



Australian Computer Society

Computer Systems and Software Engineering Board

Report to ACS Council Nov 2006

by the

Computer Systems and Software Engineering Board Rev. 1.5

1. Introduction

This is my last Report as Director of this Board.. This is a position I have held since the Board was created by splitting the single Technical Board in 1992-3, at a time when I had held the Directorship of that Board since 1989. This report will cover our activities, achievements and our areas of deficiency since the last Report to Council in November 2004. The summary below covers the major points, which are expanded in appropriate detail in the body of the Report and these in turn are further expanded in the Appendices. Council is urged to take the time to read these, they are produced by dedicated volunteers working on its behalf, in the name of the ACS.

- a) **The Australian Software Engineering Conference-ASWEC (Item 2.3.1).** In 2006, the number of industry attendees exceeded those from academia and the research community! ASWEC is a major activity in which the Board represents ACS' interests. The conference has been held successfully in 2005 and 2006, and is being regarded as a high-level vehicle for publication of research results, and a major meeting place for the Software Engineering Community. The 2007 conference will be held in Melbourne, with Prof. Doug Grant as General Chair (see <http://aswec2005.itee.uq.edu.au/home.php>, <http://cgi.cse.unsw.edu.au/~aswec2006/> and <http://aswec07.cs.latrobe.edu.au/> respectively). Complete details are in Appendix I.Pt 1

The conference's Steering Committee (Item 2.3.2) is now well and truly established, with Assoc. Prof. Paul Strooper as the Chair. This is now reporting to ACS and IE Aust through the ACS-Engineers Australia Joint Board on Software Engineering. ASWEC 2005 was held in Queensland, and was very successful, turning a modest surplus, and ASWEC 2006, held in Sydney under the auspices of NICTA returned a large surplus. Some 140 people attended. There are still issues relating to ASWEC to be resolved.. The current Draft of the Charter is in Appendix I.Pt 2. Thanks are due to Prof. Paul Bailes, an ASWEC stalwart, and a source of counsel and support to the current Director, for serving as the Chair of the ASWEC SC until 2005.

- b) **ACS Australian Safety Critical Systems Association (Item 2.6)** (Previously the Safety Systems Club, and before that National Safety Critical Systems Committee) has re-named its self as the (See Attached

report Appendix IV and its website www.safety-club.org.au, hosted by ANU) is now a National organization with some 100+ members, running successful national conferences and initiating specialist training in this area. Their most recent News Letter and their report in detail is in Appendix IV

- c) **The Deputy Director Standards (Item 2.5)**, Dr. Tom McBride, has been appointed the Chair of Standards Australia Committee IT/15 and is representing that Committee at ISO. (ACS should support this activity). His complete report is in Appendix III. A plan for forward development of Standards Activity has been developed, and a request for support from ACS will be submitted to Council (See Appendix III)
- d) **Professor Tharam Dillon, the ACS IFIP Rep for TC 2 (Item 2.8)** is now the Chair of IFIP Working Group 2.12 / 12.4 on Web Semantics. See Appendix VI for very detailed Report)
- e) **The Software Quality Association (Item 2.7)** is continuing to function well (See Attached Report, Appendix V)
- f) **The Requirements Engineering National Technical Committee (Item 2.10)** has sponsored the 11th Australian Workshop on Requirements Engineering (AWRE 2006, see <http://awre2006.cis.unisa.edu.au/>) which will be held in Adelaide in early December 2006.
- g) **The Chair of the Applied language Technology Committee (Item 2.11)** has been involved with Coling/ACL2006, the joint conference of the International Committee on Computational Linguistics and the Association for Computational Linguistics. This major international event was held in Sydney, Australia, from 17th–21st July 2006, with tutorials on July 16, workshops on July 22-23, and co-located events on July 15-16 and July 22-23. <http://www.acl2006.mq.edu.au/>. On the advice of the Chair of the Applied Language Technology Committee, the Board provided a nominal sponsorship, as you can see from the website.
- h) **The two Consultative Councils (Items 2.12,2.13)** have been dormant for quite some time. The Software Engineering Research Consultative Council (SERCC) 's Chair, Prof Ross Jeffery, resigned earlier in 2006, and the Software Engineering Education Consultative Council (SEEC) 's Chair, John Leaney fell ill with Leukemia early 2005, and I have been reluctant to replace him. Recent developments in this area may provide an opportunity for this committee to be re-vitalised. (See Appendix VII for details of the Birds of a Feather meeting on Software Engineering Education at ASWEC 2006)

- i) **The Chair of the Software Architecture Committee (Item 2.9)** has moved to the US, and been replaced with Prof. Jun Han of Swinburne University of Technology
- j) **The Board met in late 2005 (Item 2.2)**, and has not succeeded in meeting in 2006. A Policy formulation meeting was held in May of 2005. See Appendix VIII
- k) **Successive Councils have tasked the Board (and its sister Boards) with the technology transfer (Item 2.4)**. This has been far harder than anyone could imagine, however, the aSCSa has developed syllabi for courses in Safety Critical Systems (SCS), and also has initiated an SCS course using a University of York unit, offered by ANU. As Board director, I have been unable to achieve an outcome for both ACS and aSCSa in which the latter's material has been formally adopted by the former, and I don't know why! This is discussed in the context of the Participating SIG developed in 1992, and presented to Council on several occasions. (See Appendix II
- l) **Future areas of Board development (Item 3)** are covered in Table II. These include Software Testing, Formal Methods, Embedded Systems and Ubiquitous Systems
- m) **In 2005, the Board met to develop policy (Item 2.2.1)** contributions for the then Presidents policy development initiatives. For one reason or another, these were never considered by Council. (See Appendix VIII)

2. Board Activities

2.1 Board Profile

The Board's current profile of groups and activities is shown in Table I, while Table II shows activities that are planned and imminent.

Table I-CS & SE Board Structure-Current Activities Nov 2006

Committee/ Activity	Chair	Activity¹	Constituency	Coverage
Board Secretary	Chris Avram			
Board Support	Tom Rose, Vic ACS			
Standards	Dr. Tom. McBride	K,PS	Academic/Industrial	National Committee
SQA	Tom Smilie	N,K,PS	Industrial	Several States
aSCSa	George Nikandros	N,K,PD, PS	Industrial	Several States
SPIN			Industrial/Academic	
SERCC	Vacant	N	Academic/Industrial	National Committee
SEEC	Vacant	N,PD	Academic/Industrial	National Committee
Requirements	Assoc. Prof. Didar Zhougi	N,K,PS	Academic	National Committee
Language Technology	Prof. Jon Patrick	N,K	Academic	National Committee
Software Architecture	Prof. Jun Han	N,K	Academic/Industrial	National Committee
ASWEC Steering Committee ²	Assoc. Prof. Paul Strooper	N,K,PD	Academic/Industrial	National Committee

¹ The following categories are used.. **N= networking and technical exchanges for the community concerned, K= Knowledge dissemination to ACS and wider profession and community, PD=Professional Development, incl. course initiation and delivery, PS=professional standards**

² Independent, but Chair is a member of the ACS Board

Table II-CS & SE Board Structure-Under Consideration

Committee/ Activity	Chair	Type of Activity	Constituency	Coverage
Software Testing	Dr. Kelvin Ross ((TBC))	N,K.PD, PS	Industrial/ Technical	National Committee
Formal Methods in SE	TBA	N,K	Industrial/ Academic	National Committee
Embedded Systems	TBA	N,K	Industrial/ Academic	National Committee
Ubiquitous Systems	TBA	N,K	Academic/ Industrial	National Committee

2.2. The Board Meetings

2.2.1 Policy Development Meeting, 2004 (See Appendix VIII)

A small group of Board members met at the Victorian Branch offices in May of 2004 to develop policy proposals for the then President. Nothing much came of this, even though the results were provided to ACS National. This was extremely disappointing, and somewhat de-motivating.

2.2.2 General Board Meeting.

A meeting was held in Sydney in 2005, attended by the majority of the Board. There has not been a Board meeting during 2006. This is in part due to the problem of obtaining local support for organizing meetings. This simply has not worked as well as it should. In addition, the Board Director has not been able to travel as readily as in the past.

2.3 The Australian Software Engineering Conference (ASWEC) (A Joint ACS-Engineers Australia Conference)

2.3.1 ASWEC 2005-2007 Refer Appendix I.Pt 1 for details of officials and more details in all cases

In 2005 the conference was held at the Carlton Crest Brisbane from 29th of March to the 1st of April.

The conference was a great success, both from a financial and attendance point of view. A major point was having David Parnas as keynote. Parnas was a keynote at the first ASWEC in 1986. See <http://aswec2005.itee.uq.edu.au/home.php>

NICTA sponsored the 2006 ASWEC (<http://cgi.cse.unsw.edu.au/~aswec2006/>), and the Australian Technology Park venue at Redfern was used to great effect. The conference was a great success, both from a financial and attendance point of view. The list of sponsors was extremely gratifying, with IBM, MICROSOFT, Defence

Materials Organisation, Object Consulting, Davies Collison Cave (IP advisers), Borland, and of course ACS and Engineers Australia.

Dr. Paul Mackie, reporting on the Conference, said *“One interesting factoid from this is that industry attendees actually exceeded academics this year: Commercial, govt & defence accounted for (45+8=) 53% of attendees. Looking at the same data but by role type, students and senior researchers accounted for 45% of attendees, with the remaining 55% being consultants or specialists, engineers and management. We therefore exceeded our pre-conference goal of attracting at least as many industry practitioners as academic researchers.”*

One major development during ASWEC 2006, was the Birds of a feather session on Software Engineering Education, (See Appendix VII)

Next year, ASWEC 2007 is in Melbourne. More information about ASWEC 2007 is available at: (<http://aswec07.cs.latrobe.edu.au/>)

2.3.2 ASWEC Steering Committee (ASWEC-SC) (See Appendix I.Pt 2 for the Draft Charter for the ASWEC SC)

In my last Report to Council, I said that...

“While it is probably not visible to Council dealing with ASWEC has consumed a very large amount of the Board Directors time and energy over the last five years. This was necessary, since the Conference is the focus of the academic Software Engineering community, and it has been woed by IE Aust over the last few years. My goal has been to ensure that ACS was seen as the major source of support, and as a more reliable backer than IE Aust. This has been achieved!”

I have also repeated the Table of Issues that were included, and have modified the Outcomes as appropriate.

(The ASWEC–SC has met several times since our last Report, however, that is not really at our instigation...)

The outcome has been generally very good, however, the effort it has taken on my part has been totally overwhelming.

Table III-ASWEC Community Issues (Based on Table I 2004 Nov. Board Report)

Issue to be resolved	Outcome
1/ Continuity and predictability in the conduct of ASWEC.	<i>ASWEC now a fixed item on the conference calendarr</i>
2/ Reporting to one body, rather than alternating through two, and engagement with the Joint ACS IE Aust SE Board	<i>The MOU has been redrafted, based upon what is understood to Agreement by all parties that the ASWEC SC should report to ACS and IE Aust through the ACS IE Aust Joint Board, that is by</i>

	<i>reporting TO the Joint Board. This is now happening in practice</i>
3/ The establishment of a Steering Committee (SC) (This would address 1/)	<i>A Charter has been developed by the Steering Committee, and is under consideration by the Joint Board. The SC is operating by it at this time. The Chair of the SC is a member of the ACS CS & SE Board</i>
4/ More direct control over finances	<i>The SC is now effectively controlling the finances, which operate out of a ACS account, but with SC signatories with an ACS signatory. The last two conferences made significant surpluses, and the conference is close to be self-funding. HOWEVER, ASWEC may still require "underwriting".</i>

2.4 Technology Transfer Implications of SE Activities

2.4.1 Publications and Support for Branches

We don't have much specific to report on this matter..

2.4.2 Knowledge Transfer(KT)/Technology Transfer Strategy

2.4.2.1 The Role of SIGs (See Appendix II)

Since the last Report, the Board and its units either organized, sponsored or been associated with more than six (6) conferences and workshops. Plus, two of our Units (aSCSa and SQA) produce regular newsletters. As far as I know, there is no mechanism for making subs to these available to ordinary ACS members.. I have recently circulated to Council a proposal that was put to Council, as far as I can tell, in my June 1993 report to Council. It dealt with the issue of improving the performance of SIGs, and also their relationship with ACS. The proposal has never been supported! It seems that no-one has learned from the lessons of Gorbachov's failure in his "switch throwing" exercise in the transition out of the Soviet era. The proposal, developed in 1992 by a meeting of as many National and State SIGs that we could muster, recognised a number of important factors, and offered real solutions.

1. The existing SIG system works, in that people form, support and participate in SIGs in the ACS' name.
2. Currently, the costs are miniscule,
3. The SIG's legal relationship with ACS is unclear
4. ACS does practically nothing for SIGs, there is no real package of services that SIG's can use

5. Many SIGs would walk if a non-rewarding change was imposed on them
6. There would be an enormous benefit to ACS if its SIG structure was better supported, and was more accessible to members..

The proposal was a gradualist one, that had significant benefits for what we called “participating SIGs”, and did not alter the arrangements for current entities. An accessible SIG system, with established channels for transferring materials from the SIGs to the ACS membership at large, would be a great step towards effective Knowledge Transfer. Will you do it?

2.4.2.2 Knowledge Transfer Strategy

I have repeated the table from the last Report, because I cannot think of anything better to say.

Table II Knowledge/Technology Transfer Strategy, Nov 2006

Short Term 1-2	Med 2-4	Long Term 4-10	Status
<i>Conference Capture</i>	<i>IFIP TC Reps</i>	KT Publication	Needs more work
<i>General Acquisition Suitable Articles for Pub</i>	<i>Standards</i>	<i>Conference Proc. Pubs</i>	<i>Can be expanded</i>
<i>Dist. Visitors Program</i>			Was proposed in 1997
PD Contribution		KB Website (see KT Publ. pushing into a database)	
Keynote Speakers for Tech. Conferences			sponsorships help with this
<i>Creation of New TCs and SIGS</i>		Proper ACS-SIG Linkage a) Link to membership renewal b) Low cost publications mechanism c) Proper Constitution	<i>This is a major structural issue.</i>
<i>Offer a joint activity with each board units local branch</i>			Hard to make this happen
-cross publication			IA is now doing well enough to make this less of an issue

2.4.3 Absence of a KT Vehicle-New web-site to resolve?

I won't repeat this argument. I would simply point out that it is now quite difficult to place material in the Bulletins, since several of them are moving to an IA type form, and have extreme length restrictions. Its not clear from the ACS web-site how this is to be achieved.

2.5 National Standards Committee (NSC) (See Appendix III)

Tom McBride, the Deputy Director for Standards Activity has presented a report which is in Appendix III. Tom is now the Chair of Standards Australia's IT-15 Committee, and is their representative on an International Standards Organisation (and I quote from his report) "*.. ISO working group dealing with an international standard for "Software Development Processes for Very Small Enterprises" as a representative of Australia. Since Australia does have many small enterprises that develop software, it is important that Australia's concerns are represented so that the eventual standard is useful here. International standards meetings are inevitably held in distant places and do incur considerable cost to either the participants or to their sponsors. While all participants are grateful for any and all financial support they get, it is unreasonable to expect private citizens to pay the costs of implementing the policies either of the Australian Governments, both State and Federal, or the IT community, both of whom benefit from the standards in trade, participation in the global economy or in improved quality of ICT products and services. Donating time and expertise to support public policy is one thing, but paying for the privilege of doing so is another thing entirely.*"

On this basis, I will be seeking on-going budgetary support for his participation in this project. He estimates that about \$20,000 is needed over a two year period.

Tom put these goals for his activities forward in 2004, and I repeat them again.

