were transferred from Berne to Geneva.

4.4.2.1.2 Objectives/Policy (Ref. 2.41)

a. The objectives of the Union are:

(1) To maintain and extend international cooperation for the improved and rational use of telecommunications of all kinds;

(2) To promote the development of technical facilities and their most efficient operation with a view to improving the efficiency of telecommunications services, increasing their usefulness and making them, so far as possible, generally available to the public;

(3) To harmonize the actions of nations in the attainment of those ends.

b. To this end, the Union shall in particular:

(1) Effect allocation of the radio frequency spectrum and registration of radio frequency assignments, in order to avoid harmful interference between radio stations of different countries;

(2) Coordinate efforts to eliminate harmful interference between radio stations of different countries and to improve the use made of the radio frequency spectrum;

(3) Coordinate efforts, with a view to harmonizing the development of telecommunications facilities, notably those using space techniques, with a view to full advantage being taken of their possibilities;

(4) Foster collaboration among its Members, with a view to the establishment of rates at levels as low as possible consistent with an efficient service and taking into account the necessity for maintaining independent financial administration of telecommunications on a sound basis;

(5) Foster the creation, development and improvement of telecommunications equipment and networks in developing countries by every means at its disposal, especially its participation in the appropriate programs of the United Nations;

(6) Promote the adoption of measures for ensuring the safety of life through the cooperation of telecommunications services;

(7) Undertake studies, make regulations, adopt resolutions, formulate recommendations and opinions, and collect and publish information concerning telecommunications matters.

4.4.2.1.3 Program (Ref. 2.41). The technical work of the ITU is performed primarily by the International Frequency Registration Board (IFRB), the International Radio Consultative Committee (CCIR) and the International Telephone and Telegraph Consultative Committee (CCITT).

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4.4.2.1.4 Organization (Ref. 2.25)

a. The Plenipotentiary Conference is the supreme organ of the Union. The Administrative Council facilitates the implementation of the provisions of the Convention by member organizations. In addition to the Administrative Council, there are two Administrative Conferences: The Administrative Telegraph and Telephone Conference and the Administrative Radio Conference. Each of these two bodies is empowered to revise regulations within their assigned spheres of responsibility.

b. Four permanent organs comprise the operating arm of the ITU: the General Secretariat, the International Frequency Registration Board, the International Radio Consultative Committee, and the International Telegraph and Telephone Consultative Committee (CCITT). The General Secretariat of the Union is responsible for the preparatory and subsequent work associated with the ITU conferences which are held approximately every six years. These Conferences are usually well attended by large U.S. Delegations headed by an ambassador-level representative of the U.S. State Department. The Federal Communications Commission (FCC) and major U.S. domestic and international telecommunications carriers also participate. The Secretariat is responsible for publishing the recommendations and principal reports of all permanent organs of the ITU, as well as texts of regional and international agreements on telecommunications matters.

c. The International Frequency Registration Board is responsible for the registration of frequencies and as such is also responsible for testing conformance to registered communications frequencies. The International Radio Consultative Committee studies and issues recommendations on technical and operational questions specific to radio communications. The International Telegraph and Telephone Consultative Committee is concerned with the development of technical standards and operation rules for international, telephone and telegraphic communications.

4.4.2.1.5 Relation to Other Organizations. The ITU relates to the International Organization for Standardization through the study groups of CCITT, and has a specialized agency status with the United Nations. It is recognized by the UN as the responsible agency for all international communications matters.

4.4.2.1.6 International Telegraph and Telephone Consultative Committee (CCITT)4.4.2.1.6.1 History (Ref. 2.40)

a. The telephone and telegraph services of the ITU found that scientific progress brought them not only more efficient installations, but also a correspondingly greater complexity. It was the Paris Conference of 1925 of the ITU which decided that the complexities of the international telephone services needed more constant investigation than was possible at its periodic conferences. It, therefore, decided that the Comité Consultatif

International des communications telephoniques a grande distance* (CCIF) should become an integral part of the ITU and created a similar Consultative Committee for the telegraph, namely the Comite Consultatif International des communications telegraphiques* (CCIT).

b. Both the CCIF and CCITT set up offices in Paris. Both had fruitful years. However, in view of the basic similarity of many of the technical problems, proposals were made from the Atlantic City Conference in 1947 onwards to merge these two committees. A decision to this effect was taken at the Administrative Council of 1955, and from the end of 1956, the two committees became the single International Telegraph and Telephone Consultative Committee (CCITT). The first Plenary Assembly was held in December 1956. A landmark in the history of the CCITT was reached when it held its second Plenary Assembly in New Delhi in 1960; it was the first meeting outside of Europe and thus symbolized the truly world-wide character of its work.

4.4.2.1.6.2 Objectives/Policy (Ref. 2.41)

a. The duties of the International Telegraph and Telephone Consultative Committee are to study technical, operating and tariff questions relating to telegraphy and telephony and to issue recommendations on them.

b. In the performance of its studies, each Consultative Committee shall pay due attention to the study of questions and to the formulation of recommendations directly connected with the establishment, development and improvement of telecommunication in developing countries in both the regional and international fields.

4.4.2.1.6.3 Program (Ref. 2.42)

a. The CCITT program is carried out by study groups, the number and titles of which vary as technical requirements develop and change. The international study groups are listed in paragraph b below. There are 15, numbering from I to XII and XIV to XVIII. XIII is not used. X and XIV have been deleted; their functions have been incorporated into Study Group VIII. However, there are only four U.S. study groups and a joint working party that handle the combined work of the 15 international groups. The U.S. study groups are listed in paragraph c, below.

*These committees are better known by the names "International Telephone Consultative Committee" (CCIF) and "International Telegraph Consultative Committee" (CCIT), which were given to them later.

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b. The CCITT International Study Groups are: (Ref. 2.42).

- Study Group I - Definition and operational aspects of telegraph and telematic* services.
- II - Telephone operation and quality of service.
- III - General tariff principles.
- IV - Transmission maintenance of international lines, circuits and chains of circuits, maintenance of automatic and semi-automatic networks.
- V - Protection against dangers and disturbance of electromagnetic origin.
- VI - Protection and specifications of cable sheaths and poles.
- VII - Data communication networks.
- VIII - Terminal equipment for telematic* services.
- IX - Telegraph networks and terminal equipment.
- XI - Telephone switching and signalling.
- XII - Telephone transmission performance and local telephone networks.
- XV - Transmission systems.
- XVI - Telephone circuits.
- XVII - Data communication over the telephone network.
- XVIII - Digital networks.

c. The structure of the four U.S. CCITT Study Groups (Ref. 2.42), the U.S. Joint ISDN Working Party and their leadership are noted below:

(1) Study Group A, Regulatory Affairs. U.S. Study Group A is concerned with U.S. regulatory aspects of (1) international telephone switching and signaling, telephone transmission quality, automatic and semi-automatic networks, facsimile telegraph transmission and equipment, and telephone circuits with respect to the characteristics of international systems, and (2) international telegraph operations (including the telex service), general international telecommunication tariff principles, and the lease of telecommunications circuits. The Chairman is Earl S. Barbely, Public Utilities Specialist, Common Carrier Bureau, Federal Communications Commission, 1919 "M" Street, N.W., Washington, D.C. 20554, Telephone 202-632-3214.

