

Adaptation of ISO/IEC Software Engineering Standards for Very Small Enterprises

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École de technologie supérieure –Engineering Programs

Over 4500 students, 125 professors, 25 general senior lecturers and 200 lecturers.

2200 paid industrial internships in over 900 companies in 2004.

Undergraduate Programs (7)

- Construction Engineering
- Production Engineering
- Electrical Engineering
- Mechanical Engineering
- Logistics and Operations Engineering

- Software Engineering
- IT Engineering



Over 700 students

Professors in the department have a mean industrial experience of more than 15 years.

Very Small Enterprises (VSE)

- VSEs are defined as having less than **25 employees**.
- Scope includes also **small project** or **department** within a larger organization.
- Example – Greater Montréal Area.

Number of employees	Number of Enterprises	Percentage	Number of Jobs
1 to 25	540	78%	5105
25 to 100	127	18%	6221
Over 100	26	4%	6056

Source: Laporte 2005.

VSEs and Standards

1. International standards were **not written for** and/or is **hard to apply** in small projects, small development organizations, or companies that have between 1 and 25 employees.
2. International Life Cycle Standard ISO/IEC 12207 and guide do not explicitly address the **needs of VSEs**.
3. **Compliance** with standards is difficult (if not impossible) for VSEs to achieve.
4. VSE's have no or very limited ways to **be recognized** as an enterprise that produces quality software systems in their domain.
 - VSEs are **cut off** from some economic activities.
5. **Implementation** of current standards requires a significant critical mass in terms of number of employees, cost and time.
6. VSEs cannot see a **net benefit** in establishing a software process as defined by current standards.



IEEE User's Survey Implementation Difficulties

- Benefits of implementation not clearly understood
- Not enough useful examples
- Cost
- Lack of templates, implementation checklists.
- Compliance determination



IEEE Users' Survey Requested Support Items

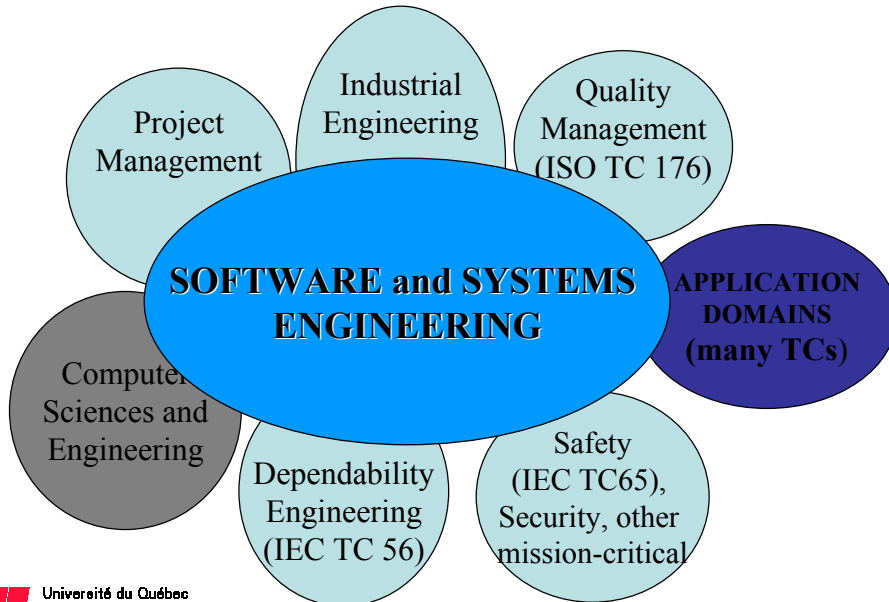
- User training course
- Examples of deliverables
- Deliverable templates
- CASE tool support for documentation generation
- On-line or phone support
- Software Engineering Standards newsletter
- Software Engineering Standards users group
- Educators resource/support