"We need to create an ACS culture on standards promotion and adoption to support quality, safety, competitiveness and professional use of IT in Australia! In particular, we need, as the next step in the process, to..

-Evaluate strategic directions.. What areas do we need standards for in IT, would standards on IT education curriculum assist ACS and the profession?

-involvement in IT governance standards..

-Promote Validation of Standards..ACS constituency can create and trial and insist on more rigor in development of Standards

-Expand and coordinate the involvement of ACS nominees in SA and ISO where standards are deemed worthwhile

-Become a national Advocate of the use by Government and industry of standards

-Improve the standards development processes.. Advise SA

-Recognise that major standards development can require major, long-lived projects as separate budget items. This recognizes the fact that developing a standard, and shepherding it through to national or ISO adoption is a major activity taking several years."

2.6 Australian Safety Critical Software Systems Association (aSCSa) Technical SIG (See Appendix IV for details) (www.safety-club.org.au,)

The Australian Safety Critical Systems Association is a National SIG which has evolved out of the SCS Technical Committee, formed by this Board more than 12 years ago.

The current Executive Committee is..

George Nikandros	Chair
Chris Edwards	Treasurer
Kevin Anderson	Secretary
Tony Cant	Program Chair
Clive Boughton	Committee
Robert Worthington	Committee
Peter Hartfield	Committee
Alex Moffat	Committee
David Geodecke	Committee
Alex Coxson	Committee

This year, the Association conducted its tenth annual workshop. Each has generated a surplus. The result is that the Club holds reserves of A\$73K, and has made an outstanding contribution to ACS objectives. (Each workshop has excellent tutorials and training activities).

This SIG has been a major generator of credibility for the ACS in an increasingly important area of IT, and this largely due to the work of George Nikandros and Kevin Anderson. Many of Australia's major player sin this area are represented on the Committee, noteworthy case being Robert Worthington of Airservices Australia.

2.7 Software Quality Association (Appendix V)

Ted Smile, is the National Chair of the SQA is one of our longest standing SIG's, and has a number of branches, in NSW, QLD, Vic and Canberra. The NSW Branch , ASMA/SQA(NSW) has taken over the IFPUG exam, the ISBSG - International Software Benchmark Standards Group membership and other ASMA National administrative functions. Kim Olsen has been very active in organising the QLD Branch, which operates as an ACS SIG and also covers SPIN activities. The Australian Conference of Software Measurement 2005, Noosa, November 2005 was organized as a joint ACOSM /ISESE conference, and the Australian Conference of Software Measurement 2006 will be in Melbourne, November 2006.

SQA also supported the 4th Annual SEPGSM Australia Conference 2006, Melbourne 25-28 September 2006.

Some papers from ACOSM 2005 are available at http://www.asma-sqa-nsw.org.au/asma/acosm_papers/ACOSM2005.htm. Regular monthly presentations are made to ASMA/SQA (NSW) members, to which other ACS SIG members are invited. Presentation material appears on the website: <http://www.asma-sqa-nsw.org.au> Melbourne, Queensland and Canberra Branches also arrange regular presentations to members.

The NSW Branch issues a monthly newsletter which is distributed by e-mail. This is supplemented quarterly by the ASMA Metrics Matters newsletter and in these months SQA material is included in Metrics Matters.

2.8 IFIP TC-2 Prof Tharam Dillon's Report (see Appendix VI)

Tharam is doing a truly outstanding job in this role. Currently, Chair of IFIP Working Group 2.12 / 12.4 on Web Semantics – (Please see Appendix IV. I for an extended report on WG 2.12 /1 12.4 activities.) He is also member of TC12 as Chair of WG 12.4 (report on this is presented by Australian representative Prof John Debenham.)

TC 2's program includes:-

1. the sponsorship of the Open Source Systems (OSS 2006) - <http://oss2006.dti.unimi.it/>. Since Free and Open Source Software (OSS) development continues to emerge, grow, and spread as a global phenomenon, the OSS 2006 was successfully held with 31 full papers (+ posters) accepted with keynote talks, a poster session and 6 workshop sessions. Conference topics included:
 - a. Software engineering perspectives on OSS development, e.g.,
 - b. Studies of OSS deployment, e.g.,
 - c. Social science perspectives on OSS development, e.g.,
 - d. External perspectives and influences on OSS, e.g.,*See Appendix IV for full details...*
2. The IFIP TC2 Academy on Software Theory and Practice held in Brazil. It was hosted by the Instituto de Informática, UFRGS, University, from 18th to 22th July 2005. This event provided students and researchers with a grounding in the core software subjects such as: High-performance computing for computer scientists, Trust and Reputation in P2P, Virtual Communities, and Web Services, Database semantics, Ontologies, and their impact on the Web, Personalization and Context Exploitation in Information Mediation, Information Integration, and Multi-Stage Programming. The school was aimed at graduate students, researchers and/or for researchers from neighboring disciplines, as well as for industrial researchers and practitioners who want to find out more about this area.

Proposed new events:

1. IFIP WG 2.12 /12.4 International Workshop on Web Semantics and Semantic Web - SWWS 2006 in conjunction with OTM 2006, Montpellier, France
2. IFIP WG 2.12 /12.4 Admin and Research Meeting, in conjunction with SWWS 2006 - Montpellier, France.

3. IFIP TC2 Academy in Addis Ababa, Ethiopia in August 2007 in conjunction with WITFOR 2007.

Council is urged to read the Appendix IV to see the full range of activities in IFIP TC 2, and Prof. Dillon's contribution.

2.9 National Technical Committee on Software Architecture

Prof. Ian Gorton, the interim Chair, has moved to the US, so I have invited Prof. Jun Han of Swinburne University of Technology to take the position. Jun is a very active younger person who will make a mark in this area.

2.10 National Technical Committee on Software Requirements Engineering

The Chair of the Committee (Assoc Prof Didar Zowghi) reports as follows..

“ The 10th Australian Workshop on Requirements Engineering (AWRE) was held in Melbourne in December 2005 (see <http://lamp.infosys.deakin.edu.au/05awre/>) . It was sponsored by the ACS and was well attended and successful. We also had the first meeting of the Technical committee on RE in Melbourne in conjunction with the AWRE.

David Randall and I have initiated a SIG in Business Requirements Analysis in the NSW chapter and the inaugural meeting will be held in November 9th 2006 in Sydney.

The 11th Australian workshop in RE will be held in Adelaide in conjunction with ACIS and Collector conferences and is sponsored by the ACS. We will have our second annual meeting of the TC again in Adelaide.” (see <http://awre2006.cis.unisa.edu.au/>)

2.11 National Technical Committee on Applied Language Technology

As was mentioned in the introduction, the Chair of the Applied language Technology Committee, Prof. Jon Patrick, has been involved with Coling/ACL2006, the joint conference of the International Committee on Computational Linguistics and the Association for Computational Linguistics, which was held in Sydney, in July 2006. (<http://www.acl2006.mq.edu.au/>.) On the advice of the Chair of the Applied Language Technology Committee, the Board provided a nominal sponsorship, as you can see from the web-site. Language technology issues are becoming more and more important.

2.12 Software Engineering Research Consultative Council (SERCC)

SERCC has not met since the last Council Meeting. A new Chair is being sought.

2.13 Software Engineering Education Consultative Council (SEECC)

SEECC has not met since the last Council Meeting. Assoc. Prof. John Leaney has been struck down by leukemia and I have been reluctant to replace him. A recent development may have created an opportunity for this to occur.

During ASWEC 2006 a “Birds of a Feather” session was called by a group including Adrian Pittman of Defence Materials Organisation, Dr. Clive Boughton, Chris Skinner and tenex. The meeting was extremely well attended, and some very strong views were put. (I have include the complete minutes of this meeting in Appendix VII as a matter of record). In particular, the view was expressed by some that the approaches of ACS/EA on certification were too mild.

A quite significant revelation was that DMO is considering offering Cadetships , and the BAE already offers them! I am in discussion Clive Boughton about this group and other matters.

3. Other Matters and Future Activities

3.1 New TC's

As was seen from Table II, we are seeking to create a number of new TC's. In one case, we are negotiating with Dr. K. J. Ross, Principal of K. J. Ross and Assoc's, to chair a National TC on Software Testing. The other areas being canvassed are:- Formal Methods in SE, Embedded Systems, Ubiquitous Systems

4. Miscellaneous

This is my last Report to Council in this role, and I assume, my last appearance at Council. As usual, I begin this report feeling that not enough has been accomplished, and end it feeling that I owe a great debt of gratitude to the people who have made a report as large as this possible! I'll be bold enough to say that ACS should indeed be pleased by the work of the people who contribute to this Board.

APPENDIX I.Pt 1 DETAILS OF ASWEC CONFERENCES, 2005-2007

App. I.1.1 ASWEC 2005

<http://aswec2005.itee.uq.edu.au/home.php>

In 2005 the conference was held at the Carlton Crest Brisbane from 29th of March to the 1st of April. The main officials are:-

General Chair	David Carrington
Research Program Chair	Paul Strooper
Industry Program Chair	Brad Long
Publicity Chair	Anthony MacDonald
Local Arrangements Chair	Colin Fidge
Industry Liaison Chair	Adrian Mortimer assisted by
Geoffrey Watson	
Sponsorship Chair	Peter Croll
Workshops Chair	Erica Glynn
Tutorials Chair	Richard Thomas
Exhibitors Chair	Soon-Kyeong Kim

The keynotes were.

- * Professor David Parnas (Ireland)
- * David Barbagello, (Mincom, Australia)
- * Professor John Gough (Australia).

The conference was a great success, both from a financial and attendance point of view.

App I.1.2 SWEC 2006

<http://cgi.cse.unsw.edu.au/~aswec2006/>

NICTA sponsored the 2006 ASWEC, and the Australian Technology Park venue at Redfern was used to great effect. The main officials are:-

General Chair:	Ian Gorton (National ICT Australia)
Research Program Chairs:	Jun Han (Swinburne University of Technology)
	Mark Staples (National ICT Australia)
Industry Track Chairs:	Anna Liu (Microsoft Australia)
	Chris Skinner (DISplay Pty Ltd)
Finance Chair:	Paul Bannerman (National ICT Australia)
Industry Sponsorship Chair:	Paul Mackie (National ICT Australia)
Publicity Chair:	Muhammad Ali Babar (National ICT Australia)

The keynotes were.

- * Dr Linda Northrop (Software Engineering Institute in Pittsburgh, USA),
- * Dr Julian Edwards (Object Consulting, Sydney), and
- * Prof John Hosking (U. Auckland)

The conference was a great success, both from a financial and attendance point of view. Industry attendees were quite a major part of the scene, and many commented on the networking opportunities that were created. The list of sponsors was extremely gratifying, with IBM, MICROSOFT, Defence Materials Organisation, Object Consulting, Davies Collison Cave (IP advisers), Borland, and of course ACS and Engineers Australia.

Dr. Paul Mackie, reporting on the Conference, said *“One interesting factoid from this is that industry attendees actually exceeded academics this year: Commercial, govt & defence accounted for (45+8=) 53% of attendees. Looking at the same data but by role type, students and senior researchers accounted for 45% of attendees, with the remaining 55% being consultants or specialists, engineers and management. We therefore exceeded our pre-conference goal of attracting at least as many industry practitioners as academic researchers.”*

One major development during ASWEC 2006, was the Birds of a feather session on Software Engineering Education,

App.1.1.3 ASWEC 2007 (<http://aswec07.cs.latrobe.edu.au/>)

Next year, ASWEC is in Melbourne. The committee is..

General Chair:	Doug Grant, Swinburne University of Technology, Australia
Research Program Chairs:	John Grundy, University of Auckland, New Zealand
Jun Han:	Swinburne University of Technology, Australia
Industry Track Chair:	Kevin Francis, Infosys, Australia
Tutorial and Workshop Chairs:	Shanika Karunasekera, & Jean-Guy Schneider, Swinburne University of Technology, Australia
Publicity Chair:	Seng Loke, La Trobe University, Australia
Finance Chair:	Leon Sterling, University of Melbourne, Australia

More information about ASWEC 2007 is available at:
(<http://aswec07.cs.latrobe.edu.au/>)

APPENDIX I.Pt 2 DRAFT CHARTER FOR ASWEC STEERING COMMITTEE (SC)

NB This is under review by the SC and the Joint Board, so it should be regarded as a final draft, that may change slightly. Thanks are due to Assoc. Prof. Paul Strooper for collating and editing this document.

ASWEC Charter

DRAFT: 20 June, 2006

Version 0.5 8/8/2006

1. Objective

The objective of the Australian Software Engineering Conference (ASWEC) is to provide an annual forum for the exchange of ideas and experiences between practitioners, researchers, and educators in software engineering in Australia and New Zealand.

To oversee the long-term planning and success of the conference, there is a Steering Committee (SC). The SC plans for future conferences, evaluates how well each conference has achieved the objective stated above, and implements improvements for better meeting these objectives.

The SC reports to the Joint Board (JB) on Software Engineering of Engineers Australia and the Australian Computer Society. The SC is appointed by the JB on the recommendation of the SC and the two parties to the Memorandum of Understanding between Engineers Australia and the Australian Computer Society for the conduct of ASWEC from defined constituencies as set out below. The JB will not, except in exceptional circumstances, refuse to endorse such recommendations, and will in any case, maintain the constituencies' representation.

In addition, for each conference there is an Organising Committee (OC) that is responsible for the planning, running, and oversight of that conference. The OC is appointed by and reports to the ASWEC SC.

The role of the SC and the OC are detailed below and the Appendix records current ASWEC Policies.

2. Steering Committee

2.1 Membership

The SC for ASWEC will be composed of five representatives of the Australian and New Zealand academic communities, one representative from industry/government, and one representative each from Engineers Australia and the Australian Computer Society.

The academic and industry/government representatives are nominated by the current ASWEC SC and appointed by the JB. At least one of the academic representatives must be from New Zealand. The representatives from Engineers Australia and the Australian Computer Society are expected to be nominated by directors of the Engineers Australia National Committee on Software Engineering and the ACS Computer Systems & Software Engineering Board or their equivalent. Normally, the term for SC members is six years. In a single year, no more than 50% of the SC members can be replaced.

The chair of the SC is elected by the SC from among the SC members for a term of three years. The chair may appoint, from among the SC, an acting chair to organise and conduct a meeting or part thereof on his behalf.

2.2 Meetings

The SC will meet annually during ASWEC. The Chair may organise additional (possibly virtual) meetings, for example, to discuss the final report from a previous ASWEC or the preliminary budget of a future ASWEC.

Half of the membership of the SC must be present to constitute a quorum. Decisions, other than amendments to this Charter, will be made subject to a simple majority of members present, with the Chair having both a deliberative vote, and a casting vote if necessary. A record of current ASWEC Policies operative as per decisions of the SC will be preserved as an Appendix to this Charter.

Amendments to this Charter itself require *unanimous agreement* all members of the SC ~~to be~~ present at the meeting considering the amendments. *A quorum consisting of at least 50% of the SC members should be present at such a meeting.* Any amendments approved by the SC must also be approved by the JB.

The General and Program Chairs for the current ASWEC conference may attend meetings of the SC as non-voting observers. General and Program Chairs Elect for the following year's ASWEC conference may also attend as non voting observers.

2.3 ASWEC Bank Account

The financial arrangements and responsibilities for ASWEC are outlined in the Memorandum of Understanding between Engineers Australia and The Australian Computer Society for the conduct of ASWEC.

To assist in running the conference, an ASWEC bank account has been created by The Australian Computer Society. This account can be used by the annual OC to run the conference. The signatories on the bank account are the SC Chair, the General Chair for the upcoming ASWEC, and The Australian Computer Society state manager for the state in which the upcoming ASWEC will be held.