(2) Study Group B, Telegraph Operations. U.S. Study Group B studies those aspects of telegraph operations which fall outside the purview of government regulatory interests. The Chairman is Roy K. Andres, Vice President - Planning, Western Union International, Inc., One WUI Plaza, New York, New York 10004, Telephone 212-363-6456.

* "telematic" is a term referring to facsimile, telex, videotex, teletex, etc.

(3) Study Group C, Telephone Operations. U.S. Study Group C examines those aspects of telephone operations which fall outside the purview of government regulatory interests. The Chairman is Henry L. Marchese, Engineering Manager - International System, American Telephone and Telegraph Company, 295 North Maple Avenue, Basking Ridge, New Jersey 07920, Telephone 201-221-4956.

(4) Study Group D, Data Transmission. U.S. Study Group D studies problems related to the development of the international digital data transmission service. The Chairman is Thijs de Haas, Institute for Telecommunication Sciences, National Telecommunications and Information Administration, Department of Commerce, Boulder, Colorado 80302, Telephone 303-499-1000, Ext. 3728.

(5) Joint Working Party on the Integrated Services Digital Network (ISDN). Recognizing that a balanced synthesis of the requirements of all services should guide the development of ISDN principles and recommendations, a joint ISDN Working Party was established on 1 June 1981. Owing to the probable impact of the ISDN on existing telegraph, telephone, and data services, members of Study Groups A, B, C, and D participate in the ISDN Working Party. The primary function of the Joint Working Party is to review the contributions of other countries to CCITT Study Group XVIII and approve U.S. positions with respect to such contributions, and to approve proposed U.S. contributions to Study Group XVIII. Inasmuch as various ISDN recommendations will be evolved by several other Study Groups, the Joint Working Party maintains liaison with the appropriate U.S. Study Groups studying such recommendations. In the event of inconsistent recommendations from different U.S. Study Groups, the matter will be referred to the National Committee for resolution. The Acting Chairman is Mr. Thijs de Haas, Institute for Telecommunication Sciences, National Telecommunications and Information Administration, Department of Commerce, Boulder, Colorado 80302, Telephone 303-499-1000, Ext. 3728.

4.4.2.1.6.4 Organization (Ref. 2.41)

a. The International Consultative Committees shall have as members:

(1) of right, the administrations of all Members of the Union;

(2) any recognized private operating agency which, with the approval of the Member which has recognized it, expresses a desire to participate in the work of these Committees.

b. Each International Consultative Committee shall work through the medium of:

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- (1) its Plenary Assembly;
- (2) study groups it set up;
- (3) a Director, elected by a Plenary Assembly and appointed in accordance with the General Regulations.

c. There shall be a World Plan Committee, and such Regional Plan Committees as may be jointly approved by the Plenary Assemblies of the International Consultative Committees. These Plan Committees shall develop a General Plan for the international telecommunication network to facilitate coordinated development of international telecommunication services. They shall refer, to the International Consultative Committees, questions the study of which is of particular interest to developing countries and which are within the terms of reference of those Consultative Committees.

d. The working arrangements of the International Consultative Committees, as defined in the General Regulations.

4.4.2.1.7 International Radio Consultative Committee (CCIR)

4.4.2.1.7.1 History (Ref. 2.40)

a. If the need for constant technical discussion in telephony and telegraphy led to the establishment of a consultative committee, one might suppose that a similar step would have been taken equally easily in the field of radio. But, this is not the case. Although the idea of a radio committee went back to 1920, it was not until the Washington Conference of 1927 that one was set up and even then there was much opposition to its establishment.

b. The U.S. delegation feared that a committee might retard the progress of radio by establishing too rigid principles, an argument that has been heard throughout the hundred years of existence of the Union. France and Britain also objected.

c. The supporters of the plan to establish a radio subcommittee, the delegations of Germany and Italy, finally were triumphant at Washington in 1927, but by a very small majority. Once established, the Committee has certainly proved its usefulness, and since 1927 has held eleven Plenary Assemblies.

4.4.2.1.7.2 Objectives/Policy (Ref. 2.41). The duties of the International Radio Consultative Committee are to study technical and operating questions relating specifically to radiocommunication and to issue related recommendations. In the performance of its studies, each Consultative Committee pays due attention to the study of questions and to the formulation of recommendations directly connected with the establishment, development and improvement of telecommunication in developing countries in both the regional and international fields.

4.4.2.1.7.3 Program (Ref. 2.42). The technical work of the CCIR is allocated to eleven study groups as follows:

- | <u>Group No.</u> | <u>Identification</u> |
|---|-----------------------|
| Study Group 1 - Spectrum Utilization and Monitoring | |
| o Spread Spectrum Modulation Techniques | |
| o Fixed and Mobile sharing in the Band 4-28 MHz | |
| o Spectrum Usage above 100 GHz | |
| o Radiolocation and Fixed-Satellite Sharing in the 4 and 6 GHz Band | |
| Study Group 2 - Space Research and Radioastronomy | |
| o Active Space Sensors and Radiolocation Sharing | |
| o Sharing Options between Space and Terrestrial Services | |
| Study Group 3 - Fixed Service at Frequencies Below About 30 MHz | |
| o Sharing between Broadcasting and Fixed and Mobile in the Band 4-30 MHz | |
| o Reduced Fixed Service Needs | |
| Study Group 4 - Fixed Service Using Communication Satellites | |
| o Mobile SATCOM use of the Geostationary Orbit-Spectrum Resource | |
| Study Group 5 - Propagation in Non-Ionized Media | |
| o Influence of Irregular Terrain on Tropospheric Propagation | |
| Study Group 6 - Ionospheric Propagation | |
| o Short-Term Prediction of Operational Parameters for Ionospheric Radiocommunications | |
| Study Group 7 - Standard Frequencies and Time Signals | |
| o Reduction of Guard Bands at 2.5, 5, 10, 15, 20, and 25 MHz | |
| Study Group 8 - Mobile Services | |
| o Mobile Satellite Operations in the 7-8 GHz Band | |
| o Coordination Procedures for Mobile Earth Stations | |
| o Preferred Characteristics of Mobile Satellite Systems | |
| Study Group 9 - Fixed Services using Radio Relay | |
| Study Group 10 - Broadcasting Service (Sound) | |
| Study Group 11 - Broadcasting Service (Television) | |

4.4.2.1.7.4 Organization (Ref. 2.41)

a. The International Consultative Committees have as members:

(1) of right, the administrations of all Members of the Union;

(2) any recognized private operating agency which, with the approval of the Member which has recognized it, expresses a desire to participate in the work of these Committees.

