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2. -- Recommendation of Standards

Pending any formal adoption of a standards for NATO CALS application a system of recommendation will be adopted. Where determined, this recommendation is shown in Column 1 under each heading:

2.1 -- Temporary Standard [T]

Temporary Standards are either de-facto standards from industry or academic development bodies or standards organizations that have been widely adopted and are available in COTS implementations from commercial vendors. If such a standards becomes an ISO standard it will be adopted as a Recommended Standard. If it is superseded by an approved ISO standard that is adequately supported by implementation tools, then it will be dropped

2.2 -- Emerging Standard [E]

An Emerging Standard is a de-facto or de-jure standard appropriate for CALS application but which has not (yet) been adopted or taken under consideration by an international standards organization. These can be Draft International Standards (DIS) or National Standards or approved International Standards without product support. Emerging Standards generally do not have approved product support (COTS tools).

2.3 -- Recommended Standard [R]

A Recommended Standard is one which has been approved by international standards organizations such as ISO, ITU-TSB/CCITT and which are supported by an adequate number of COTS implementations or tools. These standards have priority over Emerging Standards and Temporary Standards.

2.4 -- Not Recommended Standard [N]

A "Not-Recommended" Standard is one which has been approved by international standards organizations, but which does not comply with modern CALS Philosophy and which has been superseded. These standards may be in current use, but it is not recommended that they be used in future applications.

2.5 -- Undetermined Status []

Unless one of the above indicators has been used the status of the standard should be regarded as undetermined so far as NATO CALS Policy is concerned.

3. -- Equipment Acquisition Standards and Application Profiles

3.1 -- Acquisition Processes

The Acquisition Phase of a NATO Project encompasses all Business functions carried out by a System Project Office before a system enters service and is accepted by the designated user(s). These functions include Logistics Support Analysis, Initial Provisioning and associated activities such as Illustrated Parts Catalogues, NATO Codification, and Order Administration, decisions related to the development of

Integrated Logistics Support and the definition and creation of Integrated Databases needed to support both Initial Acquisition and the In-service Phase of the system Life-cycle, and specification of Technical Documentation and Maintenance Manuals.

3.2 -- Logistics Support Analysis

Logistics Support Analysis (LSA) consists of a series of analytical tasks which identify the support planning parameters and management requirements for an equipment project, define the support requirements of an equipment, identify major cost drivers, assess and influence the Reliability and Maintainability (R&M) for the design options, identify optimum support solutions, balance life-cycle costs against performance, and verify the support solution adopted once an equipment enters service. The results of LSA are stored in a Logistics Support Analysis Record (LSAR) which is a single database for the equipment.

Standard [T]	MIL-STD-1388-1A	Notice 4	DoD Logistic Support Analysis
Profile [E]	UK DEF STAN 0060	Interim Issue 1	Application of Integrated Logistic Support (ILS) -- Profile of MIL-STD-1388-1a for UK MOD use.

Note: *The NCMB is sponsoring the development of an International Standard to support Acquisition Programs and the associated Data Exchange, and this work has started to integrate MIL-STD-1388, AECMA SPEC 2000M, and AECMA SPEC 1000D and to harmonize their associated Data Dictionaries. If this work is successful the resulting ISO Standard and any associated NATO Applications Profiles (STANAGs) should replace the above Standard and Applications Profile by 1997.*

3.2.1 -- Logistic Support Analysis Record

The Logistic Support Analysis Record (LSAR) contains the data elements derived from the LSA process specified in MIL-STD 1388-1A (See para 3.2). Although this data can be delivered and stored in a variety of ways, complex projects are likely to require the data to be held in a relational database which can be maintained and used throughout an equipment life-cycle.

Standard [T]	MI-STD-1388-2B	Notice 1	DoD Requirements for a Logistic Support Analysis Record (LSAR).
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Note: *See Note to Sect 3.2.*

It should be also noted that MIL-STD-1388-2B cannot be contractually invoked independently of

MIL-STD-1388-1A (LSA -- see above) and that, in addition, these incorporate coded information derived, inter alia, from the following US DoD MIL-STDS:

MIL-STD-470A	Maintainability Program for Systems and Equipment
MIL-STD-482A	Configuration Status Accounting
MIL-STD-785	Reliability Program for Systems and Equipment Development and Production
MIL-STD-1367	Packaging, Handling, Storage, and Transportability Program Requirements
MIL-STD-1379D	Military Training Program
MIL-STD-1390	Level of Repair Analysis (LORA)
MIL-STD-1629	Procedures for Performing a Failure Mode Effects and Criticality Analysis (FMECA)
MIL-STD-1388	Is currently under review by the US DoD and major changes are expected during 1995-96.