At the discretion of the SC Chair, funds from the ASWEC bank account can also be used to assist the SC in performing its duties. For example, in meeting expenses for SC members to attend the annual meeting if they have no reasonable alternative way of meeting these costs. Any such expenses must be reported in the annual report on the previous ASWEC conference to the JB.

2.4 aswec.org

The domain name aswec.org is managed by the SC and is used to publicise current, past and future ASWECs.

2.5 Responsibilities

The SC has responsibilities and authority as follows:

- selection of location and time for the annual ASWEC;
- appointment of annual OC;
- management of ASWEC bank account;
- management of aswec.org;
- *in accordance with 3.3, ensure the preparation of the preliminary budget for the next ASWEC by its OC, for forwarding to the JB for approval;*
- *ensure the preparation of, and approve the final report from previous ASWEC, conference by its OC, for forwarding to the JB;*
- developing amendments to this Charter, in accordance with section 2.2 of this document and subject to approval by the JB.

3. Annual Organisation

3.1 Proposal and Selection Process

Proposals for organising ASWEC should be submitted to the Chair of the SC at least one month before the annual conference, in the year preceding the proposed conference. That is, bids to host the conference must be submitted to the Chair of the SC at least 13 months prior to the proposed conference date.

The proposal should list conference dates and venue, key positions on the OC (at least the General and Program Chairs, and preferably most of the other positions as well), proposed conference format including associated events such as tutorials and workshops, financial arrangements for funding the conference, including an indicative draft budget in a format approved by the SC, and a timeline for submission procedures. Information for preparing a bid to host an ASWEC can be obtained from the SC.

The SC will give final review and approval to one proposal during the SC meeting at ASWEC. The approval may be provisional and subject to modification or clarification at the discretion of the SC.

3.2 Organising Committee

The annual ASWEC OC is responsible for the planning, running, and oversight of the conference.

The OC takes responsibility for all aspects of the conference, including:

- finances, including sponsorship;
- local arrangements;
- appointment of Program Committee;
- organisation of the conference programme;
- publication of the conference (to attract papers, other contributions, and attendees from both academia and industry/government);
- conformance with this Charter and current ASWEC Policies.

3.3 Reporting Requirements

The OC must report to the SC on three occasions:

- Nine months before the start of the conference, the OC must send a preliminary budget to the SC for consideration and discussion.
- Once the preliminary budget has been considered by the SC, the budget must be formally forwarded by the SC to the JB for approval. The JB will then, after any

necessary iterations, endorse the budget, and recommend it to the two parties to the MOU, who will not unreasonably withhold approval for financial and insurance underwriting purposes.

- At the ASWEC SC meeting, the General and Program Chairs must present a preliminary report, including information on sponsorship, registrations, an updated version of the budget, and information about the program (papers submitted and accepted, industry involvement, and PC membership).
- Six months after the conference, an updated version of the above report should be forwarded to the SC, including any recommendations or suggestions for future conferences.

Appendix - Current ASWEC Policies

ASWEC is organised annually in the week following Easter.

The submission, review, and publication processes must be such that the conference Proceedings are counted as DEST E1 publications (full papers must be refereed, PC must have a significant number of international representatives, proceedings must be published by a reputable publisher).

The Proceedings of the conference are published by IEEE Computer Society Press under the editorship of the ASWEC Program Chair(s).

The General and Program Chairs for a particular ASWEC are not allowed to submit papers to that ASWEC.

The OC is responsible for selecting and awarding rewards for best paper(s) (for both research and industry submissions, if there are separate paper tracks) and for the most influential paper from the ASWEC conference from 10 years ago (or the APSEC conference if it was held in Australia in that year and ASWEC was not held as a result).

The SC is responsible for selecting and awarding an annual ASWEC Service award.

The OC provides facilities for the annual SC meeting at the conference, and arranges and pays for a SC dinner.

APPENDIX II REPORT THE PARTICPATING SIG CONCEPT DEVELOPED IN 1992

TECHNICAL BOARD PROPOSAL FOR A NEW SIG STRUCTURE

THIS IS BASED UPON THE DRAFT OF THE COUNCIL TASK FORCE, BUT REFLECTS THE ORIGINAL PROPOSALS BY THE TECHNICAL BOARD. INFACIT, IT IS AN EDITED VERSION OF THE ORIGINAL

A. INTRODUCTION

For some time Council, the Technical Board and various Branches have been endeavouring to come to grips with what SIGs are/should be particularly with regard to their relationship to the ACS. This paper suggests that the structure of National SIGs and their relationship to the ACS is clearly defined in the revised objects of the ACS, and as such does not need to be discussed further except in the regard to funding issues which are discussed below.

On the other hand the structure and relationship of Branch SIGs (ie SIGs established by a branch of the ACS, as distinct from a branch of a national SIG), is not clearly defined. Indeed the objects of the ACS only make one reference to Branch SIGs, and that reference merely states that a Branch may establish Branch SIGs. It has therefore been left to individual Branches to establish SIGs and by-laws to govern their operation as each Branch sees fit.

While the inherent flexibility in the present arrangements has some attraction, this the Technical Board, following on from the draft proposals by the Council Task Force, suggests that some degree of standardisation of Branch SIGs is now necessary to meet the further needs of the society. **However, the Board believes that it is essential that precipitous moves to standardise the relationships would lead to many valuable connections being broken, and, favours a gradualist approach which will lead to all “SIGs” voluntarily opting for the recommended status.**

The long-term goal is to have all SIGs in a “regular” relationship with the Society in which, amongst other things, they are listed on membership renewals and application forms as is done by the ACM.

B. RECOMMENDATION

This paper, following the Task Force’s model, recommends the Council adopts the following SIG structure:

1. **National SIG** (with or without branches) as defined in the Objects of the Society.

Four categories of ACS Branch SIG as follows:

2. Participating SIG's:-

- a) Adopting a standard Constitution and as a dependant part of the Branch for financial purposes, etc.
- b) Having at least the Chairman as a member of the ACS,
- c) Offering differential membership and attendance rates for ACS members,
- d) Allow ACS members free attendance to functions free to members,
- e) Being listed for recruiting purposes on renewals and applications forms (as per ACM),
- f) Receiving a package of benefits and services from the Society, (including some of the above).

The package of benefits for Participating SIGs is as shown in Table II

3. Irregular SIG's, which may be:-

- a) May not be separately incorporated,
- b) Informal groups with Constitution not necessarily conforming to that for Participating SIGs,
- c) **NOT BEING LISTED IN RENEWAL AND APPLICATION NOTICES,**
- d) Receiving such financial assistance as any Branch may deem appropriate,
- e) **NOT BEING ELIGIBLE FOR ANY OF THE SERVICES RESERVED FOR PARTIFIPATING SIG'S,**
- f) Receiving access to Branch publications for publicity,
- g) Making regular financial reports to the Branch,
- h) Agreeing not to enter into agreements in the Society's name without its express permission,
- i) Allow ACS members free attendance to functions free to members.

Participating and Irregular SIGs are said to be under the ACS umbrella in what follows ...

4. ACS Endorsed SIG/Organisation.

This would be an independent organisation which is recognised as having some area of common interest with the ACS and appropriate standing within the wider community but being a completely independent body. endorsement of this type of organisation would be similar to endorsement of a PCP provider course. There would be no financial involvement by the ACS in the endorsed organisation.

5. Other Organisation

These are organisations which have an area of common interest with the ACS but which do not meet requirements for, or have not requested, ACS Endorsed SIG/Organisation status. Obviously there would be no financial involvement by the ACS in this type of organisation.

To further clarify the relationship, the following tables have been constructed.

TABLE 1					
Benefits Provided to ACS by SIG's					
Activity	Information Exchange	Handbook for Members	Publicity in ACS Publications	Free to ACS Members	Publicity in SIG Publications
Meetings	YES			YES	
Newsletters	YES				
Proceedings		YES			
Annual Conferences		YES	YES		
PCP Participation for Attendance	YES		YES		
Tutorials		YES			
Networking	YES			YES	
Forum for Peers	YES			YES	
PR for ACS	YES	YES	YES	YES	YES

TABLE II		
ACS Service to SIGs		
	Participating	Any Sig
Meetings (Organisation of)	YES	NO
Newsletters (Publications of)		
<i>National Technical</i>	<i>YES</i>	<i>NO</i>
<i>National Operational</i>	<i>YES</i>	<i>NO</i>
Proceedings		
- <i>Annual Best Papers</i>	<i>YES</i>	<i>NO</i>
Conference/Tutorials/Seminars/P.D. Publications Admin Support		
<i>membership and mailing</i>	<i>YES</i>	<i>NO</i>
<i>publishing</i>	<i>YES</i>	<i>NO</i>
Financial Support		
- <i>Guaranteed</i>	<i>YES</i>	<i>NO</i>
- <i>Branch discretion</i>	<i>YES</i>	<i>YES</i>
Advertising		
<i>participating SIG's brochure – marketing</i>	<i>YES</i>	<i>NO</i>
<i>listing on ACS membership</i>	<i>YES</i>	<i>NO</i>
<i>Access to ACS publications</i>	<i>YES</i>	<i>YES</i>
PCP Points	YES	YES
Representation of ACS		
<i>standards committees</i>	<i>YES</i>	<i>YES</i>
<i>other associations</i>	<i>YES</i>	<i>YES</i>
<i>international</i>	<i>YES</i>	<i>YES</i>
<i>government</i>	<i>YES</i>	<i>YES</i>
Communication between SIGs	YES	YES
Sharing taxation benefits		
<i>under ACS umbrella</i>	<i>YES</i>	<i>YES</i>
<i>separate or loose-linked SIG</i>		<i>NO</i>

C. NEW SERVICES TO BE PROVIDED TO SIGs

Attention is drawn to the items in *italics* in Table II. These constitute new services which the Society will be offering SIGs. It is not intended that these should be provided at zero cost. They will also require the establishment of some infrastructure.

Support will be required from the Marketing Board and the Publications Board. However, it is expected that the publication of a Newsletter would be on a cost recovery basis from the SIG's membership fees. Similarly for maintenance of membership lists and mailing of notices.

APPENDIX III REPORT FROM THE DEPUTY DIRECTOR STANDARDS, DR. TOM MCBRIDE

Report of ACS National Standards Committee Activities 2005 - 2006

Submission to the Productivity Commission

A submission was made to the Productivity Commission into Standards and Accreditation (see <http://www.pc.gov.au/study/standards/index.html>). The submission argued that the economic circumstances for standards development had changed from those where community minded domain experts could donate their time to one where domain experts no longer have the economic freedom to donate their time.

Consequently, it is argued, potential sources of expertise should be encouraged to participate through appropriate recognition. Specifically, research related standards work should be recognised as contributing to the research quantum. Such recognition would persuade more academics to participate in standards development and improve the rigour of the development process, and subsequent standards.

Participation in any Standards activity

Since last year I have been appointed to the position of chairman of the Standards Australia committee concerned with software development standards, and head of delegation when the committee is represented at ISO meetings.

As chairman I have seen my role as one of increasing the visibility of the committee's work, increasing participation by interested domain experts and reducing the cost of developing standards. To those ends I have met with Standards Australia to develop a strategic plan for the committee, in which the objectives of the committee are expressed along with some strategies for achieving those objectives. To encourage greater participation and reduce the cost of standards development, Standards Australia intends to introduce web-based meetings so that travel for the committee's twice yearly meetings becomes unnecessary and so that people from other than the main centres of Australia can participate more easily. This will most affect Perth, which has yet to be represented, and New Zealand, which has active committee members but seldom attend meetings due to the cost.

To make the work of the committee more visible I have proposed that all projects be described in a, more or less, standard fashion. In particular, it should describe how the project contributes to the committee's objectives. In due course these descriptions should be usable by Standards Australia to promote the various projects and the subsequent standards.

There have been two meetings of the IT-15 standards committee, one in Wellington and one in Sydney. The Wellington meeting discussed the difficulty most people have in determining which standards exist that might help them in their job. The meeting decided that a list, or several lists, should be prepared showing standards that we believed would assist in specific circumstances. For example, "Which standards are relevant for ..?"

- **TEACHING AND LEARNING** Includes standards that aid teaching basic concepts, industry best practice
- **ACQUISITION AND SUPPLY** Includes standards for acquisition and supply processes, writing RFPs, responding to RFPs, project management, specifying software and system functionality and characteristics, software system delivery and installation

- **SOFTWARE DEVELOPMENT** Includes standards for software engineering processes, industry best practice, software engineering process improvement, professional qualification.
- **MERGERS AND ACQUISITIONS**
- **SAFETY AND REALIABILITY** Includes standards related to specifying safety and reliability quality characteristics, software system assurance, and related.

Recently I attended a meeting of the ISO working group dealing with an international standard for “Software Development Processes for Very Small Enterprises” as a representative of Australia. Since Australia does have many small enterprises that develop software, it is important that Australia’s concerns are represented so that the eventual standard is useful here. This meeting was held in Luxembourg. International standards meetings are inevitably held in distant places and do incur considerable cost to either the participants or to their sponsors. While all participants are grateful for any and all financial support they get, it is unreasonable to expect private citizens to pay the costs of implementing the policies either of the Australian Governments, both State and Federal, or the IT community, both of whom benefit from the standards in trade, participation in the global economy or in improved quality of ICT products and services. Donating time and expertise to support public policy is one thing, but paying for the privilege of doing so is another thing entirely.

In my role as chairman of the ACS National Standards committee is to monitor proposed standards projects for those projects that may affect ACS members or that contribute the objectives of the ACS. So far there have been two such projects- International Certification of Software Developers and Software Development Process for Very Small Enterprises. The former is being attended to by Mr Bob Hart and I am attending to the latter. A new project concerning “Software Requirements Process” has been proposed and A/Prof Didar Zowghi has been persuaded to represent Australia.

One of the projects that was started as an Australian Standard has now progressed through ISO balloting to its final stages and should be published early in 2007. This is, or will be, ISO 24744 –Software Engineering - Metamodel for Development Methodologies. This standard was developed by Professor Brian Henderson-Sellers and Dr Cesar Gonzalez-Perez of the University of Technology, Sydney.

Additionally I have been contributing to the development of AS 8016 – Governance of ICT Investments. This project is ongoing.

Any seminars or presentations to ACS branches or other ACS groups

A seminar presented to a special interest group on the topic of “An Investigation model for Software Accidents”. While this is not a standard and is not proposed as a standard, the research behind the presentation considered how an enquiry, such as the Australian Audit Office or a Commission of Enquiry, would investigate an accident that resulted from a software failure or a failed software development project. The presentation was made at the NSW ACS offices and was attended by a relatively small group of about 10.

Conclusion

The work of the ACS National Standards Committee is ongoing and mainly conducted through the Standards Australia IT-15 committee. As well as normal standards development activities, the most significant contribution that can be made at this time is to change the working methods of the committee and its members to

make more use of the available ICT technologies. Some effort is also being devoted to making the work of the committee members more accessible so that interested parties such as Standards Australia has more and better material to use in promoting the standards to their intended audience.

Tom McBride
12 October 2006

**APPENDIX IV REPORT FROM THE Australian Safety Critical
Systems Association-In the form of the Agenda of the 2006 AGM
and the latest news letter**

**These are submitted as separate PDF files.
ascsa.Agenda_2006AGM.pdf
News_Jun06_v4.pdf**

APPENDIX V REPORT FROM THE SOFTWARE QUALITY ASSOCIATION

Software Quality Association (SQA SIG) Report 12 October 2006

(see also SQA Magazine August 06.pdf)

1. News

The NSW Branch , ASMA/SQA(NSW) has taken over the IFPUG exam, the ISBSG - International Software Benchmark Standards Group membership and other ASMA National administrative functions.

