



ISO/IEC JTC1/SC7
Software Engineering
Secretariat: CANADA (SCC)

ISO/IEC JTC1/SC7 N2380

2000-10-24

Doc. Type Letter Ballot (60 Days)

Title Letter Ballot (60 Days) on the Framework ISO/IEC Software Engineering Standards - 2000/D6.1.

Source JTC1/SC7 BPG Convener

Project

Status Letter Ballot (60 days)

References N2379

Action ID FYI

Due Date 2000-12-24

Mailing Date 2000-10-24

Distribution SC7_AG

Medium Adobe Acrobat

No. Of Pages 17

Note



ISO/IEC JTC1/SC7
Software Engineering
Secretariat: CANADA (SCC)

LETTER BALLOT

Document SC7 N2380

Title: Letter Ballot (60 Days) on the Framework ISO/IEC Software Engineering Standards - 2000/D6.1.

“P” National Body must return this letter ballot to the JTC 1/SC 7 Secretariat no later than **2000-12-24**.

* We approve document N2380 as presented

OR

* We approve document N2380 with the attached comments

OR

* We disapprove document N2380 for the attached technical reasons

OR

* We abstain from voting (P-members have an obligation to vote)

National Body: _____

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**Framework for
ISO/IEC System and
Software Engineering
Standards
Draft 6.1, 21 July 2000**

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First Edition

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Framework for ISO/IEC System and Software Engineering Standards - 2000

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Foreword

The focus of this framework is to organize the collection of ISO/IEC systems and software engineering standards, be they published, under development or contemplated. By organizing and modeling the collection, it becomes possible to:

- Understand their relationship
- Visualize gaps and overlaps

The material contained in this document is drawn from a variety of sources. Notable ones include:

- The 1997 Strategic Planning workshop of SC7
- James W. Moore, *Software Engineering Standards: A User's Road Map*, IEEE Computer Society Press, Los Alamitos, CA, 1997.

History:

- Draft 3: Prepared by FC and JM as a baseline for BPG consideration, 3 December 1999.
- Draft 4: Typographical improvements made by JM, 28 December 1999.
- Draft 5: Resolves comments on ODP from ballot of Draft 4, 30 June 2000.
- Draft 6: Resolves remaining comments from ballot of Draft 4.

1 Scope

1.1 Purpose

This document describes the relationships among the existing ISO/IEC systems and software engineering standards as well as those to be completed within the next few years. The document also provides a useful planning tool for the future standardization as part of the business-driven review processes within ISO/IEC JTC1/SC7.

1.2 Field of application

This document is intended for two primary audiences:

- Developers of SC7 standards who wish to understand how proposed efforts might relate to existing standards;
- Users of SC7 standards who desire a better understanding of the overall collection.

2 References

The following normative documents contain provisions which, through reference in this text constitute provisions of this plan. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this plan are encouraged to investigate the possibility of applying the most recent editions of the normative documents listed below. Members of IEC and ISO maintain registers of currently valid international Standards.

{Eventually, an SC7 vocabulary document will be cited here.}

3 Overview of SC7

3.1 SC7 Terms of References

Standardization of processes, supporting tools and supporting technologies for the engineering of software products and systems.

Note: These processes, tools and technologies are within the scope of the JTC1 Terms of Reference and exclude specific tools and technologies that have been assigned by JTC1 to other of its SC's.

4 SC7 standards framework

The purpose of this framework is to provide a scheme to organise and relate SC7 documents for planning, delivery, coordination and presentation purposes. All types of SC7 documents are considered, including standards, technical reports, and work-in-progress.

A frameworks consists of one or more modeling views. Many views are possible, each with their own strengths and weaknesses.

Three modeling views will be used in this document:

- Functional classification
- Process road map
- Product road map

4.1 Functional classification

The functional classification view is a derivation from the SC7 terms of reference, using a process model as illustrated below:

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Several categories of SC7 can be identified in this diagram:

- Process: processes which occur during the life cycle of software products and systems
- Product: characteristics of products
- Tools and Methods: specific tools and methods which may be applied during the performance of a process
- Technologies: technologies (notably, evaluation technologies) that may be usefully applied in the performance of a process
- Human and Material Resources: resources that are used or consumed by the execution of a process
- Data (including requirements data, product data, and engineering data): specification of data and documentation

The categories are sometimes divided into sub-categories for the convenience of the reader. The sub-categories are not systematically derived; they are merely useful groupings at a particular point in time and may change over time.