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b. Each International Consultative Committee works through the medium of:

(1) its Plenary Assembly;

(2) study groups it set up;

(3) a Director, elected by a Plenary Assembly and appointed in accordance with the General Regulations.

c. There are a World Plan Committee and such Regional Plan Committees as may be jointly approved by the Plenary Assemblies of the International Consultative Committees. These Plan Committees develop a General Plan for the international telecommunication network to facilitate coordinated development of international telecommunication services. They refer to the International Consultative Committees questions the study of which is of particular interest to developing countries and which are within the terms of reference of those Consultative Committees.

d. The working arrangements of the International Consultative Committees are defined in the General Regulations.

4.4.2.1.8 Joint CCITT/CCIR Study Groups and Working Parties (Ref. 2.42).
Following is a list of Joint CCITT/CCIR Study Groups, Working Parties and Special Autonomous Working Parties.

4.4.2.1.8.1 Joint CCITT/CCIR Study Groups

CMTT - Television and sound transmission.

CMV - Definitions and symbols.

CMBD - Circuit noise and availability.

World Plan Committee - General Plan for the development of the world telecommunication network.

Plan Committee for Africa - General Plan for the development of the regional telecommunication network for Africa.

Plan Committee for Latin America - General Plan for the development of the regional telecommunication network for Latin America.

Plan Committee for Asia and Oceania - General Plan for the development of the regional telecommunication network for Asia and Oceania.

Plan Committee for Europe and Mediterranean - General Plan for the development of the regional telecommunication network for Europe and the Mediterranean Basin.

4.4.2.1.8.2 Joint Working Parties

LTG - Use of telephone-type lines for purposes other than telephony.

SMM - Maritime mobile service.

4.4.2.1.8.3 Special Autonomous Working Parties

GAS 3 - Economic and technical aspects of the choice of transmission systems.

GAS 4 - Primary sources of energy.

GAS 5 - Economic and social problems relating to telecommunication development.

GAS 7 - Rural telecommunications.

GAS 8 - Economic and technical impact of implementing a regional satellite network.

GAS 9 - Economic and technical aspects of transition from an analog to a digital telecommunication network.

4.4.2.1.9 International Frequency Registration Board (IFRB)

4.4.2.1.9.1 History (Ref. 2.40)

a. Undoubtedly the toughest and most intractable problem which has confronted the ITU during the second half of its first 100 years of existence has been the allocation, assignment, registration and orderly use of radio frequencies. Right from the first International Radiotelegraph Conference ever held, in Berlin in 1906, it became desirable to allocate certain frequencies for certain types of use.

b. One of the most important and far-reaching decisions at the Washington Conference in 1927 was to add a provision to the Radio Regulations which required each Administration to notify the Union's Bureau at Berne of any new radio station, together with its frequency and other technical characteristics. However, the Bureau had no discretionary powers, so it could merely take note. By the time of the Atlantic Conference in 1947, there were no fewer than 45,000 notifications of frequencies below 20 MHz. It was recognized that an agreed machinery for the international coordination, control or mediation of the use of radio frequencies had become essential. In order to secure this machinery, an International Frequency Registration Board, was envisaged.

c. It was agreed that a Board of eleven technical experts, nominated by their country, all of whom were to be nationals of different countries, should be elected in a world-wide competition, held by the Radio Conference, in which radio experts of Member-countries would be present. The members of the board were chosen on the basis of equitable geographic distribution. In the Convention signed at Atlantic City in 1947, a provision was included that the members of the board should be thoroughly qualified and

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"they shall serve not as representatives of their respective countries, or of regions, but as custodians of an international public trust." They were also required to be "familiar with geographic, economic and demographic conditions" within the area from which they came. Such a board has been functioning since 1948, in accordance with the ITU Convention and Radio Regulations.

4.4.2.1.9.2 Objectives/Policy (Ref. 2.23). The essential duties of the International Frequency Registration Board are:

a. To effect an orderly recording of frequency assignments made by the different countries so as to establish, in accordance with the procedure provided for in the Radio Regulations and in accordance with any decision which may be taken by competent conference of the Union, the date, purpose and technical characteristics of each of these assignments, with a view to ensuring formal international recognition thereof;

b. To effect, in the same conditions and for the same purpose, an orderly recording of the positions assigned by countries to geostationary satellites;

c. To furnish advice to Members with a view to the operation of the maximum practicable number of radio channels in those portions of the spectrum where harmful interference may occur, and with a view to the equitable, effective and economical use of the geostationary satellite orbit;

d. To perform any additional duties, concerned with the assignment and utilization of frequencies and with the utilization of the geostationary satellite orbit, in accordance with the procedures provided for in the Radio Regulations, and as prescribed by the competent conference of the Union, or by the Administrative Council with the consent of a majority of the Members of the Union, in preparation for or in pursuance of the decisions of such a conference;

e. To maintain such essential records as may be related to the performance of its duties.

4.4.2.1.9.3 Programs. An orderly program has been established to carry out the foregoing duties.

4.4.2.1.9.4 Organization (Ref. 2.23)

a. The International Frequency Registration Board shall consist of five independent members, elected by the Plenipotentiary Conference. These members shall be elected from the candidates sponsored by countries, Members of the Union, in such a way as to ensure equitable distribution amongst the regions of the world. Each Member of the Union may propose only one candidate who shall be a national of its country.

b. The members of the International Frequency Registration Board shall serve, not as representing their respective countries, or of a region, but as custodians of an international public trust.

4.4.2.2 International Organization for Standardization (ISO) (Ref. 2.25)

4.4.2.2.1 History

a. Although electrical engineers were among the first to realize the importance of international standardization, other segments of the engineering community were becoming increasingly more aware of the need for international cooperation in other areas of standardization. In 1926, about 20 of the world's principal standards bodies organized a meeting in New York and decided to band together as the International Federation of the National Standardizing Association (ISA). ISA's early activity emphasized mechanical engineering but addressed itself also to a wide range of other subjects, such as paper sizes, cinematography and textiles.

b. As the threat of war increased in the late 1930's, several countries withdrew their membership so that, by 1942, ISA ceased to exist. Its successor, comprising the national organizations of 18 allied countries, was formed in 1944 and functioned temporarily as the United Nations Standards Coordinating Committee.

c. Twenty-five countries sent 64 delegates to a meeting in London on 14 October 1946 to consider the establishment of a new international organization "whose object shall be to facilitate the international coordination and unification of industrial standards". The discussions of these delegates resulted in the establishment of ISO whose provisional General Assembly met, also in London, on 24 October 1946.

d. The ISO Constitution and Rules for Procedure were unanimously adopted by the General Assembly. It was decided that ISO should begin to function on an official basis as soon as the constitution had been ratified by 15 national standardization bodies. The 15th ratification, from Denmark, was received by the provisional Central Secretariat on 23 February 1947.

e. The Constitution and Rules of Procedure were subsequently ratified by all the national standardization bodies which had participated in the London conference. These organizations were automatically admitted as Member Bodies of ISO and, later, other national standardization bodies applied for membership.

f. The first General Assembly met in Paris in 1949; Subsequent General Assemblies were held in New York (1952), Stockholm (1955), Harrogate, U.K. (1958), Helsinki (1961), New Delhi (1964), Moscow (1967), Ankara (1970), Washington, DC (1973), and Geneva (September 1976).