Kim Olsen has been very active in organising the QLD Branch, which operates as an ACS SIG and also covers SPIN activities.

2. Conferences organised/supported.

Conferences Organised;

The Australian Conference of Software Measurement 2005, Noosa, November 2005 as a joint ACOSM /ISESE conference.

The Australian Conference of Software Measurement 2006, Melbourne, November 2006.

Conferences Supported:

4th Annual SEPGSM Australia Conference 2006, Melbourne 25-28 September 2006

3. Any projects undertaken, e/g/submissions to Governments,Inquiries etc.

N/A

4. Participation in any Standards activity

N/A

5. Any educational material produced

Some papers from ACOSM 2005 are available at http://www.asma-sqa-nsw.org.au/asma/acosm_papers/ACOSM2005.htm

6. Any seminars or presentations to ACS branches or other ACS groups

Regular monthly presentations to ASMA/SQA (NSW) members, to which other ACS SIG members are invited. Presentation material appears on the website:

<http://www.asma-sqa-nsw.org.au>

Melbourne, Queensland and Canberra Branches also arrange regular presentations to members.

7. Any seminars or presentations to non- ACS groups

N/A

8. Contributions to ACS and other publications

NSW Branch issues a monthly newsletter which is distributed by e-mail. This is supplemented quarterly by the ASMA Metrics Matters newsletter and in these months SQA material is included in Metrics Matters. The August 2006 newsletter is attached.

Ted Smillie

APPENDIX VI REPORT FROM THE IFIP TC 2 REPRESENTATIVE, PROF. THARAM DILLON

Report to ACS on IFIP TC2 & WG 2.12 / 12.4

By: Prof Tharam S. Dillon, Chair WG 2.12 / 12.4

1. Member of TC2 on behalf of ACS
2. Chair of IFIP Working Group 2.12 / 12.4 on Web Semantics – Please see Appendix I for extended report on WG 2.12 / 12.4 activities.
3. Also member of TC12 as Chair of WG 12.4 (report on this is presented by Australian representative Prof John Debenham)

TC2 main new events are:

3. The sponsorship of the Open Source Systems (OSS 2006) - <http://oss2006.dti.unimi.it/>. Since Free and Open Source Software (OSS) development continues to emerge, grow, and spread as a global phenomenon, the OSS 2006 was successfully held with 31 full papers (+ posters) accepted with keynote talks, a poster session and 6 workshop sessions. Conference topics included:
 - a. Software engineering perspectives on OSS development, e.g.,
 - i. OSS architecture, configuration and release management
 - ii. OSS processes, practices, tools or project repositories
 - iii. Testing and assuring OSS quality
 - iv. Maintaining high quality OSS documentation
 - v. Mining and analyzing OSS project repositories
 - vi. Patterns of success and failure in developing OSS
 - b. Studies of OSS deployment, e.g.,
 - i. Case studies of OSS deployment, success and failure
 - ii. OSS in Arts or Games
 - iii. OSS in the public sector: Government, Education, Health Care or Defense
 - c. Social science perspectives on OSS development, e.g.,
 - i. Diversity and international participation in OSS projects
 - ii. Beliefs, values and norms affecting OSS development
 - iii. Collaboration, control or conflict in OSS projects
 - iv. Learning and knowledge sharing in OSS projects
 - v. Dynamics of OSS project teams
 - vi. Ethnographic studies of OSS projects
 - d. External perspectives and influences on OSS, e.g.,
 - i. Diffusion and adoption of OSS innovations
 - ii. Socio-technical networks facilitating OSS development and deployment
 - iii. Economic analysis of OSS
 - iv. OSS and alternative intellectual property regimes
4. IFIP TC2 Academy on Software Theory and Practice held in Brazil. It was hosted by the Instituto de Informática, UFRGS, University, from 18th to 22th July 2005. This event provided students and researchers with a grounding in

the core software subjects such as: High-performance computing for computer scientists, Trust and Reputation in P2P, Virtual Communities, and Web Services, Database semantics, Ontologies, and their impact on the Web, Personalization and Context Exploitation in Information Mediation, Information Integration, and Multi-Stage Programming. The school was aimed at graduate students, researchers and/or for researchers from neighboring disciplines, as well as for industrial researchers and practitioners who want to find out more about this area.

Proposed new events:

4. IFIP WG 2.12 /12.4 International Workshop on Web Semantics and Semantic Web - SWWS 2006 in conjunction with OTM 2006, Montpellier, France
5. IFIP WG 2.12 /12.4 Admin and Research Meeting, in conjunction with SWWS 2006 - Montpellier, France.
6. IFIP TC2 Academy in Addis Ababa, Ethiopia in August 2007 in conjunction with WITFOR 2007.

Appendix VI.I

IFIP WG 2.12 / 12.4 Report (2005/2006)

Report Date: 20-Aug-2006

Events (2005/06):

- Past events
 - o Nov 1 -2, 2005: Inaugural event The 1st IFIP WG 2.12 / 12.2 International Workshop in Semantic Web and Web Semantics (SWWS '05) was held in Agia Napa, Cyprus, as part of the OTM 2005 federated conferences
 - o Nov 1, 2005: AGM of WG 2.12 / 12. 4
 - o TC2 IFIP Academy, Brazil

- Upcoming events
 - o IFIP WG 2.12 / 12.2 book series titled "Advances in Web Semantics" wit the first volume planned to be published by end of 2006, titled "*Volume 1: Advances in Web Semantics, A State-of-the Art Semantic Web*", (Eds) Elizabeth Chang, Tharam S. Dillon, Robert Meersman , Katia Sycara
 - o Oct 29 – Nov 3, 2006: The 2nd IFIP WG 2.12 / 12.2 International Workshop in Semantic Web and Web Semantics (SWWS '06) to be held in France, as part of the OTM 2006.
 - <http://www.cs.rmit.edu.au/fedconf/index.html?page=swws2006cfp>
 - see attached CFP
 - o WG 2.12 / 12.4 website now located at : <http://www.ceebi.curtin.edu.au/IFIP/>

Actions/comments(2005/06):

- Membership
- Officers
 - o Chair: Prof Tharam S. Dillon
 - o Vice-Chairs:
 - Prof Elizabeth Chang
 - Prof Ernesto Damiani
 - o Secretary: Prof Elizabeth Chang
 - **Acting Secretary: Rajugan Rajagopalapillai
- New members (pending approval by TC)
 - o Prof Pilar Herrero
 - pherrero@fi.upm.es
 - Universidad Polit cnica de Madrid, Spain
 - o Rajugan Rajagopalapillai (acting sectary to Prof Elizabeth Chang)
 - rajugan@it.uts.edu.au
 - University of Technology, Sydney (UTS). Australia
- WG 2.12 / 12.4 (Research) meeting is scheduled for Nov 2, 2006, following the last session of SWWS 2006 workshop.
- WG 2.12 / 12.4 (Admin) meeting is scheduled for Nov 2, 2006 following the workgroup research meeting.

Report on 1st IFIP WG 2.12 / 12.4 International Workshop in Semantic Web and Web Semantics (SWWS '05)

<http://www.cs.rmit.edu.au/fedconf/2005/swws2005cfp.html>

PC-chair: Ling Feng

Vice-Chairs: Mustafa Jarrar, Aldo Gangemi, Joost Breuker, Jos Lehmann, Andr  Valente

The 1st IFIP WG 2.12 / 12.2 International Workshop in Semantic Web and Web Semantics (SWWS '05) was held in Agia Napa, Cyprus, as part of the OTM 2005 federated conferences. This is the inaugural event for the newly formed WG 2.12 / 12.4 in 2005. The workshop was held over two days between the 1st Nov – 2nd of Nov 2005. The workshop also include two special sessions namely;

1. Special session on Regulatory ontologies (formally known as WORM): This special session on Regulatory Ontologies has been organized to allow researcher of different backgrounds (such as Law, Business, Ontologies, artificial intelligence, philosophy, and lexical semantics) to meet and exchange ideas.
2. Special session on Security & Trust as an invited paper session

This first year, a total of 35 papers were submitted to SWWS 2005. Each submission was reviewed by at least two experts. The papers were judged according to their originality, validity, significance to theory and practice, readability and organization, and relevancy to the workshop topics and beyond. This resulted in the selection of 18 papers for presentation at the workshop and publication in this OTM 2005 workshop proceedings, in both print and online versions (<http://www.informatik.uni-trier.de/~ley/db/conf/otm/otm2005-1c.html>). The proceedings of the conference book reflects the quality of the workshop, the issues raised and presented during the SWWS workshop which proves to be an interdisciplinary forum for subject matters involving the theory and practice of web semantics. We feel that these proceedings will inspire further research and create an intense following. The Program Committee comprised of all the IFIP WG 2.12 / 12.4 members. Another, the 2nd IFIP WG 2.12 / 12.2 International Workshop in Semantic Web and Web Semantics is planned for 2006 (SWWS '06) as part of the same forum (OTM 2006).

Report on 2nd IFIP WG 2.12 / 12.4 International Workshop in Semantic Web and Web Semantics (SWWS '06)

<http://www.cs.rmit.edu.au/fedconf/index.html?page=swws2006cfp>

Workshop days: Date: Nov 1-2, 2006.

The 2nd IFIP WG 2.12 / 12.2 International Workshop in Semantic Web and Web Semantics (SWWS '06) is going to be held in Montpellier, France, as part of the OTM 2006 federated conferences. This is turning out to be one of the important annual events for the newly formed WG 2.12 / 12.4 in 2006. All preliminary arrangements have been made to (CFP, website, paper submission system, etc.) make SWWS a successful event in 2006. This year the workshop includes three special sessions namely;

- Semantic Web and Web Semantics
- Security, Trust and Reputation Systems
- Providing Semantics for the Web using Fuzzy Methods

With subtopics related to these themes including, but are not limited to:

- Formal and practical knowledge representation and inference for the semantic Web
- Design, evaluation, and use of ontology
- Metadata and knowledge markup
- Special track on Fuzzy sets
 - Providing semantics for the web using Fuzzy set methods
 - Fuzzy models for the Semantic Web
 - Protoforms
- Special track on Security and Trust
 - Security and trust for the Semantic Web
 - Reputation Systems for the Semantic Web
- Special track on Regulatory Ontologies
 - Engineering of regulatory ontologies: conceptual analysis, representation, modularization and layering, reusability, evolution and dynamics, etc;
 - Multilingual and terminological aspects of regulatory ontologies;
 - Models of legal reasoning (from ontological viewpoint): regulatory compliance, casebased reasoning, reasoning with uncertainty, etc.
 - Sensitivity on and harmonization of regulations;
 - Regulatory metadata and content standardization (e.g. legal-XML/LeXML, ADR/ODRXML,...);

- Regulatory ontologies of: property rights, persons and organizations, legal procedures, contracts, legal causality, etc;
- Task models for socially regulated activities;
- Experiences with projects and applications involving regulatory ontologies in legal knowledge based systems, legal information retrieval, e-governments, e-commerce;
- Interoperability of data and Web services
- Semantics of agent and Web interaction
- Automated extraction of Information from regulatory documents.
- Content-based information and knowledge retrieval
- Information extraction, automatic, and semi-automatic generation of metadata
- Database technologies for the Semantic Web
- Multimodality and visualization technologies for the Semantic Web
- Applications on mobile devices
- Human centred aspects specifically for the Semantic Web
- Impact of Semantic Web computing on organizations and society
- Evaluation of the quality of Web semantics
- Context-awareness for the Semantic Web
- Semantics for ubiquitous computing

PC-Chairs: Katia Sycara, Elizabeth Chang

Workshop Vice-Chairs: Ernesto Damiani, Mustafa Jarrar

IFIP WG 2.12/2.14 Chair: Tharam S. Dillon

Special Track Chairs: Elizabeth Chang, Ernesto Damiani, Mustafa Jarrar

Publicity Chair: Rajugan Rajagopalapillai

Program Committee Members: All IFIP WG 2.12 / 12.4 Members

**APPENDIX VII MINUTES OF BOF MEETING AT ASWEC 2006
ON SOFTWARE ENGINEERING EDUCATION**

**AUSTRALIAN SOFTWARE ENGINEERING CONFERENCE -
SYDNEY 2006**

**BIRDS OF A FEATHER SESSION: SOFTWARE
ENGINEERING EDUCATION**

MEETING NOTES

TO BE EXPANDED AND REVISED BY ALL ATTENDEES WHO WISH TO DO SO

BOF Attendees: (NB: Email addresses are as used to distribute the Meeting Notes)

NAME	ORGANISATION	PHONE
Dr Clive Boughton	ANU	0410 632 055
A/Prof David Carrington	UQ	07 3365 3310
Prof Geoff Dromey	Griffith Uni (SQI)	07 3875 5040
Dr Julia Prior	Uni Tech Syd	02 9574 4480
A/Prof Karl Reed	La Trobe Uni and Director ACS Sys & SW Eng Board	03 9479 1377
Dr Mark Staples	NICTA	02 8374 5549
Prof Leon Stirling	Uni of Melb	03 8344 1404
Jzng Sun	Uni Auckland	-
Prof John Potter	Uni NSW	02 9385 4334
A/Prof Paul Strooper	UQ	07 3365 1628
A/Prof Ewan Tempero	Uni Auckland	-
Nigel Basheer	Tenix	08 8300 4721
Daniel Berison	Systec	0408 880 278
Domenic Catania	ADI	08 9333 8816
Simon Fry	Tenix	08 8300 4454
Michael Harding	ADI	08 9333 8701
Ben Hicks	ADI	08 9333 8944
Dr Sanjay Mazundar	BAe Systems	0409 808 311
Carl Rogers	Object Consulting (Late Entry)	0412 155 183
Chris Skinner	DISplay	0414 990 834
Dean Wright	ADI	0438 749 904
Con Zachorakis	Tenix	08 8300 4546
Adrian Pitman	DMO - EWSD	07 3306 3251
Matt Ashford	DMO - EWSD	07 3306 6317
Thong Nguyen	DSTO	08 8259 6412

Adrian Pitman [AP]:

1. Provided an overview of concerns of the Defence Materiel Organisation [DMO] that their software acquisition task will increase by approximately 70%, but the availability of skilled software engineers is decreasing as course enrolments drop.
2. DMO is considering establishment of a “cadetship” program, or similar, as a mechanism to help address this issue.

Prof Geoff Dromey [GD]:

1. Students regard software engineering [SWE] courses as more difficult than other ICT courses; typically a 4-year course versus 3-years, with more mathematics involved.
2. For software and IT related courses, Griffith University enrollment numbers have declined by more than half over last 3 years.
3. Griffith University has been successful with targeted marketing campaign for multi-media studies, resulting in an increase of high caliber enrolments.

