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Software and Systems Engineering
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Vision of Liaison Outcomes

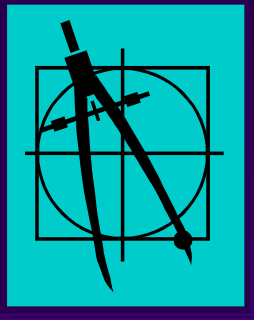
IEEE CS and

ISO/IEC JTC1/SC7



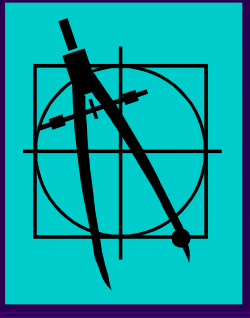
SC7 Secretariat
February 2005

Draft 2, prepared by Jim Moore



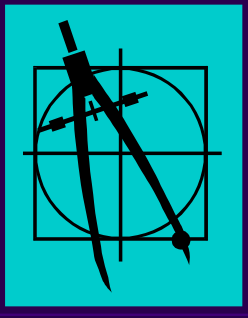
Change History

- ◆ 07N2803: Letter ballot approval of Version 1
- ◆ 2004-05, Resolution 760: Changes approved
- ◆ 2005-04, Version 2005 drafted by JWM for consideration by BPG



Purpose of this Document

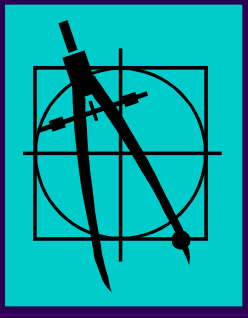
- ◆ This document presents a vision of possible outcomes from liaison between the IEEE Computer Society and ISO/IEC JTC1/SC7.
- ◆ Implementing steps toward achieving these outcomes are decided individually at appropriate times by mutual agreement between the organizations.



In the past, IEEE had adopted several SC7 standards

- ◆ IS 12207, Software Life Cycle Processes (IEEE/EIA 12207.0)
 - ◆ Supplemented with guides to data and process implementation
- ◆ IS 12119, Software Packages--Quality and Testing (IEEE 1465)
- ◆ IS 14102, Guidelines for Evaluation and Selection of CASE Tools (IEEE 1462)
- ◆ IS 14143-1, Functional Size Measurement Concepts (IEEE 14143.1)

These standards were all adopted with minor changes to normative content.
The procedures in use virtually guaranteed capricious differences.



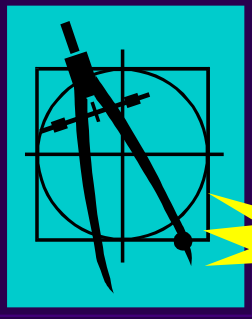
IEEE now has two Adoption Projects Underway

Updated

- ◆ IS 15288, System Life Cycle Processes
 - ◆ Approved – awaiting publication
- ◆ IS 90003, Guidelines for the application of ISO 9001:2000 to computer software
 - ◆ In progress

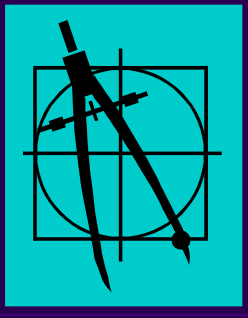
S2ESC now attempts to adopt with minimum possible change:

- Non-normative front matter describing adoption
- Non-normative annex describing relationship to IEEE standards
 - (If necessary) Normative annex listing errata



IEEE CS standards cover some areas with no SC7 standard

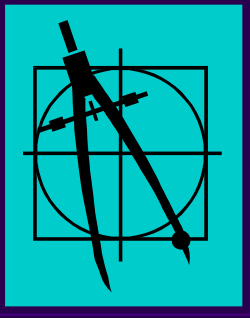
- ◆ Terminology
 - ◆ 610.12: Glossary ✓
 - ◆ Reuse:
 - ◆ 1420.1, 1420.1a, 1420.1b: Libraries
 - ◆ 1571: Processes ✓
 - ◆ Systems engineering
 - ◆ 1362: Concept of Operations
 - ◆ 1233: Requirements Specification
 - ◆ 1220: Systems Engineering Process ✓
 - ◆ 1228: Safety Plans
 - ◆ Software acquisition
 - ◆ 1062
 - ◆ Software architecture description
 - ◆ 1471 ✓
 - ◆ Software testing
 - ◆ 829: Test Documentation
 - ◆ 1008: Unit Testing
 - ◆ Internet best practices
 - ◆ 2001: Web Page Engineering ✓
 - ◆ Body of Knowledge
 - ◆ SWEBOK Guide ✓
 - ◆ Certification ✓
- ✓ Some kind of coordination underway