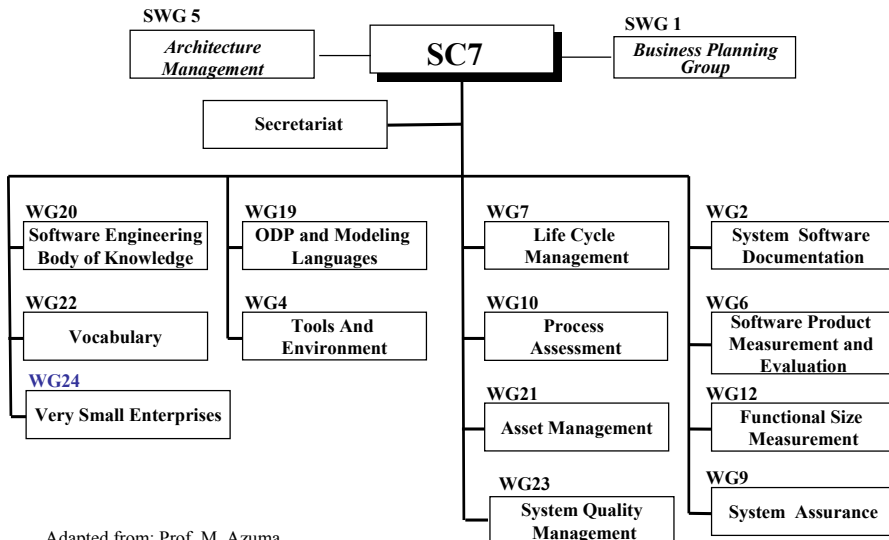
ISO/IEC JTC 1/SC7- Terms of Reference

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

SC7 - An Horizontal Committee

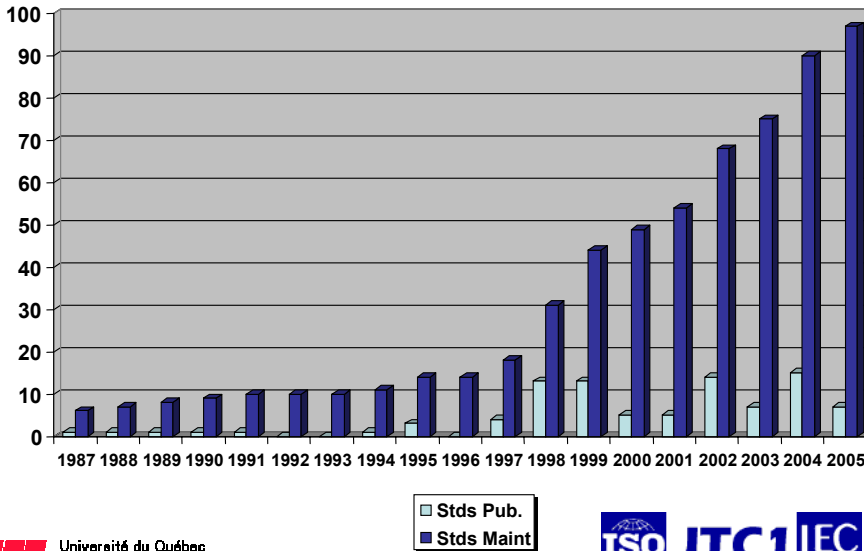


SC7 Structure

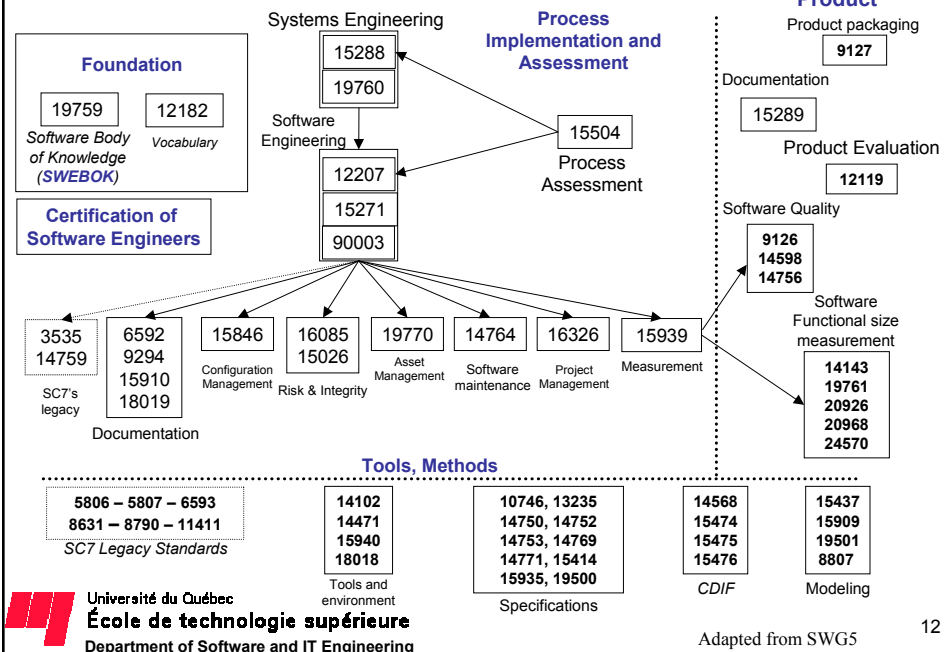


Adapted from: Prof. M. Azuma

Software Engineering Standards Produced and Maintained



Standards Collection



SC7 Meeting in Brisbane - 2004

- Canada raised the fact that small enterprises require standards adapted to their size and maturity,
- A meeting of interested parties was held with delegates from 5 national bodies (Australia, Canada, Czech Republic, South Africa, and Thailand),
- **Consensus:**
 - Make the current software engineering standards **more accessible** to VSEs;
 - Provide **turn key material** that require minimal tailoring and adaptation effort;
 - Provide **harmonized products** that integrate available standards:
 - Process standards
 - Work product and deliverables
 - Assessment and Quality.

SC7 Meeting in Brisbane - 2004

- **Consensus:**
 - Generate multiple **profiles** from elements of standards.