AP:

1. DMO has heard, anecdotally, declines in the order of 30 – 60% of enrollments across Australia for software and IT related courses. [General consensus]

Chris Skinner [CS]:

1. The dot.com boom has given a bad image to SWE as a career

A/Prof Karl Reed [KR]:

1. There has been a reluctance to admit the periodicity of demand for SWE is shorter than the time for students to be attracted to courses and complete them
2. There is a strong perception that too many ICT projects are failing
3. There is not enough attention paid to return on investment [ROI] for ICT projects

Sanjay Mazumdar [SM]:

1. The calibre of SWE graduates is reducing
2. BAE Systems has set up a cadetship program for SWE (and other) graduates
3. For defence work it takes 6-9 months for security clearances to be obtained and this fits in well with cadetship program
4. The ramp-up for graduates is extensive covering many management and process subjects eg CMM

Nigel Basheer [NB]:

1. A lot of practical aspects seem to have been cut from SWE courses recently
2. Tenix also runs a cadetship program

(BAE rep) or Tennix rep?:

1. Have needed to put a lot of effort into graduates
2. Graduates are strong on theory
3. Graduates are not as familiar with processes

Note: Australian Computer Society [ACS] and Engineers Australia [EA] (aka Institution of Engineers) have formed a Joint Board of Software Engineering to accredit SWE courses

Dr Clive Boughton [CB]:

1. Cannot teach an undergraduate SWE everything they ever need to know
2. ACS and EA need to state what is needed 3-5 years after graduation for a fully-capable professional SWE.
3. Currently, most of industry doesn't recognize the difference between a qualified SWE and anyone who can program. So some SWE grads are wondering about the advantage of an ACS/EA accredited SWE degree – ACS/EA need to be more active in getting industry to acknowledge and support SWEs as professionals.

KR:

1. Need further specialisation – and industry should define content
2. ACS has a committee chaired by Prof John Leaney which can progress this

Dr David Carrington [DC]:

1. Need to publicise the availability of cadetships and scholarships to students – the grapevine will react quickly and encourage enrolments
2. There has been a tendency to lower entry standards as enrolments have fallen and hence the capabilities of graduates can be expected to have decreased accordingly

Dr Pail Strooper [PS]:

1. Undergrad programs are fully subscribed (??)
2. Undergrad programs are not the appropriate stage to cover management issues because the students have no experience to relate to the material
3. Post-graduate programs are needed and they can then cover the process and management areas
4. Proposed (with consensus agreement) that a formal workshop on SWE education be included in next ASWEC (and in other suitable nearer-term events)

CS:

1. Need industry buy-in for the education workshop to be successful
2. Proposed paid internship program to articulate first degree in SWE to meet requirements for fully-rounded professional SWE to meet registration or certification standards on ACS and EA

SM:

1. In SA there is a Skilling Australia Defence Initiative [SADI] program supported by BAE Systems, SAAB and ASC, that included a Masters of Systems Engineering from UniSA

(BAE rep):

1. Need standardisation of qualifications (this will be covered by course accreditation process by JBSWE)

2. The funding for the program needs to be considered

CB:

1. Need to define the profession eg through the SWE body of knowledge [SWEBOOK]

KR:

1. Need to define the specialisations for post-graduate professional education

GD:

1. Proposed to form a working group of approx 5 people from meeting to progress the actions noted (suggested CB, AP, SM, KR ++ - to be confirmed by email).

CB, AP SM, KR, CS agreed to form core working group.

THE MAIN ISSUES THAT NEED ADDRESSING (CB)

As can be gleaned from the comments above, there are several counteractive forces occurring with regard to new SE/IT graduates at the moment. To help change the situation for the better, we need to consider a multifaceted approach, such as the following.

Revamp the content of SWE degrees – align them more with other engineering degrees where management, process, quality, etc. whilst being introduced, do not dominate over the necessary base skills – all of which are typically *design-driven*. This needs to be consistent across all Australian universities offering SWE degrees, so that industry knows what to expect of any SWE graduate. Hence, appropriate representatives of the ACS/EA, industry and universities need to be strongly involved with developing the key SWE graduate attributes, and developing solid content for degree program alternatives. Not all degree programs will necessarily be purely practice-oriented. There needs to be room for producing research students too. Obviously, approved mechanisms for achieving practice experience need to be defined as part the degree requirements (cadetships, sandwich courses, summer internships etc.).

The ACS/EA needs to develop a more strong-arm approach w.r.t. protecting the SWE profession. E.g., no one can call themselves an SWE unless they hold an accredited SWE degree. The ACS/EA needs to provide a map for status of SWE professionals in the same way as for other engineers (chartered, NPER etc.). Of course, these options may be deemed (by the ACS/EA) to be in place already, but I doubt that an SWE is either encouraged or knows of an appropriate path for progressing their professional status. So, ACS/EA needs to be hard lined with both industry and the academic community – an opportunity for leadership exists here.

Industry needs to express its needs and objectives (at least in regard to hiring SWEs) to both ACS/EA and academia. I say this with tongue in cheek, because as a long time industry person (and now an academic) the issue of industry expressing its needs is problematic, especially when I know that much of industry is “immature” w.r.t. SWE/IT matters and professionalism. However, there are proponents of industry that

strongly support SWE as a real profession and would like to see more qualified SWEs, but perhaps with some varying/differing skill sets. It's this part of "industry" that should express its needs. On the other hand, there is a serious question of different levels of competency in regard to qualifications in the SWE domain and thus other levels of qualification need to be determined – in general to meet the wider demands of industry to hire specialist tool users etc.

In addressing industry needs there's the broader context of demand and supply. Universities are subject to some of the (unnecessary) fluctuations that KR spoke of because of what is deemed to be happening in industry – say through journal/newspaper articles. University entrants need to be more informed about what's really happening in industry, so that they don't make ad hoc or short-sighted decisions. Information about demand (current and future) needs to flow more directly between universities and industry in order to build up a more realistic picture of fact. Of course, both sides need to accept that there will be fluctuations from time-to-time and not to over-react to falling numbers.

We need to think about the current problems being experienced by the various parties/stakeholders from a holistic perspective. Any of ACS/EA, industry or academia alone is not likely to identify anymore than self-interest solutions that may impact negatively on the SWE domain as a whole. So, let's all start thinking!!

APPENDIX VIII OUTCOMES OF POLICY FORMULATION MEETING BY ACS CS & SE BOARD

ACS TB CS&SE Policy Formulation Meeting-1 May 7 2004

ACS Victoria Office

Rev 2.0 Collated and Edited by Karl Reed

Attendees

Chris Avram: (VP and Sec. to CS & CE Board) chris.avram@infotech.monash.edu.au
Simon David: (Contractors and Consultants SIG) destina2@optusnet.com.au
Tom McBride: (Deputy Director, Standards, CS & SE Board) tommcbride@ozemail.com.au
Kevin Anderson: (ACS-Safety Club/SCS TC) riskpop3@netspace.net.au
Karl Reed (chair): (Director ACS CS & SE Board) k.reed@latrobe.edu.au

1. Outcomes Sought

- List of issues and areas that ACS should have policy on.
 - Some of these should have a one paragraph policy umbrella statement
 - High-level and
 - low level
 - Should either
 - Raise issue,
 - Offer a solution
 - Be critical
1. Should be credible to our members
 2. Address public issues
 3. Free of sectional bias
 4. Serve “National” interest
 5. Agenda setting

2. Topics On Which ACS Should Have Policy

Open Source
System Safety and Assurance
Organisation Capability “Standards”
Process Improvement
Procurement-Large Government Contracts
Outsourcing-Globalisation
Internet Security
Education
Engagement with Asia
Telecom Privatisation and Broadband
Mail and Internet Usage
ACS membership-Quals and Value
Software “Quality”-users perspective
Future Paradigms of IT Systems-Social Computing ZAIA³
Ethical use of technology

³ Zero Adoption Impact Applications is a concept due to Karl Reed

Professional Societies - Professional Reg., Product, Prof and Public Liability
Economics of IT Adoption
Standards and Standardization
Pornography
SPAM
Privacy
IP-Patent Law
Professional Liability

Note results should go to relevant ACS units for development
There is a bias here towards Software and Employment

3 OUTCOMES OF DISCUSSIONS-OUTLINES OF POLICY POSITIONS

3.1 System Safety and Assurance

- National Policy at Government Level required
- National Certification for systems such as
 - fire-safety, chemical process, manufacturing, mechanical transport system management and operation (ATC-Road Traffic-Rail etc.),
 - on-board auto/air/vehicle systems..to national and international standards
- Training
- Certification of competence of practitioners and organizations and assessors

3.2 Open Source

- Request that draft of current policy be circulated to relevant TB's and SIG's*
- Concern expressed that the full technical expertise of ACS is not being tapped. As a result, opportunities to improve the OS paradigm may be missed.*

3.3 National Procurement in a Globalised Economy

- SME friendly Government (and other) large-scale SW (and other) procurement practices.
 - Funding and governance issues
 - Project design and management for projects consisting of numbers of small companies
 - “Bonding” systems
 - Government contracts as vehicles for new product development, and skills development and training
 - Standards enforcement, especially quality

3.4 Surviving in a Globalised Economy

- Focus on high-value added and innovative products
 - Research and product development support to achieve this

- Out-sourcing for cost-savings is not credible
 - Current state of software engineering doesn't really support this
 - Need for research to develop highly leveraged strategies
- Specialisation-e.g. Games/film effects
 - (safety critical systems not seen as a local strength?)
 - Financial not seen as local strength hence SAP popular (?I'm not sure about this..KR)
 - Product-line development-COTS need to become a strength
 - Should economics be the only basis for government policy? Perhaps not.
- The creation of Australian Transnationals needs to be promoted.

3.5 Software Quality

- Software should be delivered with a quality certification- dealing with..
 - Traditional Software qualities
 - Fitness for purpose
 - Development of National Programs (including Australian and international best practice dissemination) to give Australia the lead.

3.6 Future Paradigms-Liability and Professionalism

- Future Paradigms for the evaluation of liability for (and) product liability (as expressed by Risk & Reliability Associates <http://www.r2a.com.au>)
- Base Case : Rule of Law, common law negligence tests of causation, foreseeability, preventability and reasonableness supported by seven different paradigms (in order of historic appearance):
 1. Traditional risk management typified by Lloyds insurance and Factory Mutual highly protected risk (HPR) approaches.
 2. Asset based risk management typified by engineering based Failure Modes, Effects and Criticality Analysis (FMECA), Hazard and Operability study (HazOp) and Quantified Risk Assessment (QRA) bottom-up approaches.
 - 3 Threat based risk management typified by Strengths, Weaknesses, Opportunities and Threats (SWOT) and vulnerability type 'top-down' approaches.
 4. Comparatively recent market based risk approach to variance with equivalent risk of gain as well as loss.
 5. Solution based 'best practice' risk management rather than hazard based.
 6. Biological, systemic mutual feedback loop paradigms, manifested in hyper-reality computer based simulations
 7. Development of risk culture /human factors concepts including quality type approaches.

3.7 Future Paradigms-Unusual Products, Services and Technologies

- ACS funded workshops to explore future directions in these areas
- Network of Skunkworks to demonstrate new and unusual products. Sell rights and licences to products
 - Government initial funded
 - Some Universities who have a TAFE connection

- Some Professional teams
- examples Linux watch at IBM
- New technologies
 - Molecular computing
 - Quantum computing
 - Agent technologies
 - Graphics
- Generic future directions
 - convergence of mobile phones-pda's-cameras
 - Computers in medicine (e.g. computer spinal column bypass)
 - Computer controlled palliative care-drugs to Spinal cord)
 - Use of internet as a huge computer-WHAT CAN WE DO WITH THIS?

STRATEGIC VISION

-Ubiquitous safety Systems-how could we use this conversion??

3.8 Standards and Standardisation

-Standards Development

- What standards does the IT community want.need?
- Government Support for Standards Development
 - National interest issue
 - Funding for standards development, verification and trialing (as in CCITT,now ITU/T)
 - Evidence-based standards where appropriate
 - National Standards Laboratory for standards research (cf US NIST ,US\$700m p.a. Appendix I)
 - Standards research funding scheme (competitive, but not ARC)
 - Refereed Journal (JRPIT model)
 - Funding of participation in standards for SME staff and academics/researchers
 - Benefits to the Nation-Competitive advantage

-Use of Standards

- Encourage use of relevant standards – to
 - improve risk management
 - improve legal awareness of standards
 - Formal adoption of particular standards for legal purposes-in national law (some impact on liability insurance)**
 - Government procurement
 - Corporate & Project Governance

-PAYOFFS

- reduction in public liability insurances in certain cases**

-permit a Govt. insurer to enter market to increase competition by making use of lower risks to reduce premiums

3.9 Internet Security (these views are intended to support, validate and encourage existing efforts by the CS Board, not as criticisms)

- National Research Institute on IT Security
- Introduction of Security Certifications (practioners, organizations, assessors)
- Legislative Response to IT Sec. Proposals
(E.G. OECD Guidelines)
- Public Inquiry (Parliamentary?) into why the legislative response is delayed
- Public Inquiry into Internet Security
- Security UG Degrees

Appendix I US National Institute of Science and Technology

<http://www.nist.gov> (choose budget link) (~A\$6M p.a. on a per-capita basis..)

NIST has an operating budget of about \$771 million for fiscal year 2004 (Oct. 1, 2003 to Sept. 30, 2004). NIST appropriations provide \$331.1 million for measurement and standards research in the NIST Laboratories; \$5.4 million for the Baldrige National Quality Program (BNQP) to promote and recognize organizational performance excellence; \$38.6 million for the Manufacturing Extension Partnership (MEP), an outreach program providing assistance to small and mid-sized manufacturers in all 50 states; and \$169.1 million for the Advanced Technology Program (ATP) to partner with industry to develop broadly beneficial new technologies. NIST appropriations also include \$64.3 million for renovation and repair of NIST facilities in Gaithersburg, Md., and Boulder, Colo., most of which are 35 to 45 years old, and other construction projects.

In addition, NIST expects to receive about \$39.9 million in fees for reimbursable services such as calibrations, measurement standards, and laboratory accreditation. Other federal agencies support an estimated \$122.5 million of research in the NIST Laboratories during FY 2004.



Australian Safety Critical Systems Club

A National Special Interest Group of the



Annual General Meeting held at Eden on the Park, Melbourne, 31-August 2006

AGENDA

Apologies

Allan Coxson, Clive Boughton, Rob Worthington, Alex Moffatt, Peter Hartfield

Election of 2006/07 Committee

The 2005/06 committee members, Kevin Anderson, Chris Edwards, Tony Cant, Clive Boughton, Rob Worthington, Alex Moffatt, Peter Hartfield, David Goedecke and Allan Coxson all nominated to continue as committee members for 2006/07.

Constitution Change

The proposal to change the aSCSa mission statement:

Current statement:

Help ensure that safety-related computer based systems achieve a sufficient level of safety throughout the entire system lifecycle.

Proposed statement:

Raise the awareness of the engineering and wider community of the safety issues specific to software-intensive systems and to provide leadership and guidance.

Membership

The membership as of 30 June 2006 was 107, an increase of 29 due predominantly to allowing event registrants to apply for membership at the time of registration for the event and thereby avail themselves of the member discount. However 45 members failed to pay their 2005/06 membership fees. There have been 2 resignations over the period.

Financial Position

Financially, the organisation is healthy with some \$99K as of 30 June 2006 compared with \$70K at 30 June 2005. However the aSCSa has yet to receive an invoice from the ANU for its share of The University of York's fees for the ANU-HISE course held in April 2006. The aSCSa share of the University of York's fees is 20/27 and is estimated to be \$26K – thus leaving a kitty of some \$73K.

Newsletter

Newsletters were published in December 2004 and June 2005. Articles are now being included.

Profile

- An article about the Club was to be published in August-September edition of Information Age.
- A link to the Club's webpage now exists on the ACS webpage "Related Societies and ACS Groups."
- The aSCSa has lodged a corporate membership application with the System Safety Society (Fees paid July 2006).
- Articles by Tony Cant and George Nikandros published in UK Safety Club September 2005 Newsletter.

Events

The following events were held during 2004/05:

- The 10th ACS Workshop on Safety Related Programmable Systems – Sydney, 25-26 August 2005
- Course – Introduction to Safety Engineering and Management ANU-HISE (University of York) – Canberra, 3-7 April 2006.

All events were well received by the participants and were financially successful.