In addition, standards can be classified by their normative nature. The normative nature of the standards can be described in five categories:

- Vocabulary: documents providing vocabulary for the collection
- Reference models: documents providing organizing information for the collection
- Principle standards: key umbrella standards providing principles that are detailed by element standards
- Element standards: standards with detailed conformance requirements
- Guides and supplements: documents providing guidance on how principle or element standards may be applied in specific situation.

The results of the combination of these two modeling view is a composite framework illustrated by the following figure. Individual standards or Technical Reports or parts thereof may be categorized by insertion into one of the illustrated cells of the framework:

Vocabulary						
Reference Models						
	Process	Product	Tools	Technologies	Resources	Data
Principle standards						
Element standards						
Guides and supplements						

In clause 5, current and projected documents of SC7 have been categorized using the functional view.

4.2 Process Road Map

This view is organized around a decomposition of the processes that are within the scope of SC7 terms of references. The organization is that of ISO/IEC 12207. It will ultimately be updated to incorporate the organization of the planned IS 15288.

4.3 Product Road Map

This view is organized around a hierarchical analysis of product characteristics that are within the scope of SC7 terms of reference.

5 Functional Framework

This clause categorizes the current and projected documents of SC7 using the functional framework view.

The top two layers may be depicted as shown below. Planned or incomplete items are shown in italics.

Vocabulary	12182 <i>Planned SWG2 Vocabulary</i>
Reference Models	<i>Planned SWG3 Process Repository</i> 10746 <i>15414</i>

5.1 Vocabulary

- TR 12182:1998, Categorization of Software
- *Planned SWG2, Vocabulary*

5.2 Reference Models

- *Planned SWG3, Process Repository*
- IS 10746, ODP Reference Model
- *CD 15414, ODP Enterprise Language*

5.3 Process

	Software Processes	System Processes
Principles	12207/AMD1 (Outcomes)	15288 (Outcomes)
Element Standards	12207 14764 TR TR 15939 14598- 15910 15846 16326 3/4/5	15288 <i>Planned SE Process</i>
Guides	TR ISO TR 9294 15271 9000-3	<i>Planned 15288 Guide</i>

- *Planned replacement for IS 9000-3:1997, Guidelines for the application of ISO 9001 to the development, supply, installation and maintenance of computer software*
- TR 9294:1990, Guidelines for the management of software documentation
- IS 12207:1995, Software life cycle processes
- *PDAM 12207/AMD1, (Adds process outcomes to 12207)*
- *FDIS 14598-3, Software product evaluation--Part 3: Process for developers*
- *FDIS 14598-4, Software product evaluation--Part 4: Process for acquirers*
- IS 14598-5:1998, Software product evaluation--Part 5: Process for evaluators
- *FDIS 14764, Software maintenance*
- TR 15271:1998, Guide for ISO/IEC 12207
- *CD 15288, System life cycle processes*
- TR 15846:1998, Software life cycle processes--Configuration management for software
- *FDIS 15910, Software user documentation process*
- *CD 15939, Software measurement process*
- *DTR 16326, Software engineering--Project management*
- *Planned Standard: Systems Engineering Process*
- *Planned Guide to 15288*

Notes:

Parts 1, 2 and 6 of 14598 are in another portion of the framework. Parts 3, 4, and 5 are included here because they define a process.