History of Liaison Relationship

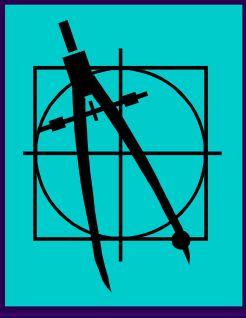
- Sep 1999** Chairman of SC7 sends letter of invitation to IEEE Computer Society, inviting Category A Liaison.
- Sep 2000** JTC1 approves Category A liaison.
- Nov 2000** IEEE CS Standards Activity Board (SAB) delegates responsibility for liaison to its Software Engineering Standards Committee (SESC).
- Feb 2001** SESC adopts the liaison policy and procedure and appoints Jim Moore as liaison representative. The procedure requires preparation of a liaison strategy.
- Dec 2001** IEEE Standards Association staff reviews liaison strategy.
- Feb 2002** IEEE CS approves Liaison strategy.
- Mar 2003** "Vision of Outcomes" and coordination procedures approved by SC7.
- May 2003** Several coordinated projects initiated.
- June 2004** Revised "Vision of Outcomes" approved.
- Apr 2005** 2005 Vision revision drafted by JWM





Principles of Coordination

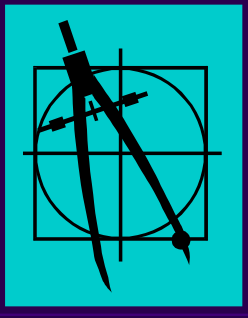
- ◆ *The collections of SC7 and SESC should be consistent and complementary--harmonized.* Users should be able to select and apply standards from both collections without contradiction.
- ◆ Both organizations should *respect the consensus* achieved by the other organization and *avoid creating multiple variants of the documents.*
- ◆ Whenever possible, coordination of a standard should commence by one organization adopting a standard of the other organization, so that *coordination begins with a shared baseline.*
- ◆ Maintenance / revision of adopted documents should be accomplished through a *coordinated process so both organizations have the same standard.*



Subject Areas of Cooperation

- ◆ General terminology and concepts
- ◆ Quality management
- ◆ Systems engineering
- ◆ Product quality
- ◆ Life cycle processes
 - ◆ Life cycle process framework
 - ◆ Maintenance process
 - ◆ Measurement process
 - ◆ Risk management process
 - ◆ Other processes
 - ◆ Process assessment
 - ◆ Process construction
- ◆ Safety
- ◆ Documentation: Life Cycle Data
- ◆ Documentation: User Documentation
- ◆ Functional size measurement
- ◆ CASE tools
- ◆ Notations
- ◆ Software Engineering Body of Knowledge (SWEBOK)
- ◆ Internet best practices
- ◆ Other

The following charts provide a baseline framework for harmonization. It is understood that we move toward harmonization through a series of individually agreed steps at a pace comfortable to both parties.



Possible cooperation: General terminology and concepts

SC7 Resources

- ◆ SC7 vocabulary database
- ◆ TR 12182, Categorization of SW
- ◆ TR 14759, Mockup and prototype

IEEE CS Resources

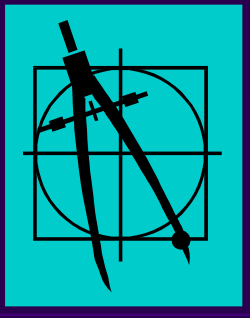
- ◆ 610.12, Glossary of SW engineering

Appropriate Actions for SC7

- ◆ SC7 has taken responsibility for Software and Systems Engineering vocabulary

Appropriate Actions for SESC

- ◆ IEEE has contributed 610.12 as a base document.
- ◆ IEEE liaises with SC7 vocabulary effort.
- ◆ IEEE adopts result of SC7 effort.
- ◆ IEEE extends results to SWEBOK and Certification programs.