4.4.2.2.2 Objectives/Policy. The object of ISO is to promote the development of standards in the world with a view to facilitating the international exchange of goods and services, and to developing cooperation in the sphere of intellectual, scientific, technological and economic activity. As a means of these ends, ISO may inter alia:

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a. Take action to facilitate coordination and unification of national standards and issue necessary recommendations to Member Bodies for this purpose.

b. Set up International Standards.

c. Encourage and facilitate, as occasion demands, the development of new standards having common requirements for use in the national or international sphere.

d. Arrange for exchange of information regarding work of its Member Bodies and of its Technical Committees.

e. Cooperate with other International Organizations interested in related matters, particularly by undertaking at their request studies relating to standardization projects.

4.4.2.2.3 Programs. ISO programs are carried out by technical committees, a description of which follows:

a. Technical Committees are composed of member bodies wishing to take part in the work assigned to each committee. Each technical committee has a secretariat which is a member body appointed by the Council. The Constitution enjoins the technical committee secretariat to strict neutrality and to careful differentiation between its interests as a Member Body and its capacity as secretariat. The secretariat is responsible for the satisfactory conduct of the work of the technical committee and reports annually to the Council on the results achieved.

b. A typical ISO technical committee meeting usually draws representatives from many member nations. In the United States, the American National Standards Institute is the recognized Member Body. In France, it is the Association Francaise de Normalisation; in the United Kingdom, it is the British Standards Institution.

c. It should be noted that ISO is involved in many standardization activities and only one of its technical committees is concerned with Automated Data Processing (ADP)--TC97, Computers and Information Processing. Other ISO Technical Committees whose work (or part thereof) is related to that of TC97 include: TC46, Documentation; TC68, Banking Procedures; and TC95, Office Machines. The USA holds the Secretariats for TC97 and TC68, Germany for TC46, and Italy for TC95.

4.4.2.2.4 Organization

a. The Principal Officers of ISO are the President, the Vice President, the Treasurer, and the Secretary-General.

b. The General Assembly, which determines the policy of the organization, consists of delegates nominated by the Member Bodies and meets at least once every three years.

c. The council is composed of the President and the representatives of eighteen Member Bodies elected by the membership for a three-year term. It meets once a year to fulfill its responsibility for the operation and administration of the organization.

d. The President presides over both the General Assembly and the Council.

e. The Vice President is elected by the Council from its own members and may retain a seat on the Council in a personal capacity when the term of office of the Member Body expires. The Treasurer may serve on the Council as the representative of his Member Body if the Member Body of the Treasurer's country is a member of the Council. Otherwise, the Treasurer serves in a personal capacity but is entitled to vote only on matters affecting the financial affairs of the organization.

f. The Council is also served by eight special advisory committees, whose advisory responsibilities are more or less self-evident from their names. The committees include the Planning Committee, the Standing Committee for the Study of Principles of Standardization, the Committee on Certification, the Development Committee, the Standing Committee for the Study of Scientific and Technical Information on Standardization, and the International Standards Steering Committee for Consumer Affairs.

g. The Executive Committee (EXCO) is composed of the Vice President and from three to seven other representatives of Member Bodies. EXCO assists the Council with regard to matters of administration, organization and finance which may arise in the interval between Council meetings, and is empowered to act where necessary within the framework of previous policy decisions of Council. The Treasurer participates in the EXCO meetings whenever financial matters are discussed.

h. The Central Secretariat is directed by the Secretary-General, who is appointed by the Council. The Central Secretariat is the chief administrative officer who conducts the affairs of the organization under authority of and in accordance with rules defined by the Council. Under the direction of the Secretary-General, the Central Secretariat coordinates the work carried out by the ISO technical committees, convenes all meetings of technical committees and subcommittees, institutes the voting procedures, circulates documents to Member Bodies, and publishes the documents accepted by the Council as International Standards. The Central Secretariat keeps the Member Bodies and Council informed of the work of the technical committees and the technical committees informed of work undertaken by other international organizations in related fields. It is the task of the Central Secretariat to ensure full consultation of the membership on the work of the technical committees which are responsible for the development of international

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standards. Organizationally, technical committees report annually to the Council through their Secretariat. The work of the technical committees is coordinated by the Central Secretariat under the direction of the Secretary-General. Currently, there are over 150 technical committees. Counting all technical committees, their subcommittees, and working groups, there are over 1850 technical working bodies. In order to form a technical committee, there should be at least five Member Bodies willing to take an active part in the work. The scope of each technical committee is strictly defined and can only be altered with the approval of the ISO Council. Within this scope, each technical committee determines its own program of work.

4.4.2.2.5 Relation to Other Organizations. ISO, which is an international non-governmental organization, has been granted consultative status with the United Nations and many of its agencies. In particular, ISO enjoys Category I consultative status with the Economic and Social Council (ECOSOC) granted to "organizations which are concerned with most of the activities" of ECOSOC and "have marked and sustained contributions to make to the achievement of the objectives of the United Nations." This upgrades the former (Category II) status which ISO had maintained since 1947.

4.4.2.3 Joint ITU/ISO Coordination (Ref. 2.43)

4.4.2.3.1 Collaboration Between International Organizations. Actually, there is no such organization as a joint ITU/ISO. However, the two organizations coordinate very closely the standardization activities of their two respective communities, namely telecommunications and automatic data processing. This coordination soon generated a recognition of the fact that each organization had areas of exclusive responsibilities for standardization while there were also areas of mutual responsibilities. The two organizations proceeded to draw up an agreement defining these areas of exclusive and mutual responsibilities, published in CCITT Recommendation A.20 (Ref. 2.43; see Appendix E).

4.4.2.3.2 Relation to Other Organizations. Appendix D applies to the National Communications System and National Bureau of Standards but the delineations of responsibilities presented are adapted from, and correspond to those of the ITU/ISO in Appendix E. Appendices D and E set the policy for each organization as to what standardization activities each will pursue individually and what activities they closely coordinate. In comparing Appendices D and E, the exclusive functions of the National Communications System (NCS) and the ITU are the same, while those of the National Bureau of Standards (NBS) and the ISO are the same. Furthermore, the mutual responsibilities of the NCS and NBS are the same as those of the ITU and ISO.

NOTE: The CCITT, in consideration of recent developments in data systems and data communications, has published Recommendation A.21, concerning collaboration with other international organizations for services such as Videotex, Teletex and facsimile. (Ref. 2.44; see Appendix F).

4.4.2.4 The International Electrotechnical Commission (IEC) (Ref. 2.25)

4.4.2.4.1 History

a. The International Electrotechnical Commission was formed in 1906.

b. A number of international congresses on the applications of electricity had been held around the turn of the century; thus the need to set up a permanent organization to carry out international standardization was evident then.

c. At the International Electrical Congress held in St. Louis in 1904, the following resolution was passed by the Chamber of Government delegates:

That steps should be taken to secure the cooperation of the technical Societies of the world by the appointment of a representative Commission to consider the question of the standardization of the Nomenclature and Ratings of Electrical Apparatus and Machinery.

d. As a result of this resolution, the International Electrotechnical Commission was formed in 1906.

e. In 1947, the IEC became affiliated with the International Organization for Standardization (ISO) as the latter's Electrical Division, but retained its technical and financial autonomy.

