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*IEEE Computer Society
Plan for Liaison to
ISO/IEC JTC1/SC7*



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Purpose of this Presentation

- ◆ This presentation describes the results desired by the IEEE Computer Society as a result of its Category A Liaison with ISO/IEC JTC1/SC7.
- ◆ This presentation is an IEEE offer toward formulating a set of *mutually desired* goals.

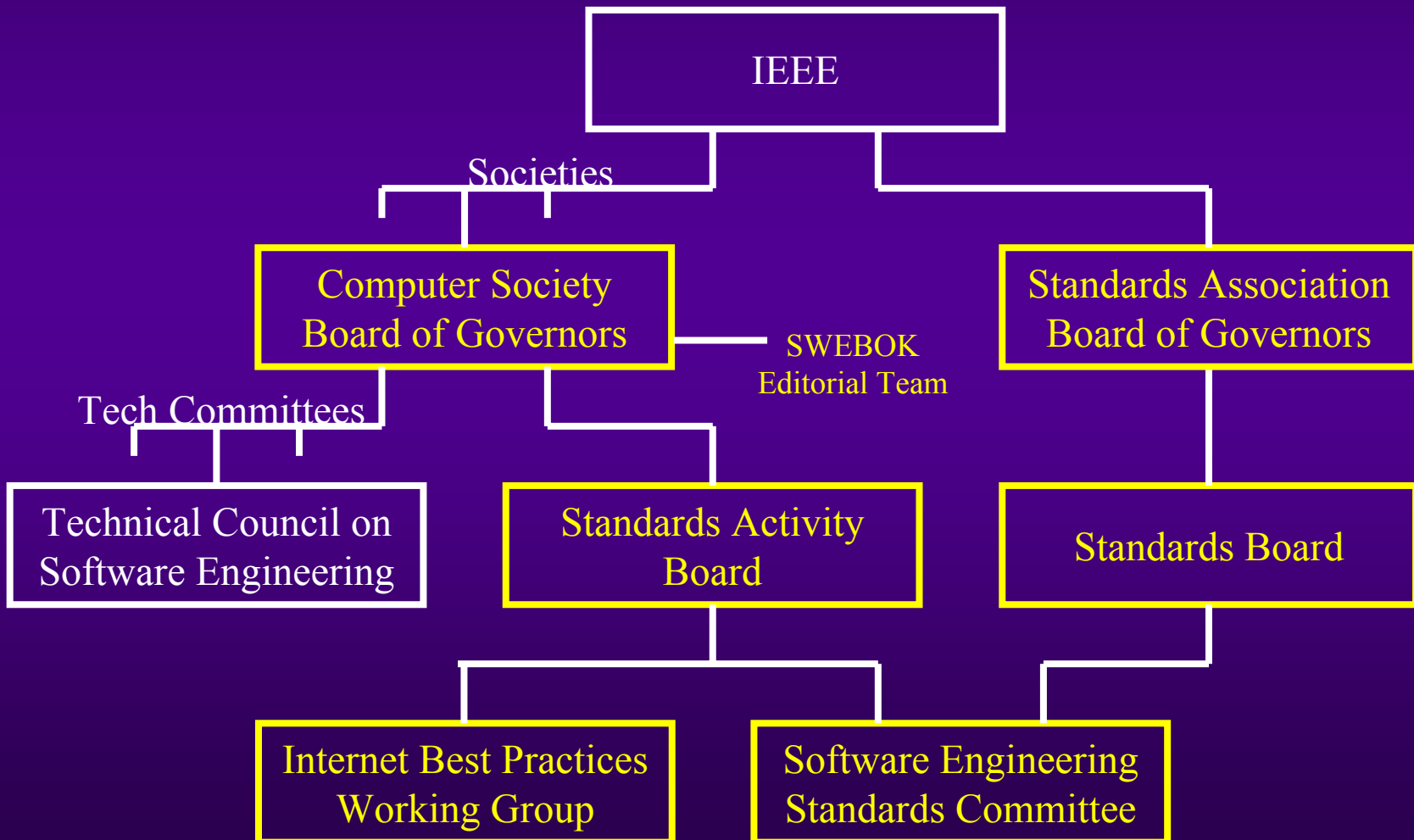


Institute of Electrical and Electronics Engineers

- ◆ **IEEE** is the world's largest organization of technical professionals--about 350,000 individuals.
- ◆ It publishes 1/4 of the world's technical literature in its areas of interest.
- ◆ It has a collection of about 50 standards for software and systems engineering.