Updated

Possible cooperation: Quality management

SC7 Resources

- ◆ IS 90003, Guide for application of ISO 9001 to software

IEEE CS Resources

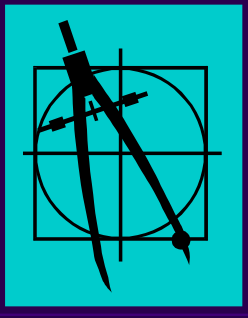
- ◆ 730, Quality assurance plans

Appropriate Actions for SC7

- ◆ SC7 is developing similar guidance for systems

Appropriate Actions for SESC

- ◆ IEEE is adopting 90003.
- ◆ IEEE will add an informative annex providing cross-references to IEEE standards.



Updated

Possible cooperation: Systems engineering

SC7 Resources

- ◆ IS 15288, System life cycle processes
- ◆ TR 19760, Guide to 15288
- ◆ WG7 Harmonization Group

IEEE CS Resources

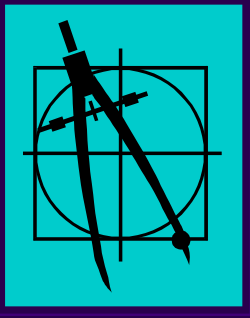
- ◆ 1220, Systems engineering process
- ◆ 1062, Software acquisition
- ◆ 1233, System requirements specification
- ◆ 1362, Concept of operations
- ◆ 1471, Architecture description

Appropriate Actions for SC7

- ◆ SC7 adopts revised 1220 via fast-track.
- ◆ WG7 creates coordinated revision requirements for 15288, 1220 and others.
- ◆ Joint revision of 1220.
- ◆ SC7 adopts 1471 via fast-track followed by joint revision.

Appropriate Actions for S2ESC

- ◆ IEEE has adopted 15288.
- ◆ IEEE has submitted 1471 for pre-FT comment.
- ◆ IEEE has completed first phase revision of 1220.
- ◆ IEEE submits revised 1220 for fast-track.
- ◆ IEEE revises other standards to be consistent.



Updated

Possible cooperation: Product quality

SC7 Resources

- ◆ IS 9126-1, Quality model
- ◆ Many more documents elaborating IS 9126-1
- ◆ IS 12119, Software packages (under revision)

IEEE CS Resources

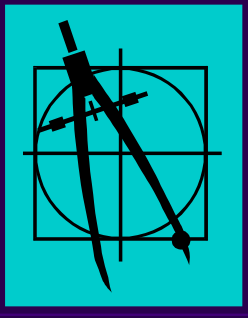
- ◆ IEEE has adopted the quality model of IS 9126-1 as a policy.
- ◆ IEEE 1465 (adoption of IS 12119)

Appropriate Actions for SC7

- ◆ WG6 considers IEEE comments on IS 12119.

Appropriate Actions for S2ESC

- ◆ IEEE provides comments on revision of IS 12119.
- ◆ IEEE adopts revised IS 12119.



Updated

Possible cooperation: Life cycle process framework

SC7 Resources

- ◆ IS 12207, SW life cycle processes
- ◆ 12207/Amd, purpose and objectives
 - ◆ (The reuse process objectives of IEEE 1517 have already been coordinated with 12207 amendments.)
- ◆ TR 15271, Guide to 12207

Appropriate Actions for SC7

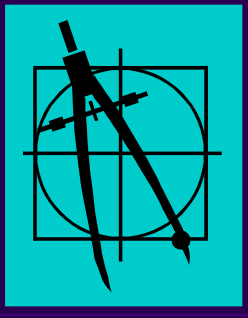
- ◆ SC7 incorporates IEEE 1517 into a future revision of IS 12207 or related documents.

IEEE CS Resources

- ◆ 12207.0, adoption of IS 12207
- ◆ 12207.1, Guide to data and 12207.2, Guide to process implementation
- ◆ 1517, Software reuse processes
- ◆ IEEE uses 12207 (with plug-ins) as process reference framework

Appropriate Actions for S2ESC

- ◆ IEEE has contributed 1517 for study by SWG5.
- ◆ Participate in WG7 harmonization program.