4.4.2.4.2 Objectives/Policy. The objective of the Commission is "to facilitate the coordination and unification of national electrotechnical standards and to coordinate the activities of other international organizations in this field". The IEC works through the National Committees of each country.

4.4.2.4.3 Program

a. The work of IEC, which is performed by technical committees, can be divided into two categories:

(1) That aimed at improving understanding between electrical engineers of all countries by drawing up common means of expression: nomenclature, agreement on quantities and units, their symbols and abbreviations, and graphical symbols for diagrams.

(2) Standardization of electrical equipment proper, involving the study of problems of the electrical properties of materials used in electrical equipment, standardization of guarantees to be given for certain equipment as to the characteristics, methods of test, quality, safety, and dimensions controlling interchangeability of machines and electrical equipment.

b. The work of the technical committees is restricted to electrotechnical standardization activities. The following technical committees are engaged in activities of interest to the ADP and telecommunications industries.

- TC 3 Graphical Symbols
- TC 29 Electro-Acoustics
- TC 39 Electronic Tubes
- TC 40 Capacitors and Resistors for Electronic Equipment
- TC 46 Cables, wires and waveguides for Telecommunication Equipment
- TC 47 Semiconductor Devices and Integrated Circuits
- TC 48 Electromechanical Components for Electronic Equipment
- TC 56 Reliability and Maintainability
- TC 51 Magnetic Components and Ferrite Materials
- TC 52 Printed Circuits
- TC 58 Methods of Measurement of Electrical Properties of Metallic Materials
- TC 64 Electrical Installations of Buildings
- TC 65 Industrial-Process Measurement and Control
- TC 66 Electronic Measuring Equipment
- TC 74 Safety of Electronic Data Processing Equipment and Office Machines
- TC 83 Information Technology Equipment

4.4.2.4.4 Organization

a. The operations of the IEC are directed by a Council which meets annually. The Council consists of the President of the Commission, the Past Presidents (without vote), and the Presidents of the National Committees. The Treasurer and General Secretary of the Commission are ex officio members with vote.

b. The Committee of Action is composed of the Presidents of nine National Committees who are elected by the Council for a six year term. The President of the Commission is also a member, as are the Past Presidents, though the latter have no vote. The Treasurer and General Secretary of the Commission are ex officio members without vote. The Committee of Action deals with any problem submitted to it by the Council and acts to expedite the technical work of the Commission. It meets at least once a year.

c. The IEC also has advisory committees to the Committee of Action for special problems that cannot be handled within the technical committee structure. At present, there are two advisory committees in the IEC: the Advisory Committee on Electronics and Telecommunications and the Advisory Committee on Safety. The President of the Commission serves as Chairman of both. The other members of the Advisory Committee on Electronics and Telecommunications (ACET) are the Chairman and one representative of the Secretariat of all technical committees related to electronics or telecommunications. At present, there are seventeen such technical committees.

d. The technical work of the Commission is accomplished by about 70 technical committees which may in turn form subcommittees to deal with individual and well-defined areas in the electrotechnical field. The scope of a technical committee is fixed at the time of its formation and must be approved by the Committee of Action.

e. All National Committees have the right to send delegations to the meetings of all technical committees and subcommittees and to receive the corresponding working documents. The technical committees and subcommittees can set up temporary working groups, with a restricted membership, to deal with a special task.

f. The United States National Committee (USNC) holds technical secretariats for nearly thirty technical committees and subcommittees.

4.4.2.4.5 Relation to Other Organizations

a. IEC has established close relations with bodies working in related fields. Some of these are inter-governmental, notably the regional organizations and other organs of the United Nations Economic and Social Council.

b. The individual National Committees maintain special liaison with the national standards bodies in each country through the technical committees. As an example, the U.S. National Committee has been affiliated with the American National Standards Institute and its predecessor organizations since 1931. The USNC represents the United States in the IEC. Delegations to IEC technical Committee meetings are authorized and certified by the American National Standards Institute.

4.4.2.5 International Civil Aviation Organization (ICAO) (Ref. 2.45)

4.4.2.5.1 History. Standards and Recommended Practices for Aeronautical Telecommunications were first adopted by the Council on 30 May 1949, pursuant to the provisions of Article 37 of the Convention on International Civil Aviation (Chicago 1944) and designated as Annex 10 to the Convention. They become effective on 1 March 1950. The Standards and Recommended Practices were based on recommendations of the Communications Division at its Third Session in January 1949.

4.4.2.5.2 Objectives/Policy. The aims and objectives of the Organization are to develop the principles and techniques of international air navigation and to foster the planning and development of international air transport so as to:

a. Ensure the safe and orderly growth of international civil aviation throughout the world.

b. Encourage the arts of aircraft design and operations for peaceful purposes.

c. Encourage the development of airways, airports, and air navigation facilities for international civil aviation.

d. Meet the needs of the peoples of the world for safe, regular, efficient and economical air transport.

e. Prevent economic waste caused by unreasonable competition.

f. Ensure that the rights of contracting States are fully respected and that every contracting State has a fair opportunity to operate international airlines.

g. Avoid discrimination between contracting States.

h. Promote safety of flight in international air navigation.

i. Promote, generally, the development of all aspects of international civil aeronautics.

4.4.2.5.3 Programs. A large number of programs are in effect, such as air navigation, accident investigation and prevention, airport and route facility economics, fares and rates, regulation of capacity and non-scheduled policy, airport and route facility, civil aviation forecasting, legal, aerodromes, air routes and ground aids, and communications. It is obvious that some of these programs such as navigation, communications and ground aids could impact on the MIL-STD-188 series.

4.4.2.5.4 Organization

a. An organization named the International Civil Aviation Organization is formed by the Convention. It is made up of an Assembly, a Council, and such other bodies as may be necessary.

b. An Air Navigation Commission that reports to the Council has been found necessary. It is composed of fifteen members appointed by the Council from among persons nominated by contracting States. These persons shall have suitable qualifications and experience in the sciences and practice of aeronautics. The Council shall request all contracting States to submit nominations. The President of the Air Navigation Commissions shall be appointed by the Council.

c. Both the Council and the Air Navigation Commission consult with the Membership, which consists of about 144 nations.

d. Work is accomplished by panels.

e. A Secretariat supports the Council, Air Navigation Commission and the Panels.

4.4.2.6 European Computer Manufacturers Association (ECMA)

4.4.2.6.1 Objectives. The purposes of the Association, as stated in the bylaws, are:

a. To study and develop, in cooperation with the appropriate national and international organizations, as a scientific endeavor and in the general interest, methods and procedures in order to facilitate and standardize the use of data processing systems.

b. To promulgate various standards applicable to the functional design and the use of data processing equipment.

c. The Association shall be a non-profit-making organization and shall devote itself to no commercial activity whatsoever.