- ◆ With about 100,000 members, the **IEEE Computer Society** is the largest of the 36 Technical Societies of the IEEE.
- ◆ IEEE CS originates all of the Information Technology standards approved by the IEEE.
- ◆ All IEEE standards are initiated, approved and published by the **IEEE Standards Association**.



Responsible Parties in IEEE



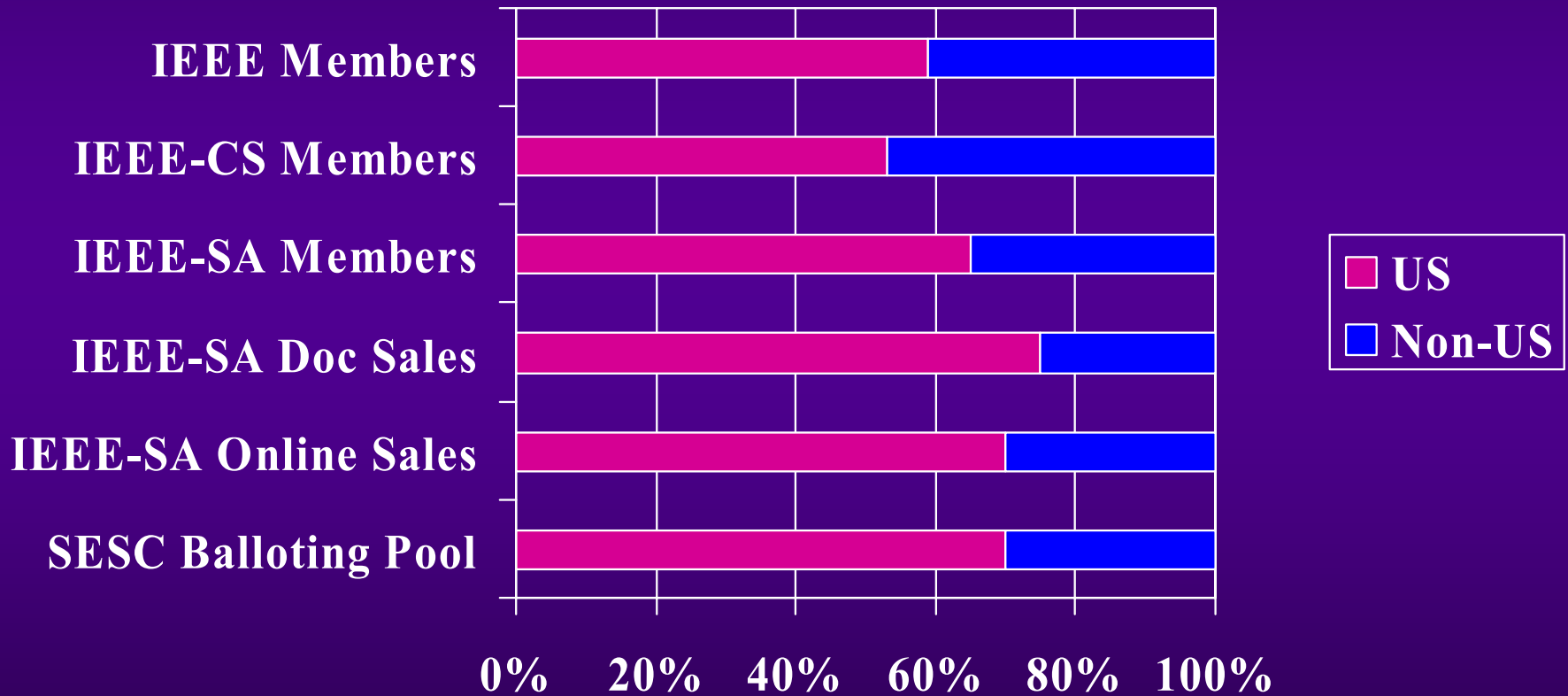


IEEE and the Computer Society are International in Scope

- ◆ IEEE has members in 150 countries.
- ◆ 47% of Computer Society members have non-US addresses in about 125 countries. Non-US membership is growing more rapidly. By the end of this year, non-US may be the majority.
- ◆ IEEE standards are used in many countries, e.g. Australia, India, European Space Agency.
- ◆ Many SC7 experts contribute to SESC standards.