Updated

Possible cooperation: Maintenance process

SC7 Resources

- ◆ IS 14764, SW maintenance
 - ◆ Conforms to 12207 Maintenance process

IEEE CS Resources

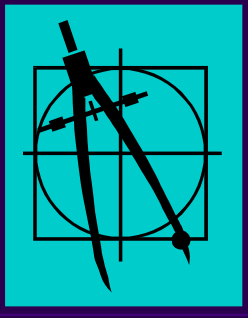
- ◆ IEEE 1219, SW Maintenance
 - ◆ Contains helpful practices that don't appear in IS 14764.

Appropriate Actions for SC7

- ◆ Project underway to merge the two standards into a new ISO/IEC/IEEE 14764.

Appropriate Actions for S2ESC

- ◆ Project underway to merge the two standards into a new ISO/IEC/IEEE 14764.



Updated

Possible cooperation: Measurement process

SC7 Resources

- ◆ IS 15939, Software measurement process

IEEE CS Resources

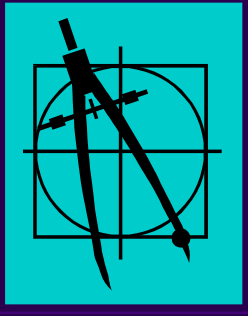
- ◆ IEEE 982 (2 parts), Measures for reliable software
- ◆ IEEE 1061, Quality metrics methodology
- ◆ IEEE has adopted 15939 framework as a policy for all measurement standards.

Appropriate Actions for SC7

- ◆ Perform “coordinated revision” of 15939.

Appropriate Actions for S2ESC

- ◆ Participate in “coordinated revision” of 15939 and adopt result.



Updated

Possible cooperation: Risk management process

SC7 Resources

- ◆ IS 16085 is fast-track adoption of IEEE 1540.

IEEE CS Resources

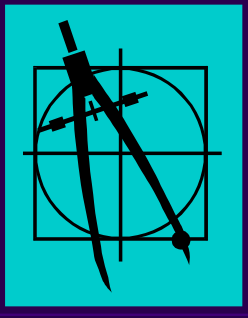
- ◆ IEEE 16085 (néé 1540), Risk management process
 - ◆ (Uses ISO TMB risk management vocabulary from draft ISO Guide 73.)

Appropriate Actions for SC7

- ◆ “Coordinated revision” of ISO/IEC/IEEE 16085 is underway.
- ◆ WG7 has requested extending scope to system level.
- ◆ Complete coordinated revision.

Appropriate Actions for S2ESC

- ◆ “Coordinated revision” of ISO/IEC/IEEE 16085 is underway.
- ◆ IEEE is has agreed to extension of scope to system level.
- ◆ Complete coordinated revision.



Updated

Possible cooperation: Supporting processes

SC7 Resources

- ◆ TR 15846, Configuration management
- ◆ TR 16326, Project management

IEEE CS Resources

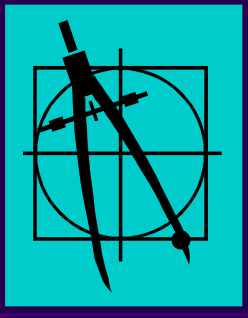
- ◆ IEEE 828, SW CM plans
- ◆ IEEE 1012, SW V&V
- ◆ IEEE 1058, SW project management plan
- ◆ IEEE 1490, Project management BOK

Appropriate Actions for SC7

- ◆ WG7 Study Group has recommended withdrawing TR 15846 and referring to IEEE 828.
- ◆ SC7 is considering project to merge IEEE 1058 and TR 16326.

Appropriate Actions for S2ESC

- ◆ IEEE is considering project to merge IEEE 1058 and TR 16326.



Possible cooperation: Process assessment

SC7 Resources

- ◆ TR 15504 (9 parts), Software process assessment
- ◆ Draft IS 15504 (5 parts), Process assessment

IEEE CS Resources

- ◆ None

Also Note

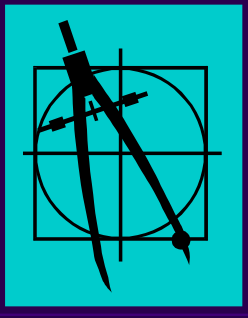
- ◆ SW-CMM is a de facto standard
- ◆ CMMI may become a de facto standard
 - ◆ (CMMI claims consistency with TR 15504.)