Review Activities:

Army - CR
Navy - AS, YD, OM
Marine Corps - MC
Air Force - 90
TRI-TAC - TT
NSA - NS
USDRE - IC, SD
NCS
SHAPE

Custodians:

Army - SC
Navy - EC
Air Force - 90

Preparing Activity:

DCA - DC
(Project SLHC-2880)

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APPENDIX A

Memorandum of Understanding Between
The Assignees for Long Haul (DCS)
and Tactical Military Communication
System Technical Standards

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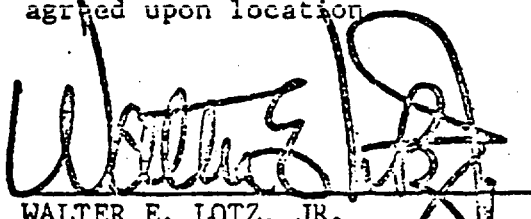
MEMORANDUM OF UNDERSTANDING
BETWEEN THE ASSIGNEES FOR LONG HAUL (DCS)
AND TACTICAL MILITARY COMMUNICATION SYSTEM TECHNICAL STANDARDS

This Memorandum of Understanding and the inclosed Terms of Reference establish a Joint Steering Committee (JSC) representing the Assignees and Assignee Activities for Long Haul (DCS) and Tactical Military Communication System Technical Standards.


The purpose of the JSC is to guide the development of Military Communication System Technical Standards common to both long haul (DCS) and tactical applications.

The overall objective is to improve interoperation of long haul (DCS) and tactical communication systems of the Department of Defense.

The JSC is established as of 15 June 1970 and will remain in being until terminated by either Assignee Activity. The JSC will meet on call alternately at DCA and the US Army Electronics Command or at some other agreed upon location.



WALTER E. LOTZ, JR.
Major General, USA
Commanding General
US Army Electronics Command



RICHARD P. KLOCKO
Lieutenant General, USAF
Director
Defense Communications Agency

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APPENDIX B

Joint Steering Committee

Terms of Reference

TERMS OF REFERENCEJOINT STEERING COMMITTEE FOR COMMON TACTICAL AND
LONG HAUL MILITARY COMMUNICATION SYSTEM TECHNICAL STANDARDS1. References:

a. OASD (I&L) AR Memorandum, Standardization Area Assignment for Long Haul Communications, 23 January 1969.

b. OASD (I&L) AR Memorandum, Standardization Area Assignment for Tactical Communications System Technical Standards, 16 December 1969.

Reference a. established a standardization area assignment for long haul communications and for the technical support of the National Military Command System (NMCS) with the area code SLHC. The Lead Service and Lead Service Activity for this area assignment is the Defense Communications Agency (DCA). The Participating Activities under this assignment are US Army Communications Command (USACC), US Naval Electronic Systems Command (NAVELEX), Air Force Communications Command (AFCC), National Security Agency (NSA), and Joint Tactical Communications Office (TRI-TAC).

Reference b. established a standardization area assignment for tactical communications with the area code TCTS. The Lead Service and Lead Service Activity for this area assignment are the Department of the Army and US Army Communications-Electronics Command (USACECOM), respectively. Participating Activities under this assignment are NAVELEX, AFCC, DCA, NSA, and TRI-TAC.

Reference b. also requires that the Lead Services for tactical and long haul communications jointly participate in the planning of their respective program plans to avoid duplication and provide proper interface. It further directs that the sectionalizing of a Military Standard (MIL-STD-188) and its subsequent revisions to contain all standards for military communications will be developed by the Lead Service Activities.

2. Purpose. The purpose of these Terms of Reference is to define the organization and functions of a Joint Steering Committee (JSC) and the objectives and methods to be followed in the preparation of a series of MIL-STD-188 documents, common to both long haul and tactical applications.

3. Scope. The provisions of these Terms of Reference will apply to the JSC and the Lead Services, Lead Service Activities, and Participating Activities for tactical and long haul Military Communication System Technical Standards (MCSTS).

4. Objective. To assure the development of a series of MIL-STD-188 documents containing MCSTS common to both long haul and tactical applications.

5. Mission. The mission of the Joint Steering Committee is to:

- a. Guide the development of the MCSTS common to both long haul and tactical communications.
- b. Establish, as required, and control joint working group.
- c. Receive, review and comment on working group reports.
- d. Provide for final coordination for all common MCSTS within the context of the TCTS and SLHC Program Plans and the Defense Standardization and Specification Program (DSSP).

6. Chairmanship. The Joint Steering Committee will be co-chaired on an equal basis by an officially designated representative of DCA and an officially designated representative of USACECOM. The co-chairman will:

- a. Jointly schedule meetings.
- b. Alternate as the presiding chairman at meetings.
- c. Assign work to members after appropriate consultation and coordination.
- d. Monitor the progress of each assigned project and make recommendation to the committee when corrective action is considered necessary.

7. Membership.

a. The Military Services (Army, Navy, Marine Corps and Air Force), the National Security Agency, the Defense Communications Agency and TRI-TAC will each have one vote and will designate a voting member and an alternate. Other attendees and working group chairman will provide assistance to their respective voting member and participate in committee deliberations as required.

b. In addition, the Joint Chiefs of Staff (JCS) will be invited as an observer to participate in the meetings.

c. The members shall:

- (1) Attend and participate in meetings when called by the co-chairmen.
- (2) Accomplish work assignments.
- (3) Inform their respective services/agencies as to the actions taken at the meetings and to bring experts to the meetings as required.

8. Secretariat. USACECOM will provide the secretariat whose duties will be:

- a. Record, transcribe, and distribute minutes of all meetings.

b. Maintain permanent records of minutes of all meetings, working group reports, general correspondence, etc.

c. Provide notifications and agenda for future meetings at the call of the co-chairmen.

d. Arrange for a meeting place at the request of the co-chairmen.

e. Coordinate and distribute working group reports to all members.

f. Other duties as assigned by the co-chairmen.

9. Voting. Decisions will be made by majority vote of the voting members in accordance with the provisions of the Defense Standardization Manual 4120.3-M.

10. Meetings. Regular meetings of the Joint Steering Committee will be held approximately every three months or as called by the co-chairmen.

APPENDIX C

Memorandum of Understanding Between the
Assignee Activity for Information Processing Standards
For Computers (Code IPSC) and the Assignee Activities
For Long Haul Communications Standards (Code SLHC)
and Tactical Communications System Technical Standards (Code TCTS)

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MEMORANDUM OF UNDERSTANDING

**BETWEEN THE ASSIGNEE ACTIVITY FOR INFORMATION PROCESSING
STANDARDS FOR COMPUTERS (CODE IPSC) AND THE ASSIGNEE
ACTIVITIES FOR LONG HAUL COMMUNICATIONS STANDARDS (CODE
SLHC) AND TACTICAL COMMUNICATIONS SYSTEM TECHNICAL STANDARDS
(CODE TCTS)**

1. Reference is made to:

a. OASD (I&L) AR Memorandum, 17 Dec 1965, subject:
Assignment of Standardization Responsibility in the Area of
Information Processing Standards for Computers.

b. OASD (I&L) AR Memorandum, 23 Jan 1969, subject:
Standardization Area Assignment for Long Haul Communications.

c. OASD (I&L) AR Memorandum, 16 Dec 1969, subject:
Standardization Area Assignment for Tactical Communications
System Technical Standards.

d. Memorandum of Understanding between the Assignees
for Long Haul (DCS) and Tactical Military Communication System
Technical Standards, 15 June 1970.