IEEE has an International Membership





IEEE Standards

- ◆ All IEEE standards are initiated, approved and published by the IEEE Standards Association.
- ◆ IEEE standards are created by forming a consensus of individual technical professionals. *(In a few cases, organizational balloting is used.)*
- ◆ IEEE-SA has a long history of international coordination on the content of important standards, e.g.:
 - ◆ ISO/IEC 9945 standards (POSIX) are identical with IEEE 1003 standards.
 - ◆ ISO/IEC 8802-3 standards (LAN/MAN) are identical with IEEE 802.3 standards.

INTERNATIONAL STANDARD	ISO/IEC 8802-3 IEEE Std 802.3
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IEEE CS Software Engineering Standards Committee (SESC)

- ◆ Purpose [from SESC Charter]:
 - ◆ Codify the norms of professional software engineering practices into standards.
 - ◆ Promote use of software engineering standards among clients, practitioners, and educators.
 - ◆ *Harmonize national and international software engineering standards development.*
- ◆ Scope [from SESC Fundamental Policy 2]:
 - ◆ Standardization of processes, products, resources, notations, methods, nomenclatures, and techniques for the engineering of software and systems dependent on software.



IEEE has already 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 without changes to normative content.



IEEE CS standards cover some areas with no SC7 standard

- ◆ Terminology
 - ◆ 610.12: Glossary
- ◆ Reuse:
 - ◆ 1420.1, 1420.1a, 1420.1b: Libraries
 - ◆ 1571: Processes
- ◆ Risk management
 - ◆ 1540: Software Risk Management Process
- ◆ 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
- ◆ SWEBOK



History of Liaison Relationship

- Sep 12, 1999** Chairman of SC7 sends letter of invitation to IEEE Computer Society, inviting Category A Liaison.
- Dec 31, 1999** President of Computer Society sends favorable reply.
- Apr 22, 2000** SC7 approves Category A Liaison status.
- Sep 29, 2000** JTC1 concurs.
- Various** SC7 appoints Study Groups with responsibilities related to the liaison.
- Nov 7, 2000** IEEE CS Standards Activity Board (SAB) delegates responsibility for liaison to its Software Engineering Standards Committee (SESC). Jim Moore was tasked to develop reporting procedure.
- Feb 20, 2001** SAB concurs with SESC liaison policy and procedure drafted by Moore.
- Feb 21, 2001** SESC adopts the liaison policy and procedure and appoints Jim Moore to execute the liaison relationship. The procedure requires preparation of a liaison strategy.
- Various** In consultation with participants of IEEE-CS and SC7, Moore drafts liaison strategy.
- Dec 4, 2001** IEEE Standards Association staff reviews liaison strategy.
- Feb 2, 2002** SESC adopts liaison strategy.
- Feb 5, 2002** SAB approves liaison strategy.



IEEE CS has formulated some Principles of Liaison

- ◆ ***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.
- ◆ ***SC7 standards should be at a higher level of abstraction than SESC standards.*** SC7 standards would describe principles; SESC standards would provide more detailed treatments of selected subjects.
- ◆ Both organizations should ***respect the consensus*** achieved by the other organization and ***avoid creating multiple variants of the documents.***
- ◆ ISO adoption implies loss of IEEE intellectual property rights. ISO adoption deprives the professionals who developed the standard of control of its evolution. Generally, only adoption as a full standard is an appropriate exchange for this loss.
- ◆ Maintenance / revision of adopted documents should be accomplished through a ***coordinated process so both organizations have the same standard.***