 - Align, if desirable, profiles with the notions of **maturity levels** presented in **ISO/IEC 15504**.
- **Establishment of a Special Interest Group to develop:**
 - A statement of requirements ;
 - The outline of key deliverables, and the associated process to create them (e.g. how to create profiles);
 - A Terms of Reference for the work group;
 - An example of a simple profile

First Special Working Group Meeting Thailand – March 2005

- Hosted by the Thailand Industrial Standard Institute (TISI) and the Thai Software Industry Promotion Agency (SIPA),
- **Representatives**
 - Australia, Belgium, Brazil, Canada, Czechoslovakia, Finland, South Africa, South Korea, USA and Thailand.
- **Outputs**
 - Project vision and strategy;
 - Draft New Work Item (ISO SC 7, Document N3288)
 - Project Schedule;
 - Product Plan;
 - Initial requirements document;



สำนักงานส่งเสริมอุตสาหกรรมซอฟต์แวร์แห่งชาติ (องค์การมหาชน)
Software Industry Promotion Agency (Public Organization)

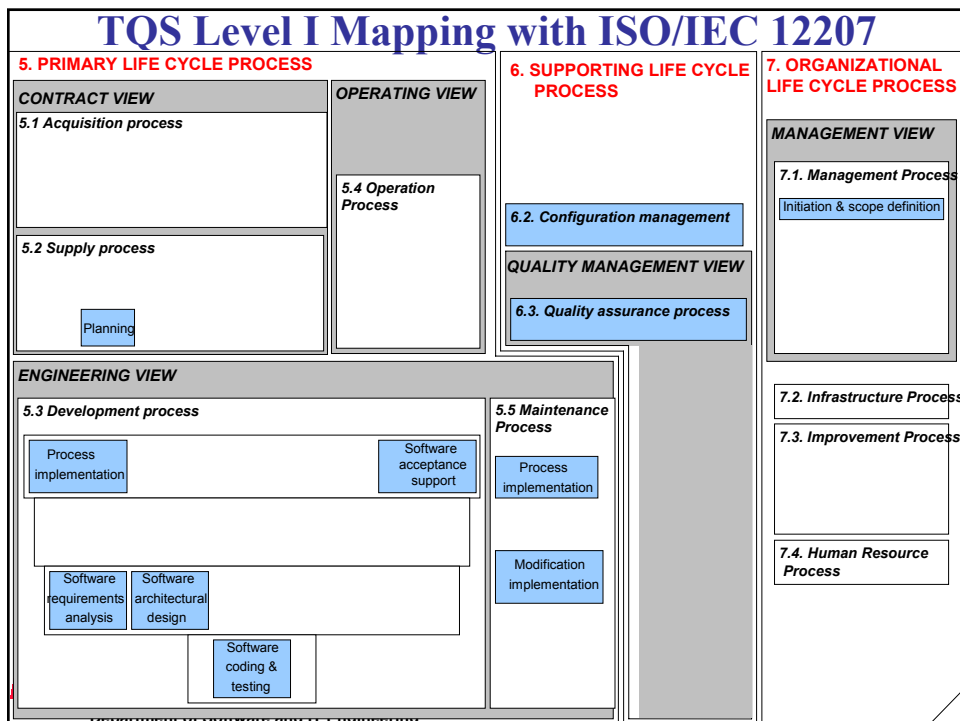
Examples of Issues and Proposed Solutions by Thailand about ISO/IEC 12207