3.3 -- Initial Provisioning

Initial Provisioning Procedures are the first steps which constitute the formal process for the acquisition of initial spares needed to support defense equipment. The processes include the identification, listing, and presentation of separable items, the presentation of illustrated parts catalogues (IPC), and NATO Codification.

Standard [T]	AECMA 2000M	Revision 2.1	Material Management Integrated Data Processing for Military Equipment
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Note: See Note to Sect 3.2.

3.4 -- Illustrated Parts Catalogues

Illustrated Parts Catalogues provide a spare parts breakdown for personnel employed in maintenance and stock management. Although the following standard includes a specification of Illustrated Parts Catalogues, current development work indicates that it may be more appropriate to handle such illustrations as part of Technical Documentation using AECMA 1000D.

Standard [T]	AECMA 2000M	Revision 2.1 Chapter 1	Material Management Integrated Data Processing for Military Equipment
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Note: See Note to Sect 3.2.

3.5 -- NATO Codification

NATO uses a standard system of numbering items of supply known as the NATO Codification System (NCS). [See ACodP-1 -- NATO Manual on Codification, Guide to NATO Codification Systems.] NCS is designed to achieve maximum effectiveness in national and international logistics support, to facilitate data management in the materiel area, and to identify items which appear to be different but meet the same requirement.

Standard [T]	STANAG 3150	Issue: 1989 Revision: 5.07.1989	Codification of Equipment -- Uniform System of Supply Classification
Standard [T]	STANAG 4177	Issue: 21.08.90	Codification of Items of Supply -- Uniform System of Data Acquisition

3.6 -- Machine Readable Code (Bar Coding)

Items of supply for delivery to NATO Nations have packaging specifications which include the labeling of each item with a machine-readable reference number specified by the NATO codification standard. The machine-readable symbology is specified as a bar code.

Standard [E]	AECMA 2000M Based on STANAG 4329	Revision 2.1 Appendix 3	Material Management Integrated Data Processing for Military Equipment -- Appendix 3 Bar Coding
Standard [T]	STANAG 4329	Issue: 6.4.1992	NATO Standard Bar Coding Symbology

Note: See Note to Sect 3.2.

3.7 -- Order Administration

Order Administration is the term used to describe the methods used for placing orders for new items of supply or repair of repairable items of supply together with the related processes needed to obtain status information about existing orders.

Standard [E]	AECMA 2000M	Revision 2.1 Chapter 3	Material Management Integrated Data Processing for Military Equipment
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Note: See Note to Sect 3.2.

3.7.1 -- Order Administration Format, Content, and Communications Techniques

Standard [E]	AECMA 2000M Based on ISO 9735 (EDIFACT) /EN29735/DIN16536	Revision 2.1	Material Management Integrated Data Processing for Military Equipment -- Appendix 1 Data Dictionary and Appendix 2 Communications Techniques
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Notes: See Note to Sect 3.2.

AECMA SPEC 2000M Revision 2.1 includes a comprehensive set of Order Administration messages which do not conform to ISO 9735/UN EDIFACT and work is in hand to develop an EDIFACT-compliant message set. Publication is expected in late 1995.

3.8 -- Consumption and Maintenance Data Exchange

Standard [E]	AECMA 2000M	Revision 2.1	Material Management Integrated Data Processing for Military Equipment -- Chapter 5 Consumption Data Exchange
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Note: See Note to Sect 3.2.

3.9 -- Standards Parts Library Data Exchange

The emerging standard for parts libraries will provide open capability for extracting information from different types of structured libraries into application systems and for transferring data between libraries. Libraries can range from parametric definitions through numeric tables to STEP Parts.

Standard [E]	ISO 13584	CD ISO TC184 SC4	Industrial Automation -- Parts Library Part 1 Over View and Fundamental Principles Part 10 Conceptual Model Part 20 General Resources
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- Part 24 Logical Model of Supplier Library
- Part 26 Supplier Identification Codes
- Part 31 Programming Interface
- Part 42 Dictionary Methodology

Scheduled for DIS End-1995.

Standard [T]	NATO Master Cross-Reference List
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Note: The Policy and applicable standards for Parts Libraries, Data transfer for NATO, and the status of the above Standard has not yet been confirmed or validated in the NATO CALS context. NAMSA currently publishes a Master Cross Reference List of parts subject to NATO Codification for use by the Nations.