A Proposal for “Coordinated Adoption” of Documents

- ◆ Initial Adoption by SC7 of an IEEE standard:
 - ◆ IEEE offers standard for JTC1 fast-track.
 - ◆ Comments collected on fast-track ballot form a basis for immediate revision.
- ◆ Thereafter, **“Coordinated Adoption”** for maintenance and revision:
 - ◆ SC7 initiates revision project; IEEE provides WG chair or project editor.
 - ◆ IEEE initiates a revision project with same person as “official reporter.”
 - ◆ SC7 CD/FCD balloting is synchronized with IEEE balloting. Comment resolution deals with comments from both sources.
 - ◆ Either IEEE or SC7 may add its own informative annexes.
 - ◆ Neither party approves standard until both reach consensus.

Goal: No “variants” of the standard. Both IEEE and SC7 adopt and maintain identical normative content.



Possible 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
 - ◆ Supporting processes
 - ◆ Process assessment
 - ◆ Process construction
- ◆ Safety
- ◆ Documentation
- ◆ Functional size measurement
- ◆ CASE tools
- ◆ Notations
- ◆ Software Engineering Body of Knowledge (SWEBOK)
- ◆ Internet best practices
- ◆ Other



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

Proposed Actions for SC7

- ◆ SC7 takes responsibility for Software and Systems Engineering vocabulary

Proposed Actions for SESC

- ◆ IEEE contributes 610.12 as a base document.
- ◆ IEEE liaises with SC7 vocabulary effort.
- ◆ IEEE adopts result of SC7 effort.
- ◆ IEEE plans to extend results to SWEBOK and Certification programs.



Possible cooperation: Quality management

SC7 Resources

- ◆ CD 9000-3, Guide for application of ISO 9001 to software

IEEE CS Resources

- ◆ 730, Quality assurance plans

Also

- ◆ Note that ASQ “owns” the ISO 9000 standards in the US

Proposed Actions for SC7

- ◆ WG18 continues development of 9000-3

Proposed Actions for SESC

- ◆ IEEE coordinates with ASQ to adopt IS 9000-3 when completed.
- ◆ IEEE adds an informative annex providing cross-references to IEEE standards.



Possible cooperation: Systems engineering

SC7 Resources

- ◆ FCD 15288, System life cycle processes
- ◆ PDTR 19760, Guide to 15288
- ◆ WG7 Study Group

IEEE CS Resources

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

Proposed Actions for SC7

- ◆ Fast-track current IEEE 1220.
- ◆ SC7 study group creates coordinated revision requirements for 15288, 1220 and others.
- ◆ Fast-track IEEE 1220 revised per requirements of study group.

Proposed Actions for SESC

- ◆ Liase with SG to create coordinated revision requirements for 15288, 1220 and others.
- ◆ IEEE (or joint WG) revises 1220 accordingly.
- ◆ SC7 and IEEE adopt identical 1220.
- ◆ IEEE adopts revised 15288.
- ◆ IEEE revises 1062, 1233, 1362, 1471 to be consistent.



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 1465 (adoption of IS 12119)

Proposed Actions for SC7

- ◆ None

Proposed Actions for SESC

- ◆ IEEE adopts IS 9126-1.
- ◆ IEEE adopts revised IS 12119.
- ◆ IEEE plans to revise its other standards to adopt terminology and concepts of 9126-1.



Possible cooperation: Life cycle process framework

SC7 Resources

- ◆ IS 12207, SW life cycle processes
- ◆ 12207/Amd.1, purpose and objectives
 - ◆ (The reuse process objectives of IEEE 1517 have already been coordinated with 12207/Amd.1.)
- ◆ TR 15271, Guide to 12207

IEEE CS Resources

- ◆ 12207.0, adoption of IS 12207
- ◆ 12207.1, Guide to data
- ◆ 12207.2, Guide to process implementation
- ◆ 1517, Software reuse processes

Proposed Actions for SC7

- ◆ SC7 incorporates IEEE 1517 into a future revision of IS 12207.
- ◆ Use “coordinated adoption” for revision of 12207.

Proposed Actions for SESC

- ◆ IEEE “adopts” 12207 amendment as its process reference framework.
- ◆ IEEE contributes 1517 for use in revision of 12207.
- ◆ Use “coordinated adoption” for revision of 12207.