Appropriate Actions for SC7

- ◆ None

Appropriate Actions for S2ESC

- ◆ None



Updated

Possible cooperation: Process construction

SC7 Resources

- ◆ None

IEEE CS Resources

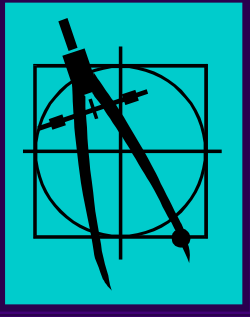
- ◆ IEEE 1074, Developing SW life cycle processes
- ◆ IEEE is improving the “fit” of IEEE 1074 with 12207.

Appropriate Actions for SC7

- ◆ SC7 could study the possibility of coordinated adoption of 1074.

Appropriate Actions for S2ESC

- ◆ IEEE would be willing to consider coordinated adoption of 1074.



Updated

Possible cooperation: Safety

SC7 Resources

- ◆ IS 15026, System and software integrity levels
- ◆ Study group under to consider how assurance requirements map into system and software life cycles.

IEEE CS Resources

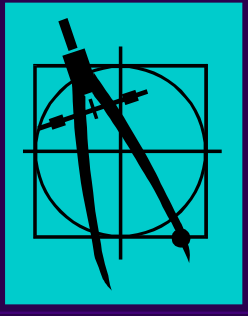
- ◆ IEEE 1228, SW safety planning

Appropriate Actions for SC7

- ◆ SC7 could accept IEEE's offer to draft 15026.

Appropriate Actions for S2ESC

- ◆ IEEE has offered to draft the revision of 15026.
- ◆ IEEE plans to broaden 1228 to deal with 15026, IEC 61508 and others.



Updated

Possible cooperation: Documentation-LC Data

SC7 Resources

- ◆ CD 15289, Guide for application of 12207 to documentation process

Also Note

- ◆ SC7/WG2 documents are not fully harmonized with SC7/WG7 documents

IEEE CS Resources

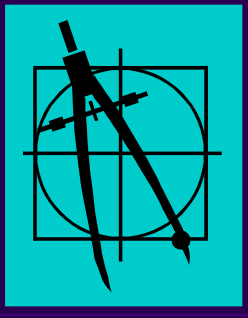
- ◆ IEEE 12207.1, Guide to life cycle data

Appropriate Actions for SC7

- ◆ Study group decided to extend 15289 to system scope and to revise it.
- ◆ Complete revision of 15289.

Appropriate Actions for S2ESC

- ◆ IEEE has provided 12207.1 to the SC7 project editor.
- ◆ IEEE will consider adoption of 15289 when completed.



Updated

Possible cooperation: User Documentation

SC7 Resources

- ◆ IS 18019, Guide for design and preparation of user documentation
- ◆ SC7 study group is underway

Also Note

- ◆ SC7/WG2 documents are not fully harmonized with SC7/WG7 documents

Appropriate Actions for SC7

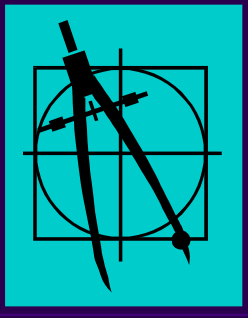
- ◆ SC7 and S2ESC perform coordinated revision of IS 18019/IEEE 1063.

IEEE CS Resources

- ◆ IEEE 1063, SW user documentation

Appropriate Actions for S2ESC

- ◆ SC7 and S2ESC perform coordinated revision of IS 18019/IEEE 1063.



Updated

Possible cooperation: Functional size measurement

SC7 Resources

- ◆ IS 14143-1, Functional size measurement
- ◆ 4 documents elaborating 14143-1
- ◆ 3 documents for particular methods
- ◆ Corrigendum to 14143-1 is being developed

IEEE CS Resources

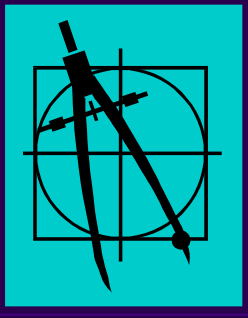
- ◆ IEEE 14143.1 (Adoption of 14143-1)
 - ◆ IEEE recently reaffirmed its adoption.
- ◆ IEEE 1045, SW productivity metrics

Appropriate Actions for SC7

- ◆ Incorporate IEEE “exceptions” into corrigendum of 14143-1

Appropriate Actions for S2ESC

- ◆ IEEE revises 1045 to make appropriate reference to 14143.1 and to other SC7 resources.
- ◆ IEEE considers adoption of corrected 14143-1.