2. Reference 1a outlines the scope of the assignment of Code IPSC under the responsibility of the Department of the Air Force. The assignment includes, among other areas, communication characteristics, input/output media and format and character codes and recognition. Reference 1b assigned the standardization area for long haul communications (Code SLHC) to the DCA and reference 1c assigns the standardization area for tactical communications (Code TCTS) to the Department of the Army with the Army Electronics Command (USAECON) as Assignee Activity. Reference 1d, signed by the Director, DCA and the Commander, USAECON, established policy and procedures to coordinate and guide the development of standards common to both SLHC and TCTS codes.

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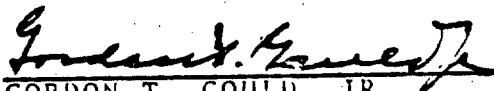
21 January 1983

Memorandum of Understanding between the Assignee Activity for Information Processing Standards for Computers (Code IPSC) and the Assignee Activities for Long Haul Communications Standards (Code SLHC) and Tactical Communications System Technical Standards (Code TCTS)

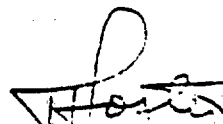
3. The scope of code IPSC includes areas which impact on both the SLHC and TCTS assignments. Therefore, representatives of the IPSC, SLHC, and TCTS assignments agreed to establish closer coordination with the objectives

- a. to prevent the development of incompatible standards;
- b. to avoid duplication of effort;
- c. to ensure that all areas of standardization are covered and necessary actions are initiated; and
- d. to agree on a common course of action in overlapping standardization areas.

4. Furthermore, representatives of the IPSC, SLHC, and TCTS assignments agreed that this coordination will be accomplished by exchanging proposed standards and other related information and by informal meetings whenever it is considered necessary to resolve problems of common interest.

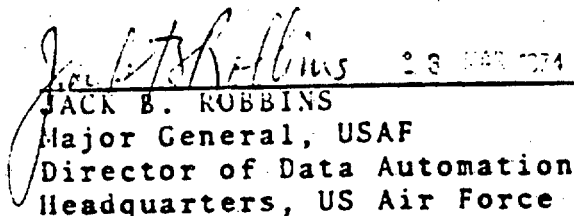


GORDON T. GOULD, JR.
Lieutenant General, USAF
Director
Defense Communications
Agency



8 MAR 1974

HUGH F. FOSTER, JR.
Major General, USA
Commanding General
US Army Electronics Command



23 MAR 1974

JACK B. ROBBINS
Major General, USAF
Director of Data Automation
Headquarters, US Air Force

APPENDIX D

Exclusive and Mutual Responsibilities
of the National Communications System
and
National Bureau of Standards For The
Development of Federal Standards Related
to Data Transmission and Teleprocessing

Exclusive and Mutual Responsibilities of the
National Communications System
and
National Bureau of Standards for the
Development of Federal Standards Related to
Data Transmission and Teleprocessing

General

For the purposes of this paper, NCS is taken to mean the Office of the Manager of the National Communications System. NBS is taken to mean the Institute for Computer Sciences and Technology of the National Bureau of Standards. Teleprocessing is taken to mean automated data processing which makes direct use of data transmission via switched or long distance non-switched telecommunication facilities.

The delinations of responsibilities presented below are adapted from, and correspond to the division of responsibilities laid out in ITU-CCITT Recommendation A-20, affecting the responsibilities of the International Telecommunication Union and the International Organization for Standardization and the International Electrotechnical Commission. The international aspects are analogous to the relationships between the existing Federal Information Processing Standards (FIPS) Program and the Federal Telecommunication Standards Program.

Exclusive Responsibilities

NBS-Teleprocessing

Pursuant to P.L. 89-306, the National Bureau of Standards (NBS) currently is responsible for recommending uniform Federal automatic data processing standards. This responsibility is fulfilled through the Federal Information Processing Standards (FIPS) Program and encompasses Federal standards related to automated data processing equipment, techniques, and computer languages; the provision of technical advice and assistance with respect to standards for data elements and codes and maintaining appropriate Registers and Reference files therefor. The NBS is also responsible for the guidance and monitorship of programs to promote the development and testing of voluntary commercial standards for ADP equipment, techniques, and computer languages, and for recommending procedures to be used in the Federal Government for adopting Federal standards and developing and implementing plans therefor.

NCS-Data Transmission

It will be the responsibility of the National Communications System (NCS) to recommend uniform Federal standards for transmission and switching employed in telecommunication networks used for data transmission. This responsibility will be fulfilled through a Federal Telecommunication Standards Program, and will encompass Federal standards related to transmission and switching equipment and techniques, and to equipment and techniques pertaining to modulation conversion for transmission. The NCS will also be responsible for the specification of any necessary Federal standard for manual or automatic operation procedures for the setting up, holding, and clearing of calls for data transmission within Federal multipurpose switched networks.

Mutual Responsibilities

The development of Federal standards for the junction (interface) between terminal modem and data terminal equipments shall be as agreed between the NCS and the NBS.

The development of Federal standards relating to alphabets and characters used for teleprocessing purposes shall be as agreed between the NBS and the NCS.

Devices designed to detect and/or correct errors must account for the following factors: (i) the error rates tolerable to the user; (ii) the line transmission conditions; and (iii) the error detection codes which must cope with the exigencies of the data alphabet and characters, as well as with error control and requisite signalling.

In this regard: Federal standards relating to limits for tolerable error rates for teleprocessing purposes shall be the responsibility of the NBS; Federal standards relating to limits for line transmission conditions for data transmission purposes shall be the responsibility of the NCS; and Federal standards relating to the error detection codes and requisite signalling shall be as agreed between NCS and NBS.

Coding is a field which cannot be decided unilaterally because of possible restrictions to teleprocessing which transmission and switching peculiarities may impose. The NCS with assistance from the NBS shall undertake any requisite standardization with respect to Federal multi-purpose switched networks which are used for data communications and which may be subject to such restrictions. Federal standards relating to limits of transmission path performance including modems shall be the responsibility of the NCS. Federal standards relating to limits for

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the transmission performance and signal margin requirements of transmitting and receiving terminal data equipment shall be the responsibility of NBS. The limits which would apply in respect to either of the above types of standards shall be determined by agreements between NBS and NCS.

The NCS and the NBS shall cooperate in the development of Federal standards requisite to the effective utilization of new technological developments in the Telecommunication and Computer fields so as to optimize data transmission capabilities in support of teleprocessing activities.