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.

Proposed Actions for SC7

- ◆ Jointly develop a strategy to merge the two documents into a single one suitable for adoption by both SC7 and IEEE.
- ◆ Maintain via “coordinated adoption.”

Proposed Actions for SESC

- ◆ Jointly develop a strategy to merge the two documents into a single one suitable for adoption by both SC7 and IEEE.
- ◆ Maintain via “coordinated adoption.”



Possible cooperation: Measurement process

SC7 Resources

- ◆ FCD 15939, Software measurement process

IEEE CS Resources

- ◆ IEEE 982 (2 parts), Measures for reliable software
- ◆ IEEE 1061, Quality metrics methodology

Proposed Actions for SC7

- ◆ Perform future revision and maintenance of 15539 via “coordinated adoption.”

Proposed Actions for SESC

- ◆ IEEE adopts 15939.
- ◆ IEEE applies 15939 terminology, concepts and process to its other standards.
- ◆ Perform future revision and maintenance of 15539 via “coordinated adoption.”



Possible cooperation: Risk management process

SC7 Resources

- ◆ WG9 has requested fast-track of IEEE 1540.
- ◆ The process objectives of IEEE 1540 have already been coordinated with 12207/Amd.1.

IEEE CS Resources

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

Proposed Actions for SC7

- ◆ Fast-track 1540.
- ◆ Perform immediate revision via “coordinated adoption” process.
- ◆ Perform future revision and maintenance via “coordinated adoption.”

Proposed Actions for SESC

- ◆ Contribute 1540 for fast-track.
- ◆ Perform immediate revision via “coordinated adoption” process.
- ◆ Perform future revision and maintenance via “coordinated adoption.”



Possible cooperation: Supporting processes

SC7 Resources

- ◆ TR 12220, 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

Proposed Actions for SC7

- ◆ None

Proposed Actions for SESC

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



Possible cooperation: Process assessment

SC7 Resources

- ◆ TR 15504 (9 parts), Software process assessment
- ◆ CD 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.)

Proposed Actions for SC7

- ◆ None

Proposed Actions for SESC

- ◆ None



Possible cooperation: Process construction

SC7 Resources

- ◆ None

IEEE CS Resources

- ◆ IEEE 1074, Developing SW life cycle processes
- ◆ IEEE plans to broaden 1074 to deal with process provisions of 12207, 15288, 15504 and 9000-3.

Proposed Actions for SC7

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

Proposed Actions for SESC

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



Possible cooperation:

Safety

SC7 Resources

- ◆ IS 15026, System and software integrity levels

IEEE CS Resources

- ◆ IEEE 1228, SW safety planning
- ◆ IEEE plans to broaden 1228 to deal with 15026 and IEC 61508.

Proposed Actions for SC7

- ◆ SC7 could study the possibility of coordinated adoption of 1228.

Proposed Actions for SESC

- ◆ IEEE would be willing to consider coordinated adoption of 1228.



Possible cooperation: Documentation

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 1063, SW user documentation
- ◆ IEEE 12207.1, Guide to life cycle data

Proposed Actions for SC7

- ◆ IEEE and SC7 work jointly to develop a single documentation framework consistent with 12207.
- ◆ SC7 applies the framework uniformly across its collection.
- ◆ SC7 could study the possibility of coordinated adoption of 1063.

Proposed Actions for SESC

- ◆ IEEE contributes 12207.1.
- ◆ IEEE and SC7 work jointly to develop a single documentation framework consistent with 12207.
- ◆ IEEE applies the framework uniformly across its collection.
- ◆ IEEE would be willing to consider “coordinated adoption” of 1063.



Possible cooperation: Functional size measurement

SC7 Resources

- ◆ IS 14143-1, Functional size measurement
- ◆ 4 documents elaborating 14143-1
- ◆ 3 documents for particular methods

IEEE CS Resources

- ◆ IEEE 14143.1 (Adoption of 14143-1)
- ◆ IEEE 1045, SW productivity metrics

Proposed Actions for SC7

- ◆ None

Proposed Actions for SESC

- ◆ IEEE revises 1045 to make appropriate reference to 14143.1 and to other SC7 resources.