- | | | |
|---|---|---|
| SMEs are <u>not ready</u> to implement the <u>whole</u> 12207 standard. | ⇒ | Standard should be <u>broken down</u> in to <u>stages</u> or levels in order to <u>fit all sizes</u> of SMEs. |
| <u>Not all 12207 activities</u> are suitable for SMEs' operations. | ⇒ | Need to <u>modify</u> activities to suit SMEs' operation – product and project based type of business. |
| There is no <u>assessment model</u> . | ⇒ | A set of <u>checklist</u> was developed for use by assessors. |
| Most software developers are <u>not document-oriented</u> . | ⇒ | Provide <u>packaged templates</u> and <u>examples</u> for rapid documenting |

Source: Thai Software Industry Promotion Agency

Thai Quality Software (TQS) Standard

- Introduced by the Association of Thai Software Industry (ATSI).
- Adapted from ISO/IEC 12207 Software Life Cycle Processes Standard to:
 - Instill discipline for software developers,
 - Guide in software engineering processes and assures quality software.
- Divided into 5 stages:
 - Software practices (ISO/IEC 12207)
 - Organizations are assessed for certification at each stage
- Currently (March 2005)
 - 43 software organizations have been certified TQS level 1, and 11 software organizations have been certified TQS level 2.



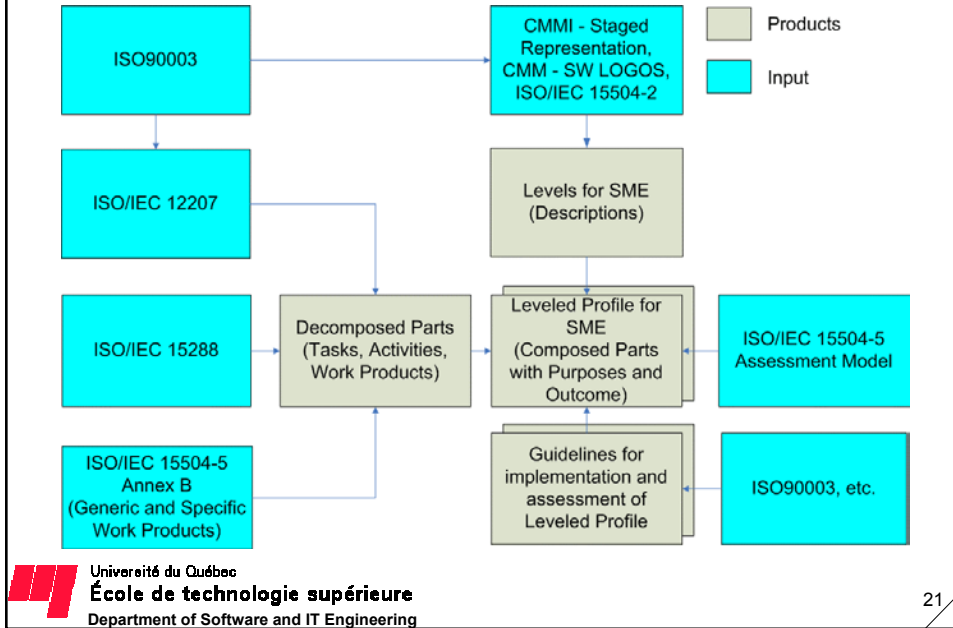
Target Market of a Future ISO/IEC Set of Technical Reports and Guides

- The collection should be based on the Software Engineering **needs of the majority** of the VSEs
 - Market driven.
- The collection should initially focus on **lower levels** of maturity
- The collection should be applicable to **small teams** or **projects**.
- The use of the collection should enable multiple VSEs to work together (**teaming** arrangements) or work with a **customer** (e.g. under contract).