4. -- Technical Documentation Standards and Application Profiles

4.1 -- Character Set

The NATO base standard for information processing is the internationally agreed reference for Latin-based languages (ISO 646) which defines the ASCII compatible binary representation of English alpha-numeric characters, a range of punctuation symbols, and four special control characters (space, tab, and the line/record start and end codes). It can be easily modified for use with other Latin-based languages. Representation of languages, country names, currencies, and dates/times should also be specified using the appropriate ISO standards.

Standard [R]	ISO 639	1988	Information Processing Coded Representation of Names of Languages
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Standard [R]	ISO 646	3rd Edition 1991	Information Technology -- ISO 7-Bit Coded Character Set for Information Interchange
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Standard [R]	ISO 3166	1988	Information Processing -- Country Name Representations
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Standard [R]	ISO 4217	1987	Information Processing -- Currencies and Funds
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Standard	ISO 6709	1988	Information Processing --
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			Representation of Latitude and Longitude
Standard [R]	ISO 6936	1988	Information Processing -- Character Set Conversion
Standard [R]	ISO 8859	Various	Information Processing -- 8-bit singly byte coded graphic character sets Pt 1 Latin Alphabet No 1 Pt 2 Latin Alphabet No 2 Pt 3 Latin Alphabet No 3 Pt 4 Latin Alphabet No 4 Pt 7 Latin/Greek Alphabet Pt 9 Latin Alphabet No 5 Pt 10 Latin Alphabet No 6
Standard [R]	ISO 8601	1988	Information Processing -- Date/Time Representations
Standard [R]	ISO 10646-1	1993	Information Processing -- Universal Character Sets

4.2 -- Information Processing

In order to share and reuse the information in documents across software applications and across computing platforms the preferred system is based on a Standard Generalized Markup Language (SGML). SGML document elements can contain text and data in ISO 646 format, graphics in CGM format, Computer Aided Design (CAD) Data in IGES format, images in ISO 8613 raster graphics format, spreadsheets and video/voice.

ISO 8879 does not contain a document presentation standard and Document Style Semantics and Specification Language (DSSSL) (DIS 10179) is intended to remedy this in the near future. MIL-M-28001 Appendix B contains a Format Outputting Specification Instance (FOSI) which can be used as an interim standard. Any application that generates a page image format can use SPDL including SGML/DSSSL and ODA.

Standard [N]	ISO 8613 Parts 1-1		Information Processing Systems. Office Documentation Architecture (ODA) and Interchange Format
Standard [R]	ISO 8879	1991	Information Processing -- Text and Office System -- Standard

Generalized Markup Language
(SGML)

Standard [R]	ISO/IEC 9069	1988	Information Technology -- SGML Support Facilities -- SGML Document Interchange Format (SDIF)
Standard []	ISO/IEC TR 9573-13	1991	Information Technology -- SGML Support Facilities -- Techniques for using SGML Part 13 Public Entity Sets for Mathematics and Science
Standard [E]	ISO/IEC DIS 10179	DIS	Document Style Semantics and Specification Language (DSSSL) Scheduled for IS in 1995
Standard [E]	ISO 8824/8825 ISO/IEC 10180	DIS 1992	Standard Page Description Language (SPDL)
Profile [T]	MIL-M-28001	Rev B 26 Jun 93	Markup Requirements and Generic Style Specifications for Electronic Printed Output and Exchange of Text -- SGML.
Handbook [T]	MIL-HDBK- SGML	Draft Published May 1994	US Department of Defense Application of -- SGML. Federal Information Processing Standard (FIPS 152)

Note: *The Office Documentation Architecture Information Processing System (ISO 8613) was developed in advance of the SGML philosophy. Although it has widespread administrative use it is not recommended for NATO technical documentation applications.*

4.2.1 -- SGML Conformance Testing

SGML Products are, at present, certified only by the US to ANSI X3.190-1993 Standard but this standard is being adopted as an ISO/IEC Standard. Conformance Testing of SGML products for NATO should be specified in accordance with the ISO standard as soon as compliant software and/or test centers become available.

Standard [E]	ISO/IEC 13673	1994	Conformance Testing for SGML Systems (Under development by ISO Fast track from ANSI X3.190-1993)
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4.3 -- Graphics and Illustrations

Graphics and Illustrations requiring two dimensional vector presentation in technical manuals -- such as graphs, charts, simple figures and line drawings -- should be specified in Computer Graphics Metafile (CGM) format. CGM provides for the interchange of processable, digital, 2-D graphics data through a Metafile format which can be created independently of device requirements and translated into the formats required by output devices, graphics, and computer systems.