The following events have been planned for 2006/07:

- The 11th ACS Conference on Safety Related Programmable Systems – Melbourne, 31 August – 01 September 2006
- Course – Introduction to Safety Engineering and Management ANU-HISE (University of York) – Canberra, early April 2007.

Certification of Safety-Related Practitioners

Certification remains a key issue. CMACS initiative is dead.

Website

Through the generosity of the ANU to provide a repository for the resource material accumulated from past events, past presentations are now accessible on line through the aSCSa website.

Other Business



From the Chair

Since the last newsletter, the aSCSa Committee has been very active arranging the 2006 Conference and hosting a five day York University course - *Introduction to System Safety Engineering and Management* in association with the Australian National University (ANU). The course was presented by Dr David Pumfrey and Mark Nicholson of the University of York. I thank the ANU again for co-hosting this event through the Masters of Software Engineering program.

The aSCSa also participated in the ACS Queensland initiative *Technologists In the Public Interest (TIPI)*. As aSCSa chairman, I was invited to prepare a paper for the initiative to raise awareness and stimulate debate. I also participated in two workshops.

More information of the TIPI initiative and my paper are included in this newsletter.

I thank my aSCSa committee colleagues Chris Edwards, Clive Boughton and Kevin Anderson in reviewing my paper for TIPI.

George Nikandros
National Chairman

Association Matters

Annual General Meeting

The 2006/07 Annual General Meeting will be held on Thursday, 31 August 2006 in conjunction with the 2006 Conference at Eden on the Park, 6 Queens Road, Melbourne VIC 3004.

The meeting will commence 4:10pm.

The meeting will be asked to vote on the proposed change to the Association's Constitution Mission Statement. The proposed statement is:

Raise the awareness of the engineering and wider community of safety issues specific to software-intensive systems and to provide leadership and guidance in matters of safety.

Continues Page 2

11th Australian Conference
MELBOURNE, 31 August – 01 September 2006
Eden on the Park, 6 Queens Road
Safe Software Architectures

The Australian Safety Critical Systems Association announces its 11th National Conference on Safety Related Systems. The 2006 conference will be held in Melbourne and will have a software architecture theme.

Critical functions for example safety, security, mission success and financial transactions are often entrusted to software intensive systems. Software architecture is the key to whether such systems can really be trusted.

Continuing the very successful format of recent annual conferences, a number of international Keynote Speakers will address this topical issue. International speakers include:

Klaus Marius Hansen
University of Aarhus, Denmark

David Garlan
Carnegie Mellon University, USA

Tim Kelly
University of York, UK

Jakob Gärtner
Esterel Technologies, Germany

Questions? More Information?

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See Page 2 for more details

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Association Matters (continued)

Membership

Membership has grown significantly over 2005/06. It now stands at 107 (an increase of 29). However 45 members failed to pay their 2005/06 membership fees. There have been 2 resignations over the period.

The increase is largely due to the policy of offering an attractive discount to members participating in the Association's events and allowing participants to become members when registering for these events.

Membership renewal notices for 2006/07 have been issued.

National Committee

George Nikandros	Chairman
Kevin Anderson	Secretary
Chris Edwards	Treasurer
Tony Cant	Workshop Program Chair
Clive Boughton	Certification & Canberra Chapter Chairman
Robert Worthington	
Peter Hartfield	
Allan Coxson	
Alex Moffatt	
David Goedecke	

Web Site www.safety-club.org.au

The term of the current committee expires 30 June 2006. As per the constitution the 2006/07 chairman is elected by the outgoing committee and all other committee positions are declared vacant. George Nikandros will continue as chairman for 2006/07 and all current committee members have agreed to continue.

Anyone interested in being a committee member is invited to contact the Association's Chairman by 31 July 2006.

Website

As previously reported the Association's website is limited to 10MB and hence is not sufficient to publish workshop presentations. In the December 2005 newsletter we advised that the larger resource items e.g. past conference presentations have been loaded on the aSCSa's resource repository hosted by the Australian National University.

Some links to the resource repository have now been provided. These links have been embedded within the program for the particular event. We expect to have a more direct link via resources webpage before the end of 2006.

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School of Information Technology
& Electrical Engineering

Development of Safety Critical Systems 3-day course

Next offering: 7-9 August 2006

Safety is a whole life cycle issue that relates to all aspects of the system. Hardware, software, operating procedures, planning, development, testing, maintenance, installation, commissioning, decommissioning, disposal and other aspects are considered in a safety program.

For most safety-critical systems, it is insufficient to simply develop a safe system; the system must be shown to be acceptably safe. The lecture component of this course explains the principles and practice of safety management and engineering and the unique challenges of computer-based systems. The content blends discussion of management and development issues with practical experience in safety analysis techniques. Topics covered include: hazard identification and risk analysis, safe system design, safety analysis techniques, safe software engineering, system hazard analysis, safety cases, safety management and human factors, and formal methods for system specification. Techniques covered include: Hazard and Operability Studies (HAZOP) and Computer Hazard and Operability Studies (CHAZOP), Fault Tree Analysis (FTA), Event Tree Analysis (ETA), Failure Modes and Effects Analysis (FMEA) and Failure Modes Effects and Criticality Analysis (FMECA), and Goal Structured Notation (GSN).

Assumed Background

It is recommended that participants have taken ENGG7000 or have had other experience of systems development and the system lifecycle. Familiarity with software engineering principles is desirable but not essential.

Cost & Venue:

\$2200 incl. GST, course notes, lunch & refreshments
GP South (Bldg 78), The University of Queensland, St Lucia

To register:

contact Virginia Garton (07 3365 1003,
email virginia@itee.uq.edu.au)

Registration deadline: Monday, 1st August, 2006

For further information:

www.itee.uq.edu.au/~engg7020/DSCScourse.htm

2006 Conference

Once again the aSCSA will be hosting a conference along the same lines as the acclaimed conferences of Adelaide (2002), Brisbane (2004) and Sydney (2005).

The 2006 (11th) conference – see advert Page 1- has a software architecture theme. The two day programme will include four invited internationally renowned speakers:

- **Klaus Marius Hansen** – Dr Hansen is an Associate Professor at the Computer Science Department, University of Aarhus and Deputy Manager of the software area of the ISIS Katrinebjerg competency centre. Furthermore, he is scientific manager of the infrastructure group of the Danish national network for pervasive communication. His research areas include software architecture design and analysis, object-oriented modelling, techniques and tools for experimental object-oriented system development, and pervasive computing. Klaus received a Ph.D. in Computer Science from the University of Aarhus in 2002.
- **David Garlan** – Dr Garlan is a Professor in the School of Computer Science at Carnegie Mellon University, where he leads several research projects and is the Director of the Master in Software Engineering Programs. He received his Ph.D. from Carnegie Mellon University in 1987. His research interests include software architecture, ubiquitous computing, self-adaptive systems, formal methods, and software development environments.
- **Tim Kelly** – Dr Kelly is a Lecturer within the Department of Computer Science at the University of York. He is also Deputy Director of the Rolls-Royce Systems and Software Engineering University Technology Centre funded at York. His research interests include safety case management, software safety analysis and justification, software architecture safety, certification of adaptive and learning systems, and the dependability of "Systems of Systems". He has published over 70 papers on high integrity systems development and justification in international journals and conferences. He is also Managing Director of Origin Consulting (York) Limited – a consultancy company specialising in safety critical systems development and assurance.
- **Jakob Gärtner** – Jakob is the Technical Director of Esterel Technologies (Germany). He specialises in formal methodologies, automatic certified code generation, and open system architectures. His work builds on experience in aerospace, rail and marine projects, and solid computer science.

Included in the programme is a dinner function on the Thursday evening. This will be an excellent opportunity to network in a relaxed atmosphere.

Also included is a post-conference event to allow visitors to experience the Melbourne hinterland.

For registration and programme details, please visit the Association's website at www.safety-club.org.au. Unlike

recent conferences this year's conference registration does have a provision to join the aSCSA to claim the member discount.

Southwest Airlines Flight 1248 crash

Source: Risks-Forum Digest Volume 24, Issues 15 and 16 located at:

<http://catless.ncl.ac.uk/Risks/24.15.html> and
<http://catless.ncl.ac.uk/Risks/24.16.html>

Post Date: Fri, 27 Jan 2006
Posted by: Joe Thompson

Post Date: Tue, 31 Jan 2006
Posted by: Peter Ladkin

The NTSB has issued an advisory A-06-16 as a consequence of the Southwest Airlines Flight 1248 crash in Chicago on December 8, 2005. The Southwest airline flight 1248 on landing at Midway Airport in a snowstorm rolled off the end of the snow-contaminated runway -- where it tore through two fences and stopped in an intersection, hitting two cars. A 6-year-old boy in one of the cars was killed.

According to Joe Thompson the NTSB reported that the thrust reversers did not deploy properly, causing the plane to overshoot the end of the runway.

The posting by Peter Ladkin gives more insight into the mishap. According to Peter Ladkin, the pilots had used an "on-board laptop performance computer (OPC)" to calculate landing distances to determine whether they could land at Midway in the snow-stormy conditions. The crew input weather data and entered runway braking conditions as "WET-FAIR" in the OPC. The OPC calculated that the airplane would be able to land and completely stop with 560 feet of runway remaining. However, "the OPC is programmed to assume that the engine thrust reversers will be deployed on touchdown" and they were not so deployed. They deployed 18 seconds after touchdown. "If the reverse thrust credit had not been factored into the stopping distance calculations made by the OPC, it would have indicated that a safe landing on runway 31C was not possible under a braking condition of either fair or poor". A point of contention right after the accident was that the pilots had apparently activated the automatic brake system in violation of Southwest policy, but the NTSB concluded the crucial factor was the unanticipated 18-second delay in the thrust-reversers deploying. As a result, NTSB is urging the FAA to prohibit allowing for thrust-reversers in onboard stopping-distance calculations. (Before landing, the crew had used the onboard computer to calculate stopping distance for "wet-poor" conditions; those calculations assumed the thrust reversers would deploy normally.)

In other words, an implicit assumption made by the OPC program led to the OPC indicating to the pilots that they could land safely on runway 31C when, under the conditions that actually obtained during the landing, the OPC program would have indicated that they could not do so without overrunning.

The reasons for the delayed deployment of reverse thrust have not yet been publicly determined by the Board.

Pilot reliance on the OPC seems to be a key causal factor in the mishap. Without any knowledge of the OPC, one can only speculate as to the rigour of its development or the understanding by its developers of the consequences of reliance upon it.

Association Matters (continued)

Finance

As of June 30, 2006, the Association has some \$70K in accumulated funds. These funds are not the profit made over the year, but are the funds that have been accumulated over the last 10 years; 7 of those years as the ACS National Technical Committee on Safety-Critical Systems.

The aSCSa essentially broke even over this financial year.

The committee intends to continue to use these funds for conferences and educational activities. The association's administration costs will rise as the reliance on the committee members' employer organisations reduce.

Affiliations

The aSCSa Committee has joined the System Safety Society as a corporate member. The System Safety Society is a non-profit organisation supporting safety professionals worldwide. With a wide range of individual and corporate members, the Society is affiliated with major corporations, educational institutions and other agencies.

As a corporate member, we get our logo and a link to our website, hopefully raising our profile internationally.

Education - Safety Critical Systems

Again this year aSCSa and the ANU organised the High Integrity Systems unit from the University of York to present a 5 day intensive course on Systems Safety Management. The course is an elective within the ANU Masters of Software Engineering program and industry participants are encouraged to attend through advertising by aSCSa. This year there were 7 MSE students and 20 industry participants from various organisations such as Boeing, CSC, CSR, Dept. of Defence, SAAB, Thales, Union Switch and Signal, and Westinghouse. University of York sent two presenters in David Pumfrey and Mark Nicholson. Workshops were run with the help of Clive Boughton, Brian Molinari, Malcolm Newey, and Gordon Stone.

As with last year, the course was well received by all. A couple of the industry participants decided to attempt the assignment that is used to assess the masters students. They have 6 months to hand in their attempts if they want them assessed. All industry participants will be receiving certificates in the mail.

The course will be running again next year (see advert) at around the same time at ANU. Once the date has been finalised, aSCSa will advertise for industry participants. There were no prerequisites for participation.

Technologists in the public interest

Source: Information Age, April/May 2006 and June/July 2006.

In response to a sustained decline in interest in ICT in schools and universities and acknowledging the critical importance of ICT for economic growth, the Queensland State Premier, Peter Beattie announced a national skills summit, an initiative of the Queensland Minister for ICT Policy, Chris Cummins. Sharing these concerns, the Premier also provided the ACS with an opportunity to lead a separate event *Technologists in the public interest (TIPI)*, a phrase coined by ACS President Philip Argy and initiated by the ACS Queensland Chairman, Mark Lloyd.

TIPI seeks to promote debate in the ICT community about what should be the minimum codes of conduct, standards and training for ICT workers. The outcome expected is:

- A cohesive identity – something better than geek, nerd, propeller-head, computer professional, system analyst;
- A competence framework – what are the base skills, what are the skills required for particular specialisations?
- An ethical framework – is there a need for an enforceable code of ethics?
- A governance structure – many associations represent the ICT industry; there is no peak body to ensure competence and ethics.

Research papers have also been completed and these act as resource material and thought starters for attendees at various workshops. The papers cover Safety Critical Systems, Security Certification, Ethics, and how traditional professions (Engineering, Financial Planners, Law and Teaching) have addressed the issues that TIPI is attempting to address.

The Premier of Queensland has planned to deliver his annual address to the ICT industry on August 11, with the National Skills Summit and TIPI featuring prominently.

2005 Workshop

The papers for the 10th Australian Workshop on Safety Critical Systems held in Sydney on 25-26 August 2005 have been published and are available at the ACS Conferences in Research and Practice in Information Technology website (<http://crpit.com/Vol55.html>).

Hard copies will be distributed to members.

**Introduction to System Safety
Engineering and Management
(Content to be confirmed)**

Day 1	<ul style="list-style-type: none"> • Introduction and Safety Concepts • Development for Safety • Preliminary Hazard Identification & Case Study • Modelling Event Sequences • Case Study: Chemical Containment Fault Tree • Risk Assessment
Day 2	<ul style="list-style-type: none"> • Functional Hazard Assessment • Case Study: ARP4761 WBS FHA • HAZOP • Case Study: Process Plant HAZOP • Systematic failure • Safety Integrity levels
Day 3	<ul style="list-style-type: none"> • Safety Analysis techniques 1 • Case Study: AGV Fault Tree and FMEA • Safety Cases 1 • Case Study: Safety Case Construction • Safety Cases 2
Day 4	<ul style="list-style-type: none"> • Safety Analysis Techniques 2 • Preliminary System Safety Assessment • Case Study: ARP 4761 WBS PSSA and SSA review • Common Cause Analysis • Safety case: Common Causes • Introduction to Software Safety
Day 5	<ul style="list-style-type: none"> • Safety Management • Case Study: AGV Safety Management • Human factors • Safety Culture • Conclusions • Bibliography • Glossary

Australian National University

April 2007

**Registration
(to be advised)**

**Contact aSCSa Secretary to register
interest and for more information**

Early bird and group discounts

Bulletin Boards

ACM Risk Forum On Risks To The Public In Computers and Related Systems – <http://catless.ncl.ac.uk/Risks>.

Safety-Critical Mailing List Forum hosted by the University of York. Need to join using the form located at www.cs.york.ac.uk/hise/text/sclist/form.php for access.

ICT When it really has to matter!

This paper was prepared for reference material for the ACS Technology in the Public Interest initiative.