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APPENDIX E

CCITT RECOMMENDATION A.20

Collaboration with Other International Organizations Over Data Transmission

COLLABORATION WITH OTHER INTERNATIONAL ORGANIZATIONS
OVER DATA TRANSMISSION

(Geneva, 1964; Mar del Plata, 1968; and at Geneva, 1972, 1976 and 1980)

The CCITT,

considering

(a) that, according to Article 1 of the agreement between the United Nations and the International Telecommunication Union, the United Nations recognizes the International Telecommunication Union as the specialized agency responsible for taking such action as may be appropriate under its basic instrument for the accomplishment of the purposes set forth therein;

(b) that Article 4 of the International Telecommunication Convention (Malaga-Torremolinos, 1973) states that the purposes of the Union are:

- "a) to maintain and extend international cooperation for the improvement and rational use of telecommunication of all kinds;
- b) to promote the development of technical facilities and their most efficient operation with a view to improving the efficiency of telecommunication services, increasing their usefulness and making them, so far as possible, generally available to the public;
- c) to harmonize the actions of nations in the attainment of those ends";

(c) that Article 40 of the Convention states that, in furtherance of complete international coordination on matters affecting telecommunication, the Union shall cooperate with international organizations having related interests and activities;

(d) that in the study of data transmission the CCITT has to collaborate with the organizations dealing with data processing and office equipment and particularly the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC);

(e) that this collaboration has to be organized in a manner that will avoid duplication of work and decisions that would be contrary to the principles set out above,

unanimously declares the view

that international standards for data transmission should be established with the following considerations in mind:

(1) Clearly, it will be the responsibility of the CCITT to lay down standards for transmission channels, i.e., aspects of data transmission which require a knowledge of telecommunication networks or affect performance of these networks.

(2) The standardization of signal conversion terminal equipment (modems) is the province of the CCITT; the standardization of the junction (interface) between modem and the data terminal equipment is a matter of agreement between the CCITT and the ISO or the IEC.

(3) Devices designed to detect and (or) correct errors must take account of:

- the error rate tolerable to the user;
- the line transmission conditions;
- the code, which has to meet the exigencies of the data alphabet and the requirements of error-control (this must be such as to give an output satisfactory to the user) together with the requisite signaling (synchronism, repetition signals, etc.).

Standardization here may not come wholly within the CCITT's province, but the CCITT has very considerable interests at stake.

(4) The alphabet (definition 52.02 in the List of definitions) is a "table of correspondence between an agreed set of characters and the signals which represent them".

The CCITT and the ISO reached agreement on an alphabet for general (but not exclusive) use for data and message transmission and have standardized a common alphabet which is known as International Alphabet No. 5 (CCITT Recommendation V.3) (ISO/646-1973: seven-bit coded character sets for information processing interchange).

Complementary study of some control characters of the alphabet should be effected in cooperation with each other.

(5) Coding (definition 52.05 in the List of definitions) is "a system of rules and conventions according to which the telegraph signals forming a message or the data signals forming a block should be formed, transmitted, received and processed". Hence, it consists of a transformation of the format of the signals in the alphabet for taking account of synchronous methods, and introduction of redundancy in accordance with the error-control system. This is not a field in which the CCITT alone may be able to decide; however, no decision should be taken without reference to the Committee, because of the possible restrictions which transmission and switching peculiarities may impose on coding.

When the general switched network is used (telephone or telex) and when the error-control devices are subject to restrictions (switching signals - reserved sequences), it is the CCITT which is in fact responsible for any necessary standardization in conjunction with other bodies.

(6) The limits to be observed for transmission performance on the transmission path (modem included) fall within the competence of the CCITT; the limits for the transmission performance of the sending equipment and the margin of terminal data equipment (depending on the terminal apparatus and the transmission path limits) should be fixed by agreement between the ISO and the CCITT.

(7) In all instances, the CCITT alone can lay down manual and automatic operating procedures for the setting-up, holding and clearing of calls for data communications when the general switched networks are used, including type and form of signals to be interchanged at the interface between data-terminal equipment and data circuit-terminating equipment.

(8) When a public data network is involved, the CCITT has the responsibility to provide the Recommendations which apply. Where these Recommendations have an impact on the basic design and features of data processing systems and office equipment (normally DTE), they shall be the subject of consultation between CCITT and ISO and in some cases a mutual agreement may be desirable. Likewise when the ISO is developing or changing standards that may affect compatibility with the public data network there shall be consultation with the CCITT.

APPENDIX F

CCITT RECOMMENDATION A.21

Collaboration with Other International Organizations
On CCITT-Defined Telematic Services

COLLABORATION WITH OTHER INTERNATIONAL ORGANIZATIONS
ON CCITT-DEFINED TELEMATIC SERVICES¹⁾

The CCITT,
considering

(a) that, according to Article 1 of the agreement between the United Nations and the International Telecommunication Union, the United Nations recognizes the International Telecommunication Union as the specialized agency responsible for taking such action as may be appropriate under its basic instrument for the accomplishment of the purposes set forth therein;

(b) that Article 4 of the International Telecommunication Convention (Malaga-Torremolinos, 1973) states that the purposes of the Union are:

- "a) to maintain and extend international cooperation for the improvement and rational use of telecommunication of all kinds;
- b) to promote the development of technical facilities and their most efficient operation with a view to improving the efficiency of telecommunication services, increasing their usefulness and making them as far as possible, generally available to the public;
- c) to harmonize the actions of nations in the attainment of those ends";

(c) that Article 40 of the Convention states that "in furtherance of complete international coordination on matters affecting telecommunication, the Union shall cooperate with international organizations having related interests and activities";

(d) that this cooperation has to recognize the advisory capacity of organizations participating in the work of CCITT;

(e) that, in the study of terminals for new CCITT-defined telematic services (e.g., Teletex, Telefax, Datafax, Bureaufax, Videotex), ISO in particular is invited to give advice to CCITT based on their work on data systems and data communications;

(f) that this cooperation has to be organized in a manner that will avoid duplication of work and of decisions that would be contrary to the principles set out above.

recognizes the following principles

(1) it is the responsibility of the CCITT alone to make the decisions regarding the operational, technical (including factors needed to ensure international interworking) and tariff principles of the CCITT-defined services.

(2) while the CCITT will define many of the relevant factors for the CCITT-defined telematic services, other international organizations will be invited to give specialist advice to CCITT on subjects that are of mutual interest, such as:

- character sets and coding;
- end-to-end control procedures including error protection;
- interfaces between terminals and circuit terminating equipment;
- terminal transmitter distortion and receiver margin;
- paper sizes and text formatting.

(3) standardization, if required, of hardware and software implementation of terminals, such as printing systems, paper feed, character type fonts, paper characteristics etc., are outside the scope of CCITT.

1) "Telematic services" is used provisionally and include such services as Videotex, Teletex, facsimile, etc.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER MIL-HDBK-188		2. DOCUMENT TITLE Volume II of 2 Volumes -- Details Concerning Standardization Organizations	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)	
		<input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify): _____	
b. ADDRESS (Street, City, State, ZIP Code)			
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	