Standard [R]	ISO/IEC 8632 1-4	Version 3 1992	Information Processing Systems -- Computer Graphics-Metafile of the storage and transfer of picture description information (CGM) Type 0 (Monochrome) Type 1 (Greyscale) Type 3 (Color)
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Standard []	ISO/IEC 9592 1-3 ISO/IEC 9593.3 ISO/IEC 9592.4	1989 1990 1992	Information Processing Systems -- Programmers Hierarchical Interactive Graphics System (PHIGS)
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Standard []	ISO/IEC 9639 1-6	Version?	Information Processing Systems -- Computer Graphics Interface (CGI)
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Profile [E]	ISP 12064-1	DISP	Image Application -- Simple Document Structure -- Raster Graphics Content Architecture Document Application Profile ITU-ISB Recommendations T4 and T6 + Tiled Raster Graphics FOD 112
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Profile [T]	MIL-D-28002	Rev B Amend 1 20 Sep 93	Requirements for Raster Graphics Representation in Binary Format Federal Information Processing Standard (FIPS 150) NISTIR 5108 Raster Graphics: A Tutorial and Implementation Guide provides guidance regarding use
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of MIL-D-28002.

Profile [T]	MIL-D-28003	Rev A Nov 92 Amend 1 14 Aug 92	Digital Representation for Communication of Illustration Data: CGM Application Profile. MIL-D-28003 is scheduled to migrate to a Federal Information Processing Standard (FIPS 128-1) by End 1996.
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4.3.2 -- CGM Conformance Testing

CGM Products are, at present certified only the US National Institute of Standards and Technology to MIL-D-28003. The Policy and applicable standards for Conformance Testing of CALS products for NATO has not yet been confirmed or validated in the NATO CALS context. NIST should be consulted before any product is accepted for use.

4.4 -- Product Data

The exchange of technical 2-D and 3-D drawings, documentation, and other data required for product design and manufacturing, including geometric and non-geometric data such as form features, tolerances, material properties, and surfaces and the information typically associated with Computer Aided Design and Manufacturing (CAD/CAM) should be described in international standards terms. Currently the Initial Graphics Exchange specification (IGES) should be used. IGES will eventually be replaced by STEP (Standard for the Exchange of Product Model Data) which will be capable of representing product data throughout its life-cycle and of specifying file exchange. STEP is expected to become an ISO standard in 1995 when it is likely to be adopted for NATO usage.

Standard [E]	ISO/IEC 10303	DIS	Standard for the Exchange of Product Model Data (STEP)
Standard []	ANSI/EI 548	1988	Electronic Design Interchange Format (EDIF) May be subsumed by STEP
Standard [E]	ANSI/IEEE 1076		Very High Speed Integrated Circuit (VHSIC) Hardware Description Language (VHDL). On migration path to ISO (1995) but may be subsumed by STEP
Standard [T]	ANSI/ASME Y14.26M/	Ver 5.2 (1989)	Initial Graphics Exchange Specification (IGES) May be

	FIPS 177		subsumed by STEP
Profile [E]	STEP Applications		At least 27 different ISO STEP Application Profiles are under development.
Profile [T]	MIL-D-28000	Rev A 10 Feb 92 Amend 1 14 Dec 92	Digital Representation for Communication of Product Data: IGES Application Subset and IGES Application Protocols.

4.5 -- Images

Non-processable, optically scanned drawings and documents should be specified using raster graphics interchange standards. These were developed initially for digital facsimile over Integrated Services Digital Networks (ISDNs). Two forms of raster data may be specified: Type I (untiled) and Type II (tiled). Type II (tiled) is the preferred format. A tiled raster image resembles a two-dimensional grid with each "tile" or set of pixels representing a portion of the image. Text and graphics in raster data formats allow a rapid and consistent access to stored images and are suitable for electronic transmission. Raster files can also be converted to digital documents for work processing or desk-top publishing and edited through manipulation of individual pixels.

A number of standards exist which are not CALS-specific.

Standard [R]	ISO/IEC 10918 1,2,3	1992 CD	Coding of Digital Continuous Tone Still Picture Images (JPEG)
Standard []	ISO/IEC 12087 1-3	1994	Information Processing Systems -- Image Processing and Interface (IPI)
Standard [R]	ITU-TSB T6 (formerly CCITT Recommendation T.6)	1988	Facsimile Coding and Control Functions for Group IV Facsimile Apparatus.

4.6 -- CD-ROM Storage/Transfer Media

Multi-media applications may specify the use of CD-ROM for file transfer or technical documentation applications.