Author: G. Nikandros, aSCSa, submitted April 2006

**Information and Communication
Technology -
When it really has to matter!**

Abstract

In this paper I discuss the ever-increasing reliance of Information and Communication Technology (ICT) for mission critical and safety-related systems. The flexibility of the technology entices its use for applications never before contemplated. However, can or should ICT be trusted for such applications and if so, how?

Examples are cited where ICT was a significant contributor in the loss of life and/or mission failure and considers the effectiveness of regulation within Australia in the control of such risks.

Keywords: information, communication, technology, ICT, mission, critical, safety, regulation

Introduction

If a builder has built a house for a man and his work is not strong and the house falls in and kills the man, then the builder shall be slain.

Code of Hammurabi, 2150 BC (Underwood, 1996)

If such a code applied to ICT systems today then perhaps the enthusiasm to exploit the technology would be somewhat curbed.

ICT has moved beyond simple administrative functions; it now runs the family car, microwave oven, washing machine and even amusement park rides, to name but a few. The train you travel on or the plane you fly both depend on ICT to get you to your destination safely. You even rely on ICT to correctly process your "000" emergency call (Nikandros, 1998).

In fact, ICT systems are now controlling many complex processes in industry. Industry examples include chemical processing, manufacturing, transport, power generation and distribution, medical devices, telecommunications, mining machinery, and fire and protection.

Yet despite this ever-increasing reliance "bugs" are still regarded as being synonymous with ICT – often up to 10 per thousand lines of code. In no other "product", is the community more tolerant of defects - so much so that terms like "good enough software" are often used.

What can go wrong?

There have been numerous instances where ICT was considered to have been the significant contributor to the failure directly leading to substantial loss. Two of the more publicised examples are the Therac-25 radiation therapy machine and the Ariane 5 rocket launch vehicle.

Therac-25

Between 1985 and 1987 the Therac-25 massively overdosed 6 people. The direct cause was the re-use of software from an earlier model, the Therac-20. However, unlike the earlier model, there were no hardware safety interlocks. These safety interlocks effectively masked the software errors in the Therac-20, consequently the software was assumed to have had a proven safe history and therefore was accepted as is, without the safety interlocks. (Standards Australia HB220-2000)

Ariane 5

In 1996 an Ariane 5 exploded during the launch phase and resulted in the loss of a communications satellite. The explosion was blamed on a complete loss of guidance and altitude information 30 seconds after lift-off. The guidance system gave a wrong command to the boosters. The cause according to the official report was that "the loss of information was due to specification and design errors in the software of the inertial reference system. The extensive reviews and tests carried out did not include adequate analysis and testing of the inertial reference system or the complete flight control system, which could have detected the potential failure." (Standards Australia HB220-2000)

Software from Ariane-4 had been used in Ariane-5 without testing. When subjected to higher accelerations, the software (calibrated for Ariane-4) ordered an "abrupt turn 30 seconds after lift-off", causing the airframe to fail. Apparently, conversion from a 64-bit floating representation to a 16-bit signed representation caused an Operand Error. (Neumann – New Material)

Other Examples

The following paragraphs are further examples of ICT failures:

- On January 23, 2003, a Singapore Airlines (SIA) Boeing 747-400 experienced a complete loss of information on all six integrated display units (IDUs) while in cruise flight from Singapore to Sydney, Australia. The pilots flew the airplane for 45 minutes using standby flight instruments, namely an altimeter, airspeed indicator, and artificial horizon/attitude indicator i.e. no traffic alert and collision avoidance system, enhanced ground proximity warning system, or weather radar. (National Transportation Safety Board, 2003)
- Der Spiegel Issue 12/1999, page 226 gives an analysis of an accident in which a baby was killed by a deploying air bag in a Volkswagen Golf after having been disabled in a certified garage. Deactivation is a software control function. However if the system self-checking detects an error, the current configuration is automatically replaced by back-up software held in ROM. The back-up only knows simple rules e.g. deploy all air bags on impact. (Risk Digest Volume 20: Issue 28)

- A woman in Düsseldorf, Germany, told the court that she had been erroneously informed of having incurable syphilis and had passed it on to her daughter and son. As a result, she strangled her 15-year-old daughter and attempted to kill her son and herself. She was acquitted. The insurance company said the medical information had been based on a computer error – which could have been a lame excuse for human error. (Neumann)
- As many as 20 deaths may have been attributable to the London Ambulance Service's inability to dispatch ambulances in response to emergencies. After severe difficulties in system development, including repeated test failures, the system was finally placed in operation. The system then collapsed completely, including worst-case delays of 11 hours. "An overcomplicated system and incomplete training for control staff and ambulance crews are the likely causes...." (Neumann)
- In late Spring of 1983, there was serious flooding from the Colorado River resulting in six deaths and damages costing millions. The problem was traced to a bug in the computer program that had modelled the flood process and predicted how much water should be stored. (Neumann)
- A payroll blunder left the Brisbane City Council responsible for bus drivers incurring late mortgage fee and bank fee penalties as the result of 1400 bus drivers not being paid on time. The council has blamed a computer payroll error for the mistake. Brisbane ratepayers will be required to cover the cost of the late payment penalties incurred. This was the second major payroll problem in seven months. (Courier Mail, 2006)
- The Tokyo Stock Exchange suffered its worst ever outage on 02-Nov-2005 when trading was suspended for four and a half hours due to a software problem. The glitch appeared to be connected to the decision to expand the trading system's capacity the previous month in response to high trading volumes. The modified system had worked well, but crashed when the automatic monthly clean-up of the software was implemented. A back-up system also failed because it also used the same software. (Risk Digest Volume 24, Issue 9)

Software Flexibility

Software is an "intangible" - by itself it cannot cause harm. Not being a "physical" artefact, software developed for one purpose can be used for other purposes, beyond which the designer originally envisaged. These other purposes may have much higher safety risk compared to the purpose for which it was originally designed. (Standards Australia HB220-2000)

To illustrate this point, who would have envisaged that the Microsoft® Access data base application would be the underlying software platform for a legal euthanasia machine?

In 1995, the Northern Territory amended the *Rights of the Terminally Ill Act* to allow a terminally ill person

experiencing pain and suffering to request their doctor to assist them in terminating their life.

Dr Philip Nitschke, assisted by a computer technician, developed such a device after Australia's Northern Territory passed that law. It consisted of a laptop computer loaded with the *Deliverance* software, a syringe driver and other standard medical components. The patient operated it via the keypad. Answering 'Yes' to a series of questions led to the release of a fatal injection. Between 1996 and 1997 four people were legally allowed to use the machine before Australia's Federal Parliament overturned the controversial law.

According to Uhlig and Martin, 1996, the computer program, *Deliverance*, checked that a patient realises what he or she was doing before administering a lethal dose of barbiturate. It used an adaptation of Microsoft® Access, a database program. Once all the questions are answered affirmatively, a signal goes from the computer's parallel port - normally used to connect a printer - via a relay switch to an air compressor that pushes the plunger of a syringe containing the appropriate drugs.

One can only wonder what would have happened if the "Print Screen" key was pressed (accidentally or deliberately). Would this have compromised the safeguard provided by the question sequence? What about the integrity of the electronic interface between the parallel printer port and the powered syringe delivering the deadly drug cocktail? What if all the questions were answered and the syringe failed to operate? Imagine the psychological stress on the patient.

Software – the case for regulation?

Leveson (1992) provides a strong case as to why the development of software should be regulated. Her argument parallels the development and use of steam power to that of software highlighting the similarities. The following paragraphs in italics are from Leveson, 1992.

James Watt, through his research and development of steam engines, had patented several important ideas which prevented others from building rotating steam engines.

The Watt engines used low pressure steam which limited both their efficiency and economy. High pressure would have permitted more powerful engines, but Watt opposed it on the grounds that it increased the danger of explosion and thus constituted an unacceptable risk.

Watt's patents expired in 1800 and such high pressure engines soon made their appearance. Steam power was transforming industry and therefore very important to the economy and national growth. Until 1800, such growth had been constrained by Watt's patents.

Death and injury increased significantly following the increasing spread of the use of high pressure steam engines in steamboats and industrial plants. These often resulted in disastrous explosions.

Boiler technology lagged the development of the engines. Engineers quickly amassed scientific information about thermodynamics, the action of steam in the cylinder, the strength of materials in the engine, but had little scientific understanding about the build up

of steam pressure in the boiler, the effect of corrosion and decay and the causes of boiler explosion.

The early steam engines used inferior materials; they had low standards of workmanship; the mechanics lacked proper training and skills; and there were serious problems with quality control.

In England, Watt's campaign against high pressure engines supported by well publicised accidents slowed their adoption.

In the USA between 1816 - 1848, a total of 233 steamboat explosions had occurred in which 2562 persons had been killed and 2097 injured with property losses in excess of \$3M (1840s value).

Watt and others were correct in their beliefs, that standards were essential in the design, manufacture, and operation of steam engines.

These high standards were finally enforced in Britain in the latter period of the nineteenth century. Boiler explosions dropped to 14 deaths per year (in 1905) as compared to 383 in the USA. Eventually USA enforced such standards.

Society is now in the computer age and it is now again faced with a technology for which there are great economic incentives to push the state of the art and to use this technology to control dangerous systems.

Computers, like steam engines and electrical systems, give users the ability to accomplish things we could not accomplish before. And again, it appears that the risks could increase over time as computers take over more and more functions.

Like boilers, the scientific foundations of the software engineering field are still being developed. Changing from an art to a science requires accumulating and classifying knowledge. Although this is happening, more effort is being expended on new inventions and building tools for unproven techniques.

The paper continues to discuss the need for those involved in the computer industry to understand the hazards associated with the systems they are building and the need for appropriate skills and knowledge to manage the development and use of these systems.

Software – legal issues

The following paragraphs are from the December 2004 edition of the Australian Safety Critical Systems Club's newsletter article titled *Software and the law*.

Society's tolerance towards "buggy" software is very much contrary to its tolerance to faulty products and services in general. When it comes to software it seems, society is prepared to tolerate defects as long as the software generally provides the functionality expected.

As a consequence of society's complacency in relation to software, lawmakers have tended to shy away from the complex issue of software liability.

In an article Beware of Faulty Software published in Engineers Australia Magazine (July 2004), David Neiger, a mechanical engineer and lawyer, provides some valuable insight into the peculiarities of software in relation to the Australian Trade Practices Act and the various State Fair Trading Acts.

Whilst statute law in relation to negligence is clear, in that designers of faulty products are liable for any

reasonably foreseeable loss or damage that arises for the use of the products, these laws are not so clear in relation to software – is software a product?

“Most cases involving computer software rely upon intellectual property rights such as copyright, patents and design. No one thought of software as a good.....”

“At first, object code (the 1s and 0s stored in a ROM or on floppy disks) was not thought of as a property at all because the judges did not consider the electrical charges in a ROM or magnetic pulses on a disk to be a “literary work” worthy of protection. However, source code, which could be read by a human was considered to be a literary work and was protected under copyright law. In 1984, after an appeal, the judges were finally convinced that both source and object (machine) code were literary works that could be protected under copyright. This was enshrined in legislation with the Copyright Amendment (Digital Agenda) Act 2000.”

“While computer programs are considered literary works, they are not covered by the same rules of product liability as physical goods or services. The way the law is presently, the vendors license you to use the computer program in accordance with the conditions of the End User Licensing Agreement (EULA) contract.”

By making the use of the software conditional on ‘voluntary’ acceptance of a EULA, liability is effectively transferred from the software vendor to the software end-user. However goods and services involving the use of the software are very much subject to the Trade Practices Act. Further, engineering software tools, being ‘literary works’ would not be regarded as consumer goods, and as such would not have the statutory warranty protection provided by the Trade Practices Act.

David Neiger sums up the issue thus:

Ultimately, as engineers, we are responsible for the output of any computer programs, so if your CAD package or machine control software fails and your designs are faulty, you, rather than the software vendor will be held liable.

If you write software, you impose any conditions you want in your EULA, so you might as well exclude everything. And be particularly careful if you supply goods that rely on software as you may still be liable, even if the software is at fault unless you have negotiated a different contract with the software vendor.

It follows of course, those procurers who specify (mandate) software packages to be used in relation to the goods and services to be supplied incur liability arising from the use of the software.

Standards Australia (HB220-2000) gives a concise and clear explanation of the laws in relation to liability, namely the Common Law Tort of Negligence and the Commonwealth’s Trade Practices Act – Product Liability.

The Common Law Tort of Negligence

The Common Law Tort of Negligence is available to anyone at anytime. However it can only be applied when:

- harm has occurred; **and**
- a “duty of care” existed towards the injured party; **and**
- the expected “standard of care” was not met; **and**
- the harm was a foreseeable consequence of the breach of care.

A “duty of care” is owed to anyone who might have been foreseen as affected by the consequences of your act or omission. The “standard of care” is the standard that should be exercised by an ordinarily competent and diligent member of the profession.

In such actions, the courts will look to industry and professional standards to determine the “standard of care”.

Trade Practices Act – Product Liability

Like Common Law, contracts cannot exclude liability under the Trade Practices Act. The developer/supplier and procurer have obligations under the act. Under the act, in terms of safety, “....goods are defective if they do not provide the degree of safety which persons generally are entitled to expect [in all the circumstances]....”. It includes not only the specified use of the product, but also reasonably foreseeable misuse.

The goods covered by the Act include systems containing software. This means that developers and procurers of such systems are legally liable for their safe operation throughout their life. It should be noted that if the goods were defective solely because they complied with a mandatory standard, or that the state of scientific knowledge was such that the defect could not be discovered at the time of the sale, then the supplier has a strong case against a claim under the Trade Practices Act.

Standards

Standards and their compliance are essential in minimising the risk of legal action.

Numerous standards (international, some adopted by Australia) now exist, both for general and industry specific ICT mission-critical and safety-related applications. Because the state-of-the-art in relation to ICT is still very much evolving, the standards somewhat differ in their requirements. This proliferation of conflicting standards has created a situation where developers cannot be certain that the particular standards adopted will satisfy a future court that the standard of care was appropriate at the time. After all Courts are required to adjudicate after some loss has occurred; this may be long after the critical decisions were made. They also have the benefit of hindsight.

All standards acknowledge that rigorous testing alone is insufficient due to the complexity of ICT systems. The nature of ICT is such that defects are difficult to detect; they lie dormant until the conditions arise to reveal them, often with serious consequences. Civil and mechanical engineers, for example, use well-established continuous models supported by extensive data that enable failure predictions with some accuracy.

Standards for ICT systems are generally process focussed. The theory is that the application of robust and rigorous processes correctly applied to all phases of the system life cycle will strongly support a claim that the ICT system is appropriate for the intended application.

However processes alone are not sufficient; there needs to be the proper framework to support those processes. Key is the definitions of roles and responsibilities and ensuring that those so assigned have the necessary competence and required independence.

Competency requirements for ICT practitioners

Many in the ICT industry today remain largely unaware that standards exist; they don't know what they don't know. This goes for both organisations as well as individual ICT practitioners.

The underlying premise of standards relating to safety/mission critical ICT, is that a system being developed has to be considered critical until justified otherwise. Also, today's practitioners usually consider only the functions that a system has to perform; not the functions that it must not.

Software functionality is virtually limitless – it is the processing hardware which limits functionality – and software is often made complex so as to allow its use for many varied applications. Much of today's software is able to be customised through e.g. configuration parameters, add-ins etc. This flexibility substantially increases the state space so as to make complete testing impossible for all but trivial applications.

Much of today's software development (customisation/integration) involves the use of commercial-off-the-shelf (COTS) ICT. However the intended use may be for an application not originally considered by the COTS product developer. The user of the COTS product is most likely not aware of its limitations. More disturbing is the increasing use of software/system-of-unknown-pedigree (SOUP); as not only are the limitations unknown, but there is no evidence of its quality.

