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AEROSPACE STANDARD

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SPECIFICATION FOR AN AUTOMATED INTERCHANGE OF STANDARDS DATA

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1. INTRODUCTION:

- 1.1 Purpose: This specification defines the general, quality assurance and implementation requirements for digital delivery of aerospace standards.
- 1.2 Scope: The requirements contained herein are intended for those standards that are promulgated by national standards organizations and used in the aerospace industry. These technical data include narrative text, tables and various graphic data which comprise the standards.

Both interface control and interface definitions are covered in this specification. The internal architectures of the computer facilities of either the providers or the users are not constrained by this interchange specification. Rather, neutral formats and transmitting media are defined in order to enable more cost-effective ways to distribute information for computer users than by sending printed documents.

This method for digital delivery of aerospace standards is intended to allow the users to display and maintain standards on current computer systems in addition to producing hard copy comparable to existing printed standards.

- 1.3 Background: The aerospace industry, government agencies and industrial societies share a common interest in exchanging data in electronic form because the exchange of information in printed paper form is proving to be more costly in overall handling and use. Also, as industry and government continue their evolution towards higher levels of automation, the need exists to provide data in computer sensible form so that computer systems can process and operate on the data.

A recent movement towards this end is the Computer-aided Acquisition and Logistics Support (CALS) initiative of the Department of Defense. This specification complies with the intent of CALS, specifically the requirements of MIL-STD-1840, and correlated industry specifications.

- 1.4 Approach: While it is recognized that certain CALS objectives, such as exchanging three-dimensional geometric data, require further technological development, adequate technology is currently available to provide the effective and economical interchange of non three-dimensional, book-form information in electronic form.

Accordingly, the general approach for standards interchange is initially to provide for interchanging that data converted from existing paper publications. This specification is rigorous for those formats and protocols that will be used for the initial conversion and interchange. However, full details have not yet been developed for later upgrading.

This specification will be revised for the purpose of including formats for processable, logical content of tables and graphs, and including detailed procedures for on-line transfer mechanisms. The logical form of tables and the addition of search parameters will enable using database management system queries to find particular parts, materials, processes, etc. As this specification is enhanced by revisions, a strategy for upgrading the formats of computerized data will also be provided.

**Documents**

Document Sharing Hub

1.4 (Continued):

Initial conversion of standards data is expected to yield most graphics data in the minimally acceptable formats such as scanned images. Due to initially using minimal formats as well as enhancements to the specifications, standards providers will plan for upgrading the data, as applicable, following the initial conversion.

This approach may be viewed as a series of phases moving toward a preferred end state. An implementation strategy for this approach is included in 5.

The need remains for distribution of standards in printed form for an indefinite period, but this specification anticipates the shift of the "primary authority" versions of the standards from hard copy forms to computer based information.

1.5 Definitions:

ASCII	American Standard Code for Information Interchange as defined in ANSI X3.4-1986. (This standard defines 7 bit codes. In the future, the 8 bit definition in ANSI X3.134-1987 may be specified.)
Compound Document	A digital representation of a paper document consisting of multiple object types such as text, graphics and photo images.
Computer Graphics	The representation of a picture in terms of computer graphic primitives such as lines, markers, polygons, text and cell arrays.
Engineering Drawing	Two-dimensional geometry, usually representing 3D parts, assemblies, etc., and associated text annotations. They are historically the medium of engineering design or product definition.
Data Graph	An exhibit of relationship between sets of numeric data, either as points with coordinates or lines, used to extract data values by interpolating or extrapolating or to simply illustrate a trend or formula.
General Illustration	Two-dimensional line art with labels, titles, etc., which is not inherently useful for extracting computational data values or geometric information.
Paragraph Text	Grammatically punctuated word strings which express a thought or point.
Photo Image	A photographic print with shading (halftone).
Product Definition Data	A digital representation for product data that is required for the analysis, design, manufacture, test and support of a product.

1.5 (Continued):

Provider	A standards issuing company or organization which delivers standards from their computing system to a user computer system.
Scanned Image	The representation of an image by successive scan lines of picture elements or PIXELS (PELS). Scanned images are often interchanged as facsimile data transmissions.
Table	An orderly arrangement of data in rectangular form of rows and columns which is used to extract discrete data.
User	A company or body of users which receives standards from external standards-making organizations and uses the standards via their computer system.

The following acronyms are used:

CALS	Computer-aided Acquisition and Logistic Support
CCITT	International Consultative Committee on Telegraphy and Telephony
CGM	Computer Graphics Metafile
DDN	Defense Data Network
FIPS	Federal Information Processing Standard
FTAM	File Transfer, Access and Management
GOSIP	Government Open Systems Interconnection Procurement
IGES	Initial Graphics Exchange Specification
ISO	International Standards Organization
ODA/ODIF	Office Document Architecture/Office Document Interchange Format
OSI	Open Systems Interconnection
PDES	Product Data Exchange Specification
PIXEL (PEL)	Picture Element
SGML	Standard Generalized Markup Language
STEP	Standard for the Exchange of Product Model Data
TOP	Technical and Office Protocols



2. APPLICABLE DOCUMENTS:

The following specifications and standards documents form a part of this specification to the extent specified herein. The latest revision of each referenced item shall apply unless otherwise indicated.