Standard	ISO 9660	1988	Information Processing -- Volume
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[]			and File Structure of CD-ROM for Information Exchange.
Standard []	ISO/IEC 10149	1989	Information Technology -- Data Interchange on Read-only 120mm Optical Data Discs (CD-ROM)

Note: *The policy and applicable standards for NATO CD-ROM usage have not yet been confirmed for CALS applications. In particular a number of NATO STANAGs contain CD-ROM specifications and work is in hand to identify such references.*

4.7 -- Video and Motion Picture Media

Multi-media applications may specify the inclusion of Video and Motion Picture files or still images derived from moving pictures. Such specifications, together with legacy data migration strategies, will also need to include appropriate reference to the acceptable data compression standards.

Standard [E]	ISO DIS 10918	Part 1 1994	Joint Photographic Experts Group (JPEG) Still Picture Greyscale and Colour Image Data Compression Algorithms
Standard [R]	ISO DIS 11172 MPEG2 ISO CD 13813 1-3	Parts I, II, III 1993 Part IV 1994 CD	Motion Picture Experts Group (MPEG) Coding of Motion Pictures and Associated Audio for Digital Storage Media Part 1 -- Video Part 2 -- Audio Part 3 -- Systems Part 4 -- Conformance MPEG is working on a second generation of (professional wide-bandwidth) standards currently at CD stage. These developments will need to be monitored.
Standard [R]	ISO/IEC 11544	1994	Joint Photographic Experts Group (JPEG) Coded Representation of Picture and Audio Information -- progressive bi-level image compression (JBIG)

Note: *The Policy and applicable standards for NATO Video and Motion Picture Video usage have not yet been confirmed for CALS applications.*

4.8 -- Digital Audio

Multi-media applications may specify the inclusion of Audio files but to date there is no internationally accepted standard for digital audio specification.

Standard []	TBD
Standard []	TBD
Standard []	TBD

Note: *The Policy and applicable standards for NATO Audio usage have not yet been determined.*

4.9 -- Hypermedia and Multimedia

The HyTime standard, which is build on SGML, is used to create relational links between objects (text, graphics, audio, video, etc.). The objects are then linked in a document or between documents so as to become accessible within a computer system.

Standard [R]	ISO/IEC IS 10744	1992	Information Technology -- Hypermedia/Time Based Document Structuring Language (HyTime)
Standard []	ISO/IECS 13522-1	DIS	Information Technology -- Coding of Multimedia and Hypermedia Information (MHEG)

Note: *The Policy and applicable standards for NATO Hypermedia and Multimedia use has not yet been confirmed or validated in the NATO CALS context.*

4.10 -- Interactive Electronic Technical Manuals

An Interactive Electronic Technical Manual (IETM) is a technical manual (e.g., maintenance, user, training, operations, etc.) prepared (authored) in digital form on a suitable medium, by means of an

automated authoring system, designed for electronic screen display to an end-user, and possessing the following characteristics:

- . The format and style of the presented information are optimized for screen presentation to ensure maximum comprehension; that is, the presentation format is "frame-oriented" and not "page-oriented".
- . The elements of technical information constituting the technical manual are so interrelated that a user's access to the required information is facilitated to the greatest possible extent and is achievable by a variety of paths.
- . Display devices, including personal computers and portable "laptop" devices can function interactively (as a result of user requests and information input) in providing procedural guidance, navigation directions, and supplemental information.
- . Screen presentations can include material derived from data stored in textual, graphical, audio, or video form in a relational data base which is composed of logically connected, but randomly accessible IETM data elements.

Standard []	ISO 12083		Electronic Manuscript Preparation and Markup
Standard [E]	ISO DIS 2709		Format for Information Exchange
Standard [E]	AECMA SPEC 1000D	Change 4	International Specification for Technical Publications using a Common Source Database.
Standard [T]	MIL-M-87268	20 Nov 92	Interactive Electronic Technical Manual (IETM) Content
Standard [T]	MIL-D-87269	20 Nov 92	Interactive Electronic Technical Manual (IETM) Database
Standard []	MIL-Q-87270	20 Nov 92	Interactive Electronic Technical Manual (IETM) -- Quality Assurance Requirements for Quality Assurance Program

Notes: See Note to Sect 3.2.