Possible cooperation: CASE tools

SC7 Resources

- ◆ IS 14102, Evaluation and selection of CASE tools
- ◆ TR 14471, Adoption of CASE tools

IEEE CS Resources

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

Proposed Actions for SC7

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

Proposed Actions for SESC

- ◆ IEEE adopts 14471 to replace IEEE 1348.
- ◆ Perform future revision and maintenance via “coordinated adoption.”



Possible cooperation: Notations

SC7 Resources

- ◆ DIS 19501-1, UML
- ◆ Others

IEEE CS Resources

- ◆ 1320.1 and 1320.2, IDEF

Proposed Actions for SC7

- ◆ None

Proposed Actions for SESC

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



Possible cooperation: ***SWEBOK***

SC7 Resources

- ◆ Study Group on SWEBOK

IEEE CS Resources

- ◆ Trial-use version of SWEBOK
- ◆ (Ca. 2003, final SWEBOK)

Proposed Actions for SC7

- ◆ SC7 uses accelerated process to adopt trial-use SWEBOK as TR3.
- ◆ Comments are provided to SWEBOK editorial team.
- ◆ SC7 uses accelerated process to adopt final SWEBOK, as is, as TR3.

Proposed Actions for SWEBOK

- ◆ IEEE provides trial use SWEBOK for adoption.
- ◆ SWEBOK editorial team resolves SC7 comments in final SWEBOK, ca 2003.
- ◆ IEEE provides final SWEBOK for adoption.



Possible cooperation: Internet best practices

SC7 Resources

- ◆ None

IEEE CS Resources

- ◆ IEEE 2001, Web page engineering

Also Note

- ◆ IEEE 2001 is not currently the responsibility of SESC, but SESC will take initiative for transfer.
- ◆ IEEE 2001 is currently being revised.

Proposed Actions for SC7

- ◆ Fast-track 2001.
- ◆ Perform future revision and maintenance via “coordinated adoption.”

Proposed Actions for SESC

- ◆ Obtain responsibility for IEEE 2001.
- ◆ Contribute 2001 for fast-track.
- ◆ 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

Proposed Actions for SC7

- ◆ None

Proposed Actions for SESC

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



Relevant SC7 resolutions and responses

- ◆ 578. ...establish a study group to investigate the need for a document or documents within the SC7 product plan dealing with the topic of risk management ...
- ◆ Study Group Report proposed fast-track of 1540. This plan offers the document.



Relevant SC7 resolutions and responses

- ◆ 607. ...extends its Systems Engineering Study Group and instructs it to negotiate with EIA and IEEE the contribution of pdf formatted versions of their relevant system engineering documents ...
- ◆ 646. ...extends its Systems Engineering Study Group and assigns it to WG7 ...
- ◆ This plan would implement the plans [for IEEE-CS documents] of the study group.



Relevant SC7 resolutions and responses

- ◆ 608. ...create an Ad-hoc Working Group on SWEBOK ... develop SC7 comments ... prepare NWI [for] TR type III ... plan with the IEEE-CS joint activities for potential accelerated processing ... and subsequent trialing and revision
- ◆ 638. ...issue Guide to SWEBOK for combined WD/PDTR reg/PDTR ballot ...
- ◆ 639. ... request from JTC1 that SWEBOK remains available free of charge [on] World Wide Web...
- ◆ This plan continues the implementation of the resolutions.



Relevant SC7 resolutions and responses

- ◆ 606. ...establish a Study Group to jointly investigate with IEEE-CS...
 - ◆ Internet Web site development practices
 - ◆ Re-use
 - ◆ Architecture Description and Modeling languages
 - ◆ Risk Management
 - ◆ Vocabulary
- ◆ 649 [extended 606]
- ◆ This plan offers contributions in all of these areas.



Conclusion

- ◆ IEEE Computer Society views the Category A liaison as an approach to harmonizing the two collections of standards.
- ◆ IEEE CS believes that:
 - ◆ We should mutually respect the consensus of both organizations.
 - ◆ We should select key standards for coordinated adoption so that both organizations have the same normative content.