ANSI X3.4-1986	American National Standard Code for Information Interchange (Note: This is for the initial implementation. A future revision will specify the ANSI X3.134-1987 which defines an 8-bit code.)
ANSI Y14.26M.1987	Digital Representation for Communication of Product Definition Data (IGES V3.0)
CCITT T.6	Facsimile Coding Schemes and Coding Control for Group 4 Facsimile Apparatus
CCITT X.25	Interface Between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Terminals Operating in the Packet Mode on Public Data Networks
DOD-D-(IGES)	Digital Representation for Communication of Product Data: Application Subsets
FED-STD-1064	Telecommunications: General Aspects of Group 4 Facsimile
FED-STD-1065	Telecommunications: Facsimile Coding Schemes and Coding Control Functions for Group 4 Facsimile Apparatus
FIPS PUB 25	Recorded Magnetic Tape for Information Interchange (1600 CPI, PE) (ANSI X3.39)
FIPS PUB 50	Recorded Magnetic Tape for Information Interchange (6250 CPI, Group-coded Recording) (ANSI X3.54)
FIPS PUB 79	Magnetic Tape Labels and File Structure for Information Exchange (ANSI X3.27)
FIPS PUB 100	Interface Between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Operation with Packet-Switched Data Communications Networks
FIPS PUB 100-1	Interface Between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Operation with Packet-Switched Data Communications Networks
ISO 2022	Information Processing - ISO 7-bit and 8-bit Coded Character Sets - Code Extension Techniques
ISO 2375	Data Processing - Procedure for Registration of Escape Sequences
ISO/DIS 8613	Information Processing - Text and Office Systems - Office Document Architecture (ODA) and Interchange Format

2. (Continued):

ISO 8632	Information Processing Systems - Computer Graphics Metafile for the Storage Transfer of Picture Description Information
ISO 8879	Text Preparation and Interchange - Processing and Markup Languages - Part Six: Generic Document Representation (SGML)
ISO 8571	File Transfer, Access and Management (FTAM)
MIL-STD-1840	Automated Interchange of Technical Information
TOP V3.0	Technical and Office Protocols - Version 3.0 (Implementation Release, May 1987, MAP/TOP Users Group, Society of Manufacturing Engineers)

3. GENERAL REQUIREMENTS:

3.1 General Description: The interchange of standards information is defined primarily in terms of the delivery methods and the formats used for the data as it is being delivered. Delivery methods include the shipping of physical storage media and the transfer of the data over communications networks. Data formats specifically define file and record contents, as well as data representation methods for the various data types which are identified in 3.2.

3.2 Data Representations: This specification retains the composition architecture of compound technical documents. The digital representations of standards documentation shall be integrated to make available the total content of standards. That is, no elements or objects included by the originator to produce the total effect of a standard may be left out, although the particular organization or order of display may be significantly different from its paper publication.

The data types are those typically included in technical publications: paragraph text, tables, physical/mathematical data graphs, diagrams and engineering drawings, general illustrations (for example, composites of shaded areas, icons and line art), and photo images. The digital representations identified for each type are:

Paragraph Text ASCII character strings

Tables ASCII alphanumeric fields by column and row (together with attributes), or ASCII character strings (text without defined structure)

Data Graphs Scanned image, or computer graphics, or algorithmic representations (together with coordinate attributes)

Engineering Drawings and Diagrams Scanned image, or computer graphics, or geometric definitions

3.2 (Continued):

General Scanned image, or computer graphics
Illustrations

Photo Images Scanned image or computer graphics

Specific definition of formats for the data types and preferred formats are given in 3.4.

3.3 Distribution Controls and Conventions: Communications and media options for distribution of data between the originating computer and receiving computers or devices are defined as: on-line network access, and off-line transport via physical storage media such as magnetic tape.

3.3.1 Distribution Controls: Control over interchange is determined by: the method for initiating delivery, computer system file protection, and the file organization and identification records.

3.3.1.1 Initiation of Delivery: Users may make requests for transfer of standards data on storage media by mail or telephone. The provider will honor the request by initiating the writing of tape or other storage media, packaging and sending the material.

Additionally, the provider shall allow users to initiate and gain on-line access to standards data to perform transfer of standards documents via communications networking. (This capability is intended for implementation phases 2 and 3, identified in Table 5-2.)

3.3.1.2 Read-Only Protection: User access to the provider's data files during an on-line session shall be confined to read-only capability by the account identification and by other security measures of the provider's choice. Conversely, the user computer system shall allow only overwriting or creating new files with neither read nor write access under control of the provider computer system.

This type of protection is irrelevant in off-line media transfers.

3.3.1.3 Organization of Files: The groups of files that comprise the document transfers are:

Document declaration (defined in 3.3.1.4 below);
Text files;
Table definitions;
Illustration files.

The order of files which represents multiple standards documents shall be as shown below. The order of a subset of files which contain one standards document will be the same for both on-line transfers and transport via storage media. However, an on-line transmission session shall be limited to the transfer of one document, as specified in 5.4 of MIL-STD-1840.

3.3.1.3 (Continued):

The general order of files is:

1. All document declaration files
2. Text files for first document
3. Illustration files for first document
4. Table files for first document
5. Text files for second document
6. Illustration files for second document
7. Table files for second document

--- etc. ---

- n-2. Text files for last document
- n-1. Illustration files for last document
- n. Table files for last document

3.3.1.4 Document Declaration File: A document declaration file shall be included in the transfer of each standards document. It shall correspond to the definition given in MIL-STD-1840, 5.1, with the following parameter selections:

Records 1 and 2 shall be defined as specified in the reference.

Record 3 Sending system related document identifier
- Enter "none"

Records 4, 5 and 6 shall be defined as specified in the reference.

Record 7 Destination system document identifier
- Enter "none" for off-line transfer
- To be determined later for on-line transfer

Record 8 Destination system related document identifier
- Enter "none"

Records 9 and 10 shall be defined as specified in the reference.

Record 11 File count
- Add the count of parametric form table files preceded by the letter "P."

Record 12 Security label
- enter "none"