5.4 Product

	Product Quality Model	Product Characteristics	Software Packages	Product Documentation	Functional Size
Principles	9126-1				14143-1
Element Stds	TR 9126-2/3/4	15026	12119	9127	PAS-IFPUG PAS-MkII 14143-2
Guides				18019	TR 14143-3/4/5

- *FDIS 9126-1*, Software product quality--Part 1: Quality model (Replaces IS 9126:1991)
- *PDTR 9126-2*, Software product quality--Part 2: External metrics
- *PDTR 9126-3*, Software product quality--Part 3: Internal metrics
- *PNWI 9126-4*, Software product quality--Part 4: Quality in use metrics
- IS 9127:1988 (r94), User documentation and cover information for consumer software packages
- IS 12119:1994, Software packages--Quality requirements and testing
- IS 14143-1:1998, Software measurement--Functional size measurement--Part 1: Definition of concepts
- *FCD 14143-2*, Software measurement--Functional size measurement--Part 2: Conformity evaluation
- *PDTR 14143-3*, Software measurement--Functional size measurement--Part 3: Verification
- *PDTR 14143-4*, Software measurement--Functional size measurement--Part 4: Reference model
- *PDTR 14143-5*, Software measurement--Functional size measurement--Part 5: Functional domains
- IS 15026:1998, System and software integrity levels
- *NP 18019*, Guidelines for design and preparation of SW user documentation
- *PAS-IFPUG*, anticipated PAS submission from IFPUG
- *PAS-MkII*, anticipated PAS submission of UKSMA MkII

5.5 Tools and Methods

	CASE Tools	Tool Requirements	Prototyping	SEE	Spec of Distributed Systems
Principles					14771 14752 14753
Element Stds	14102 TR 14471	18018		15940	14769
Guides			TR 14759		

- IS 14102:1995, Guideline for the evaluation and selection of CASE tools
- TR 14471:1999, Guideline for the adoption of CASE tools
- IS 14752, ODP protocol support for computational interactions
- IS 14753, ODP interface references and binding
- *DTR 14759*, Software life cycle tailored for mockup and prototype
- IS 14769, ODP type repository function
- IS 14771, ODP naming framework
- *NP 15940*, Software engineering environment services
- *NP 18018*, Configuration management tool requirements

5.6 Technology

{In a comment on a prior draft, it was suggested that Evaluation should be broken into a separate category. There are possibly several choices here:

- Leave as is.
- Add a new category, Evaluation, which like Technology would point into the bottom of the process box on the first figure. Move the Process Evaluation standards and the Product Evaluation standards into that category.
- Add a new category, Evaluation and Measurement, which would point to the top of both Process and Product in the first figure. This category would include the Process Evaluation standards and the Product Evaluation standards. It would also include 15939. Other types of controlling processes could be added to this category as appropriate.}

	Process Evaluation		Product Evaluation	Related Technologies	System Architectural Elements
Principles	TR 15504-1	TR 15504-9	14598-1		14771 14752 14753
Element Stds	TR 15504-2	TR 15504-3	14598-2 14598-6 14756	Risk mgmt Dependability Functional safety	13235 14769 19500-2
Guides	TR 15504-5	TR 15504-4			
	TR 15504-7	TR 15504-8			

- IS 14598-1:1999, Software product evaluation--Part 1: General overview
- *FDIS 14598-2*, Software product evaluation--Part 2: Planning and management
- *CD 14598-6*, Software product evaluation--Part 6: Documentation of evaluation modules
- *FDIS 14756*, Measurement and rating of performance of computer-based software systems
- TR 15504-1:1998, Software process assessment--Part 1: Concept and introductory guide
- TR 15504-2:1998, Software process assessment--Part 2: A reference model for processes and process capability
- TR 15504-3:1998, Software process assessment--Part 3: Performing an assessment
- TR 15504-4:1998, Software process assessment--Part 4: Guide to performing assessments
- TR 15504-5:1998, Software process assessment--Part 5: An assessment model and indicator guidance
- TR 15504-7:1998, Software process assessment--Part 7: Guide for use in process assessment
- TR 15504-8:1998, Software process assessment--Part 8: Guide for use in determining supplier capability
- TR 15504-9:1998, Software process assessment--Part 9: Vocabulary

ODP Standards

- IS 13235-1:19??, ODP-Trading Function-Part 1: Specification
- IS 13235-3:19??, ODP-Trading Function-Part 3: Provision of trading function using OSI directory
- *DIS 14769*, ODP-Type repository function
- *DIS 19500-2*, ODP-GIOP/IIOP-Part 2:

Related technologies:

Risk Management

- Ongoing work of ISO TMB on risk management vocabulary
- Results of Risk Management study group

Dependability

- IEC 60300-3-6, Software aspects of dependability
- IEC 60300-3-9, Risk analysis of technological systems

Functional Safety

- IEC 61508, Functional safety--Safety-related systems

Notes:

- Parts 3, 4, and 5 of 14598 are placed in the process category because they provide process requirements.
- Part 6 of 15504, concerning assessor qualifications, is categorized with human and material resources.

5.7 Human and Material Resources

	Practitioner Qualifications	Auditor Qualifications
Principles		
Element Stds		
Guides	<i>Guide to SWEBOK</i>	TR 15504-6

- TR 15504-6:1998, Software process assessment--Part 6: Guide to qualification of assessors
- Planned fast-track approval of the Guide to the Software Engineering Body of Knowledge

5.8 Data

This section of the framework deals with means for the specification of data and documentation.

	Electronic Interchange	Documentation	Notations	
Principles	15474-1			
Element Stds	15474-2/3/4	6592	5806	11411
	15475-x		5807	14568
	15476-x,		8631	15437
	15477-x		8790	15909
	15478-x,		PAS-UML	
	15479-x		14750	
Guides		15289		

- IS 5806:1984, Specification of single-hit decision tables
- IS 5807:1985, Documentation symbols and conventions ...
- IS 6592:1985, Guidelines for the documentation of computer-based application systems
- IS 8631:1989, Program constructs and conventions for their representation
- IS 8790:1987, Computer system configuration diagram symbols and conventions
- IS 11411:1995, Representation for human communications of state transition of software
- IS 14568:1997, DXL: Diagram exchange language for tree-structured charts
- IS 14750, ODP Interface Definition Language
- *WD 15289*, Guidelines for the content of software life cycle process information products
- *DIS 15437*, Enhancements to LOTOS
- *15474-1*, Software engineering data definition and interchange--Part 1: Overview
- *15474-2/3/4*, Software engineering data definition and interchange--Framework (Parts 2, 3 and 4)
- *15475-x*, Software engineering data definition and interchange--Transfer format (Multiple parts)
- *15476-x*, Software engineering data definition and interchange--Integrated meta-model (Multiple parts)
- *15477-x*, Software engineering data definition and interchange--Presentation meta-model (Multiple parts)
- *15478-x*, Software engineering data definition and interchange--PCTE schema definition sets (Multiple parts)
- *15479-x*, Software engineering data definition and interchange--IRDS content modules (Multiple parts)
- *FDIS 15909*, High-level Petri net
- *PAS UML, anticipated PAS submission of Unified Modeling Language*

6 PROCESS ROADMAP VIEW

This view is organized around a decomposition of the processes that are within the scope of SC7 terms of references. The organization is that of ISO/IEC 12207. It will ultimately be updated to incorporate the organization of the planned IS 15288.

The drawing conventions for road map charts are:

- More general standards are at the top end of a line
- More specific standards are at the bottom end
- Lines indicate nature of relationship
- Solid: normative relationship
- Dotted: guidance
- Dashed: one standard meets the intent of the other or assists in implementing it
- Numbers in italics indicate drafts.

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7 PRODUCT ROADMAP VIEW

This view is organized around a hierarchical analysis of product characteristics that are within the scope of SC7 terms of reference.

The drawing conventions for road map charts are:

- More general standards are at the top end of a line
- More specific standards are at the bottom end
- Lines indicate nature of relationship
- Solid: normative relationship
- Dotted: guidance
- Dashed: one standard meets the intent of the other or assists in implementing it
- Numbers in italics indicate drafts.

{TBD: One possibility is to begin with a top-level subdivision into Technical, Quality and Packaging characteristics. The Technical characteristics would be represented by 15026; the Quality characteristics by 9126-1; and the Packaging characteristics by 9127 and 12119. Other standards would be related to the characteristics described in these standards.}