Updated

Possible cooperation: CASE tools

SC7 Resources

- ◆ IS 14102, Evaluation and selection of CASE tools
- ◆ TR 14471, Adoption of CASE tools
- ◆ WG2 is developing 15940, SEE Reference Model

IEEE CS Resources

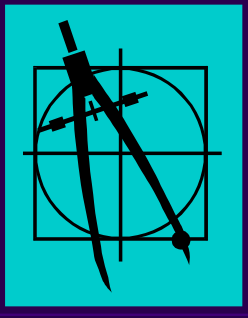
- ◆ IEEE 1462 (Adoption of IS 14102)
- ◆ IEEE 1348, Adoption of CASE tools

Appropriate Actions for SC7

- ◆ SC7 has authorized revision of 14102 and 14471.

Appropriate Actions for S2ESC

- ◆ IEEE adopts results of SC7 revisions of 14102 and 14471.
- ◆ IEEE offers comments on 15940.



Possible cooperation: Notations

SC7 Resources

- ◆ DIS 19501-1, UML
- ◆ Others

IEEE CS Resources

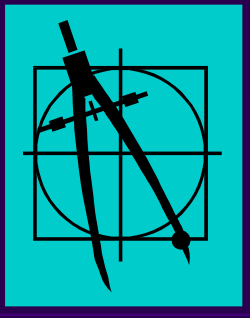
- ◆ 1320.1 and 1320.2, IDEF

Appropriate Actions for SC7

- ◆ None

Appropriate Actions for S2ESC

- ◆ IEEE adopts 19501-1 or S2ESC adopts a policy encouraging use of 19501-1 as a normative reference.



Updated

Possible cooperation: Body of Knowledge

SC7 Resources

- ◆ Working Group on SWEBOK

IEEE CS Resources

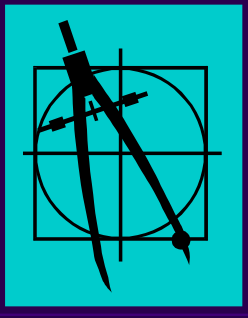
- ◆ 2004 version of SWEBOK Guide is available
- ◆ Certified Software Development Professional (CSDP)

Appropriate Actions for SC7

- ◆ Consider results of Certification Study Group.

Appropriate Actions for SWEBOK

- ◆ 2004 version of SWEBOK has been provided to ISO CS for publication as TR 19759.



Updated

Possible cooperation: Internet best practices

SC7 Resources

- ◆ SC7 requested fast-track
- ◆ Fast-track ballot now underway in JTC1

IEEE CS Resources

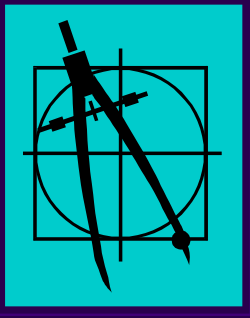
- ◆ IEEE 2001, Web page engineering

Appropriate Actions for SC7

- ◆ Perform future revision and maintenance via “coordinated adoption.”

Appropriate Actions for S2ESC

- ◆ Perform future revision and maintenance via “coordinated adoption.”



Possible cooperation: Other standards

SC7 Resources

- ◆ 17 OSI and ODP documents
- ◆ Dozens of SEDDI documents

IEEE CS Resources

- ◆ IEEE 829, Test documentation
- ◆ IEEE 830, SW requirements
- ◆ IEEE 1008, Unit testing
- ◆ IEEE 1016, SW design description
- ◆ IEEE 1028, SW reviews
- ◆ IEEE 1044, Classification of anomalies
- ◆ IEEE 1420.x, SW reuse libraries

Appropriate Actions for SC7

- ◆ None

Appropriate Actions for S2ESC

- ◆ As the IEEE standards are revised, improve consistency with selected SC7 standards (e.g. 12207, 9126-1, etc.).