AECMA SPEC 1000D embodies both hard-copy and IETM requirements and emphasizes the use of

Internationally agreed standards

- . Text to SGML (ISO 8879)
- . Graphics to CCITT Group 4 (MIL-R-28002)
- . Vector Graphics to IGES V4 (MIL-D-28000)
- . Images to CGM (MIL-D-28003)
- . Magnetic Tape Transfer to MIL-STD-1840A

5. -- System Management Standards and Application Profiles

5.1 -- Integrated Logistics Support

The term Integrated Logistics Support (ILS) is used to describe a disciplined management approach, affecting both customer and industry, aimed at optimizing equipment Life Cycle Costs. It includes elements for influencing equipment design and determining support requirements to achieve supportable and supported equipment.

Profile [E]	UK DEF STAN 0060	Interim Issue 1 1994	Application of Integrated Logistic Support (ILS)
Standard [T]	AC/305(SLM) -- D23		Orientation Document for Integrated Logistic Support Within the Framework of Multinational Equipment Projects
Handbook [T]	MIL-HDBK 59		Computer Aided Acquisition and Logistics Support (CAL S) Program Implementation Guide

Note: See Note to Sect 3.2.

5.2 -- Configuration Management

Full introductory text is not yet available.

The configuration of material

Standard [E]	ISO 9004-7	IS	Guidelines for Configuration Management
Standard [E]	ISO 10164	IS	Configuration Management

Standard [N]	STANAG 4159	NATO Materiel Configuration Management Policy and Procedures for Multi-National Joint Projects
Standard [E]	MIL-STD 973	
Profile [N]	MIL-STD-483A	Configuration Management Practices for Systems, Equipment, Munitions, and Computer Programs
Standard []	MIL-STD-498	Configuration Management and Software Development

Note: *Configuration Management Policy for NATO CALS has not yet been determined. The above STANAG and profiles pre-date CALS thinking and are no longer appropriate. Suitable replacements have not yet been identified for application in a NATO CALS context. This also applies to the Allied Configuration Management Publications (ACMPs) which concern the Configuration Management Standards applicable to NATO.*

5.3 -- Life Cycle Assessment

Environmental issues are becoming increasingly important and this field is undergoing rapid advancement and change. Not only is the body of knowledge increasing but the demand for consistent, usable guidelines and reliable standards is also becoming obvious. In the face of environmental claims it is essential to know the environmental impact of product design, usage throughout the life cycle, and ultimate disposal. Although this topic is not specific to CALS, users and regulatory bodies will require access, throughout a product life cycle, to reliable information to assist in the development of regulations, operating instructions, and disposal programs which recognize environmental issues.

Standard [E]	ISO 14040	CD	Environmental Life Cycle Assessment DIS Expected 1996
	ISO 14041	CD	Life Cycle Inventory Analysis
	ISO 14042	CD	Life Cycle Impact Assessment DIS expected 1997-98
Profile []			

5.4 -- Disposal of Equipment

This paragraph will consider the methodology required for defense equipment disposal in the future.

- . Montreal Convention: Particular reference will be made to the standards applicable to the disposal of products which require special handling (e.g., Radioactive, Toxic, Corrosive, Poisonous, etc.) and to the life-cycle data requirements of products covered by the Montreal Convention.
- . UN List. Although no standard applicable to disposal of hazardous items has yet been identified, some information is contained in a document known as "The UN List".
- . UN Recommendations on the Transport of Dangerous Goods ST/SG/AC.10/1 Rev 5 Chapter 2.
- . UN Publication Sales No E87 VIII.1 ISBN 92-1-13 9023-0.
- . Reference may also be made to NATO mechanisms which exist [STANAGS] or are under development [e.g., NAMSA SHARE] to assist in formulating disposal methodology.
- . US DoD MIL-STD-1388 contains some data elements which carry information appropriate to the US Disposals Process but this standard is currently being reviewed.

Standard	TBD
[]	
Profile	
[]	

5.5 -- Quality Management

Although Quality Management is in no way specific to CALS, quality assessments may well be based on data acquired through CALS tools and the appropriate standards are therefore relevant.

Standard	ISO 8402	Quality -- Vocabulary
[R]		

Standard	ISO 9000	Quality Management and Quality Assurance Standards -- Guidelines for Selection and Use.
[R]		

Standard	ISO 9001	Quality Systems -- Model for Quality Assurance in Design, Development, Production, Installation, and Servicing.
[R]		

Standard [T]	AQAP 1	NATO Requirements for an Industrial Quality Control Program
Standard [T]	AQAP 13	NATO Software Quality Control System Requirements

Note: Quality Standards for NATO CALS applications have not yet been verified.

6. -- Data Formats and Delivery Standards

6.1 -- Contract Data Requirements List

Specific data requirements, formats, and delivery modes will have to be specified for each project on one or more Contract Data Requirements Lists (CDRLs).