Potential Benefits for VSEs

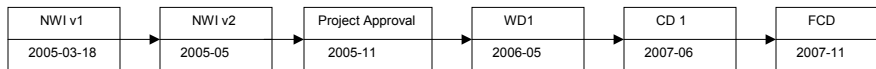
- The use of the documents should contribute to the reduction of risk
 - Business, cost, schedule and quality
- The use of the documents should facilitate alignment of the IT strategy to the business objectives.
- The documents should help understand and appreciate the value added (short and long term).
- The documents should offer guidance on quantifying the benefits of standards implementation.
 - The documents should include a measure of increased productivity and quality.

VSE Proposed Model

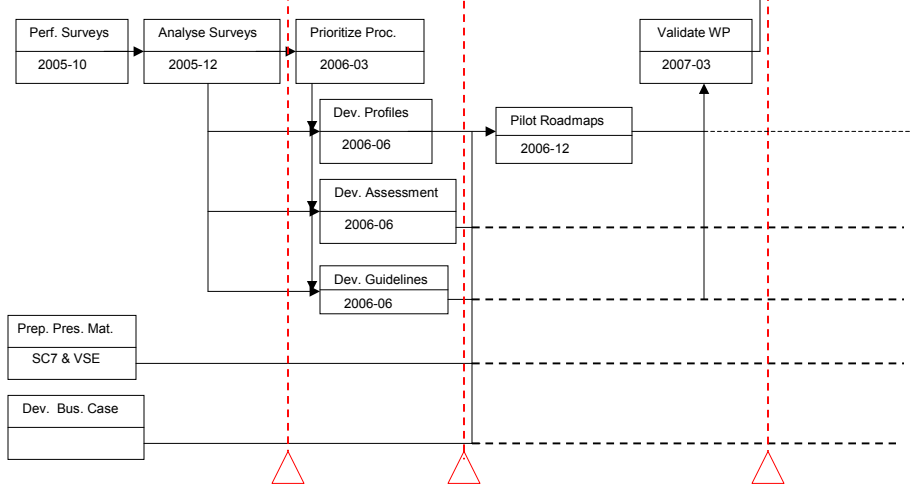


Estimated Schedule of Activities

ISO JTC1 Process



Shadow Process



SC7 Meeting in Finland – May 2005

- Proposal developed in Thailand was reviewed
 - **Recommendation:** To establish a new Working Group
- Resolution was approved to **ballot** the New Work Item Proposal
 - *Software Life Cycle Profiles and Guidelines for use in Very Small Enterprises (VSE)*
- Many countries **voted in favour** of the NWI Proposal
- Working Group 24
 - Mr. Tanin Uthayanaka (Thailand) was appointed Convener.
 - Mr. Jean Bérubé (Canada) was appointed Secretary.
 - Mr. Claude Y. Laporte (IEEE CS) was appointed Project Editor

Second Special Working Group Meeting Thailand – September 2005

- Hosted by the Thailand Industrial Standard Institute and the Thai Software Industry Promotion Agency
- **Representatives**
 - Australia, Belgium, Canada, Finland, Japan, Luxembourg, South Africa, USA and Thailand.
- **Outputs**
 - Proposition to use **International Standardised Profiles (ISPs)** as a framework to develop documents (e.g. guides)
 - Proposed **survey** on VSEs exposure and needs for software development lifecycles;
 - Proposed **business models** to help classify VSEs

First SC7 Working Group 24 Meeting Italy – October 2005

- **Countries committed to participate to Working Group 24**
 - Belgium, Canada, Czech Republic, Ireland, Italy, Japan, Korea, Luxemburg, South Africa, Thailand, UK, USA
- **Outputs**
 - New Work Item – comments received during balloting,
 - Project Requirements,
 - Business Models,
 - Custom on contract, Custom in-house, Commercial products, Mass-market software, Firmware.
 - Strategy to create profiles.
 - Users' Survey,
 - Strategic Plan,
 - Web site for **public** review of documents produced.
- **Next Step**
 - Perform Users' **Survey**.
- Next WG 24 Meeting - May 2006, Thailand.

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- **Working Group 24 Public site – (Under construction)**
 - **<http://www.jtc1-sc7.org/>**

Resources

- ISO/IEC TR 19559, Software Engineering Body of Knowledge (SWEBOK) (Free copy of TR)
 - http://isotc.iso.org/livelink/livelink/fetch/2000/2489/Ittf_Home/PubliclyAvailableStandards.htm
- National Computing Centre – Toward Software Excellence
 - <http://www.software-excellence.org/>

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