6.2 -- Classified Data

Classified data will be safeguarded in accordance with the NATO Regulations appropriate to each Project. [C-M (55)15(FINAL)]

6.3 -- Data Encryption

When data needs to be safeguarded.

6.4 -- Digital Signatures

Digital signatures may be specified in accordance with.

6.5 -- Digital Data Delivery

Data will be acquired in digital form unless specific operational reasons dictate otherwise.

- . Product (Equipment) Data should be developed and presented in digital form regardless of the intended use of such data throughout the product or equipment life-cycle.
- . Data with a relatively short life (e.g., Agenda, Minutes, schedules, spreadsheets, plans, progress reports) may be specified according to project management requirements:
 - . According to the standards contained in this Section.
 - . According to administrative standards used in the project (for example, HQ NATO has adopted WordPerfect for word-processing and Microsoft Excel for Spreadsheets). They are not CALS Standards but their specification may satisfy the management requirement.
 - . Mutually Agreeable Commercial Software agreed by all participants in a Project.

In general it should be noted that, in principle, CALS products should be software and hardware independent. Any departure from this principle must take into account the eventual use of the data so acquired and management should consider not only Project Office requirements but also the needs of the users during the whole of the life-cycle, so far as these may be ascertained.

6.6 -- Electronic Data Interchange (EDI)

Data Exchange should be specified by electronic means unless operational requirements have determined that such means are inappropriate or not cost-effective.

Standard [R]	ISO 7372	UN/ECE TDED Vol 1	EDIFACT Data Element Directory
Standard [R]	ISO 9735	1988 Amdt 1:1992	Electronic Data Interchange for Finance, Administration, Commerce and Transport (EDIFACT) Syntax Rules
Standard [T]	ANSI X.12	Version 3 Release 3 Sub-release 2 (June 1993)	
Profile [E]	FIPS 161-1		US Federal Information Processing Standard (EDIFACT) (Transaction Set 841?)
Standard [T]	STANAG 5500		NATO Message Text Formatting System
Profile [T]	ADatP-3		Allied Data Publication 3 -- NATO Message Text Formatting System Part 1 -- Rules & Procedures

Note: *AECMA have an EDIFACT compliant version of Specification 2000M under development and this is expected to become definitive in late 1995. Whereas X.12 is the current Requirement of US CALS DoD, it should also be noted that MIL-HDBK-59B and MIL-STD-974 (CITIS) explicitly reference FIPS 161-1. EDIFACT for CALS applications and ANSI are currently pursuing a migration path to EDIFACT. UN/ECE EDIFACT is expected to be adopted as the NATO standard in the near future.*

7. -- Information Management

7.1 -- Electronic Data Interchange Agreement

An Electronic Data Interchange Agreement records the understanding between tow or more parties in a joint project or acquisition program as to the type and level of services to be provided for the transfer of data.

Standard [E]	AECMA 2000M	Revision 2.1	Material Management Integrated Data Processing for Military Equipment -- Volume 4 Appendix 2 Annex G -- Example of an Interchange Agreement
Profile [E]	UK DEF STAN 0060 Part 20	Interim Issue 1	Application of Integrated Logistic Support (ILS) -- Electronic Data Interchange Agreement for Data Exchange specified in AECMA SPEC 2000M

Notes: See Note to Sect 3.2.

AECMA 2000M Chapter 4 contains an outline Data Interchange Agreement.

AC/313 is actively engaged in developing a NATO Data Interchange Agreement and this has been used as the basis for Section 8 of this Handbook.

7.2 -- Data Dictionary

The NATO CALS Office is compiling a standard data dictionary to support logistics information processing. Whilst there is no definitive standard for a data dictionary, a number of supporting standards exist:

Standard [R]	ISO 639	3rd Edition 1991	Information Processing -- Representations of the names of Languages
Standard [R]	ISO 8601	1988	Information Processing -- Date/Time Representations
Standard [R]	ISO 4217	1987	Information Processing -- Currencies and Funds
Standard [R]	ISO 3166	1988	Information Processing -- Country Name Representations

Standard [R]	ISO 10421		Information Processing -- Preparation and Layout of International Terminology Standards
Standard [R]	ISO 11179		Information Technology -- Basic Data Element Attributes

Note: The International Standards Community, as a joint ISO, UN/ECE, and ISO/IEC activity, is currently engaged in the development of a Basic Semantic Repository (BSR). The BSR is a tool to aid in the rationalization and alignment of existing data dictionaries in line with international standards and to enable future alignment of internal data and external communication requirements. The NATO CALS Office intends to adopt the BSR principles as an aid to the development of a NATO Data Dictionary. The Characters in ISO 8859 shall be used for the representation of the Data Elements in the NATO Data Dictionary.

7.3 -- Integrated Product Database

The use of a single coherent set of CALS standards, the acquisition of data in digital form, and the exchange of data electronically does not, in itself, fully exploit the advantages of CALS. To obtain added value, all project data should be stored on a single database organized in such a way that all authorized users can have optimum access. Such a database, which may be physically distributed between several locations, should permit data to be created once and used many times. The creation of the Integrated Product Data Base should use the standards defined above under Data Dictionary.

7.4 -- Database Query Language

SQL is based on a relational database model. It is used to define data in relational databases within a data dictionary component of SQL and to manipulate data.

Standard [E]	ISO 9075	3rd Edition 1992	Database Language -- Structured Query Language (SQL) [SQL2]
Standard [E]	ISO 10032	DIS	Data Management Reference Model
Standard [E]	ISO/IEC 9579 -1 And-2	1993	Information Processing -- Remote Data Access (RDA) Pt 1 Generic Model, Service and Protocol Pt 2 SQL Specialization

7.4.1 -- SQL Conformance Testing

Formal SQL conformance testing is available through the US National Institute of Standards and Technology (NIST) which instituted a test service in 1990. Version 4.0 of the NIST SQL test suite, which is designed to test the required features of the new planned US Federal Information Processing Standard (FIPS) PUB 127-2 based on SQL Version 2 is expected in the near future. NIST publishes a quarterly list of FIPS-validated processors, but requiring compliance with the NEST conformance test procedure may well limit choice to US products. The Policy and applicable standards for NATO have not yet been confirmed or validated in the NATO CALS context.

7.5 -- Contractor Integrated Technical Information Service (CITIS)

CITIS is intended to be an efficient, contractually implementable means for providing Purchasers with on-line access to, and exchange of, Contractor-generated and maintained data specified in a Contract Data Requirements List (CDRL).

Standard [T]	MIL-STD-974	20 Aug 93	Contractor Integrated Technical Information Service (CITIS)
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The initial US concept described in MIL-STD-974 specified requirements within a US legal framework. Such a framework does not necessarily exist outside the US. Intellectual Property Rights and other legal issues may inhibit the implementation of a CITIS approach within NATO unless clear contractual agreements can be reached within each project, and therefore it has not yet been possible to determine the NATO Policy towards CITIS or to define a standards for its implementation.

7.6 -- Automated Interchange of Information

MIL-STD-1840 defines the procedures for handling several forms of document transmittal and for the transmittal of product data that does not consist of documents. However, it prescribes that the primary and only required form is that of SGML encoded text with graphics in separate (linked) files.

Standard [T]	MIL-STD-1840	Revision B 3 Nov 93	Automated Interchange of Technical Information
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Note: *The Policy and applicable standards for Automated Interchange of Information for NATO, and the status of the above Standard has not yet been confirmed or validated in the NATO CALS context. Although there are legacy systems based on this US DoD Military Standards in use within NATO, it should be noted that this Standard may not reflect NATO CALS requirements.*

7.7 -- Technical Data Packages

Standard [T]	MIL-T-31000	Revision A 1 Dec 92	General Specification for Technical Data Packages
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Note: The Policy and applicable standards for Technical Data Packages for NATO, and the status of the above Standard has not yet been confirmed or validated in the NATO CALS context. It should be noted that the above US DoD Military Standard may not yet reflect NATO CALS requirements.

7.8 -- Database Manager

To facilitate such database development a database manager with a clear understanding of CALS principles should be appointed for each project.

8. -- Communications Infrastructure

Whilst CALS Standards should ideally be specified independently of hardware, software, and communications infrastructure, nevertheless a number of CALS applications are dependent on communications/infrastructure standards. However, such standards are necessarily not CALS-specific and do not fall within the area of responsibility of the NATO CALS Management Board.

9. -- Status of Document

9.1 -- Disclaimer

This document is issued by the NATO CALS Office as a **Working Draft Only** and it has not been endorsed by the NATO CALS Management Board at its date of issue. Nevertheless the information contained in the draft is believed to reflect NATO CALS Policy and the CALS-related standards applicable at the date of issue.

9.2 -- Feedback

Comments or Observations on layout, content, or future distribution would be welcomed by the NATO CALS Office. Further details may be obtained from the Director, CALS Policy (Mr. Charles W. Schaffer ext 4750) or the Director, CALS Implementation (Wg Cdr Brian W. Price ext. 4653).