Legislative requirements

In Australia, there is currently little regulation in relation to the safety/mission criticality of ICT. Whilst there are laws covering safety, these laws are very much focussed towards workplace health & safety (WH&S). Apart from the laws governing drugs, poisons and therapeutic goods, there is little in relation to public safety.

Of those practitioners involved in the ICT industry only professional engineers are subject to regulation and that regulation only seems to apply in the state of Queensland. Queensland has the Professional Engineers Act 2002, which is supported by the Professional Engineers Regulations 2003. The Act and the Regulations are controlled by the Board of Professional Engineers, Queensland. The Act and supporting regulations require those so registered to work within their nominated engineering area of competence. However no competency requirements are specified in order to satisfy registration. All that is required is that applicants meet the qualifications for Membership of the Institution of Engineers Australia (Engineers Australia) and have the designated years of experience.

Engineers Australia operates a National Professional Engineers Registration (NPER) scheme. This is a voluntary scheme and there is no legislation which requires NPER for those engineers involved in the ICT industry. In any case NPER does not define competency requirements.

Professional engineers would only be a small proportion of the ICT practitioners within Australia.

In fact there is little by way of definition of competency requirements for safety/mission critical related ICT worldwide. The UK Health & Safety Executive (HSE) commissioned the UK Institution of Electrical Engineers (IEE) to undertake preliminary work in relation to determining competency requirements. This led to the development of the Competency Guidelines for the Safety-Related System Practitioners. These guidelines, published in 1999, were the result of collaboration between the IEE and the British Computer Society (BCS). These guidelines were developed so that UK Industry is able to demonstrate competence of individuals involved in the development and operation of safety-related systems.

Establishing competency requirements is one thing, there needs to be the training programmes to enable gaining of these requirements and certification that these have been attained.

Training for ICT practitioners

In 2001, the Australian Computer Society (ACS) through its National Technical Committee on Safety-Critical Systems¹ (ACS-SCSC) commissioned a study to determine the requirements for an introductory course for developers and procurers of safety-related systems. The intent of this course was to provide practitioners with key basic skills in relation to the existence of standards and the ability to understand the requirements. Basically, so that those involved in ICT will know what they don't know and where to go for information. Boughton, 2002 provides us with the results of the study. In essence there were no courses available that addressed the topics considered necessary. In fact only the UK, USA and Germany had appropriate learning centres. However, most safety-critical specialists and courses reside in the UK and USA; hence the available courses are not practical for those residing in Australia.

The ACS-SCSC attempted to establish an elective module within the ACS CMACS (Certified Member of the Australian Computer Society) programme for safety / mission critical related systems. However it was not considered to be commercially viable due to the likely limited interest.

To fill this void, the Australian Safety Critical Systems Association (aSCSa) in association with the Australian National University (ANU) are offering the course *Introduction to System Safety Engineering and Management*. This is a 5 day course developed and

¹ The National Technical Committee on Safety Critical was established under the ACS Software Engineering and Computer Science Board in 1991. In 2002, the national committee evolved into the Australian Safety-Critical Systems Club, as a National Special Interest Group of the ACS. In 2005, the Club amended its name to that of the Australian Safety Critical Systems Association (aSCSa).

delivered by the High Integrity Systems Engineering (HISE) group at University of York. This course is held at ANU and is part of an ANU master's degree program. It is available to industry participants.

In relation to continuing professional development (CPD) and to raise awareness, the aSCSa has conducted annual workshops, the 11th to be held in Melbourne later this year. For the more recent workshops, the aSCSa has had a number of international experts in a related field as invited speakers. Information on these workshops and other activities can be found on the aSCSa's website www.safety-club.org.au.

Conclusions

Boughton, 2002 opined:

Within industry world wide there seems to be a great deal of ignorance about evaluating, constructing, managing and maintaining, software-based safety critical systems. This is especially so in Australia.

Given the frequent media reports relating to ICT system failures, it's an opinion that has some justification. One merely has to visit the The Risk Digest.

Unfortunately within Australia, ICT practitioners don't know what they don't know. The ACS through the aSCSa is endeavouring to raise awareness so that ICT practitioners at least know what they don't know.

Fortunately, Australia has been spared the serious accidents cited in the paper. This however has very much contributed to the high level of ignorance within the ICT industry.

The legal status of software and the limited legislative framework will continue to frustrate the implementation of appropriate practices and ensuring that only those having the appropriate competence are associated with safety/mission critical related systems.

The phrase *fly-by-wire* emerged from within the air industry to refer to the replacement of the mechanical controls in an aircraft with distributed controllers interconnected electrically. Such commercial aircraft have been flying some 10 years now without a major mishap. That does not mean of course that critical failures have not happened; it means that no such aircraft has fallen out of the sky.

If the use of ICT in the car continues to evolve unabated it won't be long before there is a *drive-by-wire* model available. Imagine driving a car where the steering wheel is no longer mechanically connected to the front wheels; all there is a joy-stick like device with an input to

a computer. It is this computer that points the front wheels in the required direction. Bear in mind that the software that does the control is considered to be "artwork".

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ASMA/SQA (NSW)

Australian Software Metrics Association / Software Quality Association (NSW)

NEWSLETTER

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From The Editor

Anything billed as “The Most Highly Publicized Software Failure In History“ has to attract our attention, purely from a professional stance of course and quite unrelated to any ghoulish pleasure in software horror stories. This description has been applied to the FBI’s disastrous VCF project in an article titled **Who Killed the Virtual Case File?** The article and various reports during and after the project give some insights on how a project can go off the rails even when apparently following some sound software development practices. For example, the FBI engaged an experienced project manager and the project was using Joint Application Development (JAD) and spiral/iterative approaches in what the participants must have thought was a rigorous manner. They ran 2-week JAD sessions interspersed with 2-week feedback sessions for 6 months. The FBI’s JAD team manager later recalled *“I worked seven days a week, 14 hours a day. Six months of JAD was hell.”*

At the same time, the FBI was ignoring warnings from wiser heads both inside and outside the project. One of the insiders was security expert Matthew Patton, who became so frustrated that he posted his concerns on a web discussion board in October 2002 and was removed from the project shortly thereafter. His comments included *“I couldn't believe my ears when the boss said, that if the customer is happy with the security as presented then I should shut up and sit down, that it was none of my concern.”* His posting is an interesting read in its own right and is reprinted below.

One of the key weaknesses in the failed VCF saga was the absence of an FBI enterprise architecture, A September 2003 US General Accounting Office (GAO) report titled **FBI Needs an Enterprise Architecture to Guide Its Modernization Activities** notes: “Given the state of the FBI’s enterprise architecture management efforts, the bureau is at Stage 1 of GAO’s enterprise architecture management maturity framework.. Organizations at Stage 1 are characterized by architecture efforts that are ad-hoc and unstructured, lack institutional leadership and direction, and do not provide the management foundation necessary for successful architecture development and use as a tool for informed IT investment decision making.”

Talking about Enterprise Architecture (EA), we are lucky enough to have EA expert, Dorothy Luther with us on Monday 4th September. Dorothy has agreed to fit a presentation for us into her very busy schedule and will explain why we need EA and how much of it we need. The presentation covers the various EA theories and models with practical tips on how to apply the models in practice, where the FBI went wrong and how we can avoid failures like the VCF.

Ted Smillie

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Notes from the Previous Meeting: Quality outcomes for Westpac Corporate Clients

Westpac's Corporate Online channel is a market leader in delivering a web based solution for high end business, corporate and institutional customers. It provides a full range of easy to use administration, accounts, receipts and payments services.

Over the last few years, there has been increasing pressure to deliver more functionality in less time - creating challenges to the traditional development approach used by Stakeholders, business and IT. A new way of doing things was needed for 2006. At the same time, Westpac had started to deploy a single methodology for all projects, for Business and IT, to replace the multitude of different approaches used across Westpac in Australia and New Zealand and BT Financial Services.

This session covered how TOM (Towards One Methodology) was successfully applied as a prototype to meet an important Corporate Online development need. Significant benefits were achieved by applying only a part of the TOM process:

- * significantly clearer requirements
- * faster results
- * improved Stakeholders involvement
- * estimated 60% reduction in time spent on Requirements

The presentation discussed the need for Requirements Best Practice and the framework which Westpac uses to achieve this. The approach was prototyped using a small but complex project, with very encouraging results. Some lessons were learned along the way which will be incorporated into the Requirements Best Practice framework for future projects.

Presenter: Robert Johnson

Robert Johnson is Channel Development Manager, Electronic Channels at Westpac. He has worked extensively in the Systems Development and since 1993 has held a series of specialised roles within Westpac. He has worked on both the IT and Business sides of the business and from 1999 onwards specialised in web development for Westpac frontline staff (Branches and Contact Centres). Since 2005 he has worked with corporate web channel development (Corporate Online) and wealth web channel development at BT Financial Services. As Project Manager for the implementation of TOM, Robert has led the team to realise significant benefits and reduce time to market for an important Corporate Online development.

“The Most Highly Publicized Software Failure In History “

Ted Smillie

Who Killed the Virtual Case File?

One of the top 10 articles at IEEE Spectrum is **Who Killed the Virtual Case File?** [1], an engrossing 11 page read about the FBI's Virtual Case File (VCF), which the article describes as “the most highly publicized software failure in history.” Unluckily for the FBI, its antiquated IT systems were in the spotlight following the September 11, 2001, terrorist attacks, when counterterrorism became the top priority. This resulted in a series of reviews by the Office of the Inspector General (OIG), U.S. Department of Justice and testimony to the US Senate Committee on the Judiciary, which was highly embarrassing to the FBI.

The VCF was in the third phase of the Trilogy Information Technology Modernization Project, which was to upgrade the FBI's IT infrastructure and replace its outmoded and largely paper-based case management system with a modern online system. Trilogy comprised: 1) the Information Presentation Component upgrade, 2) the Transportation Network Component, a communication network upgrade and 3) the User Applications Component which would replace the FBI's most important investigative applications, including the Automated Case Support (ACS) system, the FBI's current case management system.

The Trilogy infrastructure upgrades were completed 22 months late and at a cost of US\$337 million, which was close to US\$100 million over budget. The US\$170 million VCF project was cancelled in March 2005 and is being replaced by a new information technology project called Sentinel.

The VCF was always going to be a disaster but without 9/11 there would probably never have been such a detailed and public analysis. Using interviews with key players and quotes from official reports, *Who Killed the Virtual Case File?* gives a step by step account of how the project went pear-shaped even though it appeared to be using “tried and true” software development and project management approaches. These included hiring a seasoned project manager and using Joint Application Development (JAD) and a spiral/iterative methodology.

What Went Wrong?

So what went wrong? In its own words, the article “paints a picture of an enterprise IT project that fell into the most basic traps of software development, from poor planning to bad communication.” This opinion is reinforced by various warnings and reports throughout the project. As usual, there were wiser heads inside and outside the project whose warnings were ignored. One of the best examples is Matthew Patton.

Like Cassandra before the fall of Troy, the VCF had Matthew Patton, a security expert who was taken on by the VCF Contractor, SAIC in 2002 and left after a few months. From the start, Matthew had some serious reservations about the project, which he raised with his supervisor but to no effect. In frustration, he posted a cri de coeur (blew the whistle) on a

web discussion board in October 2002. His comments included: “As a 2-bit journeyman I can't seem to get anyone to pay the slightest attention nor do they apparently (want to) understand just how flawed the whole design is from the get go.”

Matthew also has a side-swipe at the cost of the project:” A year+ from now the FBI will have fielded a MAJOR national-security/law-enforcement impacting system at an incredibly high price tag (I've personally done systems of roughly comparable complexity with a staff of eight, not 200 persons) with but a figleaf for security (and an entertaining disaster recovery plan to boot).” Matthew concludes, “If ‘trained experts’ are not allowed to pull the emergency brake and force a reality check, what chance is there EVER of changing the appalling security in the gov't IT landscape regardless of how many millions get thrown at the problem?”

The immediate result of Matthew's action was that he was taken off the project and left SAIC shortly thereafter. Matthew's posting is an interesting read in its own right and is reprinted below.

NRC Report

One of the key problems was that the FBI had no enterprise architecture. As the article notes: ”This cavalier approach to software development would prove fatal to the VCF.” Again, there were warnings. Special Agent Larry Depew, who took on a project management role, thought that the rush to implement the VCF meant “shooting from the hip.”

In September 2002, the FBI asked the National Research Council (NRC) for help in reviewing Trilogy. The NRC convened various experts to meet with the FBI for briefings and to respond to the FBI as individuals on various aspects of Trilogy. A later NRC report (2004) notes plaintively: ”In hindsight, many of these individually provided comments presaged the more formal findings and conclusions presented in this report.”

A September 2003 GAO report titled *FBI Needs an Enterprise Architecture to Guide Its Modernization Activities* [2] notes: “Given the state of the FBI's enterprise architecture management efforts, the bureau is at Stage 1 of GAO's enterprise architecture management maturity framework. Organizations at Stage 1 are characterized by architecture efforts that are ad hoc and unstructured, lack institutional leadership and direction, and do not provide the management foundation necessary for successful architecture development and use as a tool for informed IT investment decision making.”

For the 2004 report, the Computer Science and Telecommunications Board (CSTB) of the NRC selected a committee composed largely but not exclusively of the experts convened for the September 2002 meeting. (The FBI privately referred to this committee as the “graybeards.”) The FBI had asked for a review that could be done quickly and relatively inexpensively. Briefings to the committee on October 27-28, 2003, and December 15-16, 2003 constituted the factual base for the 2004 report, *IT-Related Issues for the FBI Requiring Immediate Action* [3].

THE NRC report raised a number of significant issues requiring concerted FBI action in four major clusters: 1) Enterprise architecture; 2) System design; 3) Program and contract management; and 4) Skills, resources, and external factors. The report notes: "The issues in each of these clusters are serious in and of themselves. Taken in aggregate, the detrimental impact of inattention to these issues on the FBI's IT modernization efforts is enormous despite the progress that has been made."

The full NRC report is worth reading from an enterprise architecture perspective as it gives a lucid explanation of why an enterprise architecture is necessary, explains the structure of an enterprise architecture and provides some case studies and references. To quote a brief extract:

"An enterprise architecture characterizes the enterprise's missions, tasks, and operational processes, and relates these tasks, processes, and operational objectives to IT strategy, investment, and design. It provides substantial detail on the structure and standards used to implement the IT system. The enterprise architecture is the framework that describes the way in which an organization such as the FBI conducts its mission(s), how it organizes and uses technology to accomplish its goals and execute key operational processes, and how the IT system is structured and designed in detail to achieve these objectives. In general, it should also include documentation that explains the rationale behind important decisions and why certain alternatives were chosen and others rejected."

OIG July 2005 Testimony

The OIG Inspector General's July 2005 testimony to the Committee on the Judiciary [4] covers various FBI activities, including the VCF. The Inspector General noted some general concerns as well as specific factors which contributed to the VCF's demise. In summary, his general concerns were:

1. The first is the urgent need to upgrade the FBI's information technology systems. I believe this is one of the most critical challenges facing the FBI.
2. The FBI faces challenges in the human capital area. Between November 2001 and February 2005, 15 different key information technology managers have been involved with the Trilogy project, including 5 FBI Chief Information Officers and 10 individuals serving as project managers for various aspects of Trilogy.
3. A third critical challenge facing the FBI is its need to share intelligence and law enforcement information efficiently, both within the FBI and with its law enforcement and intelligence partners.
4. Fourth, I believe the FBI must value and support to a greater degree FBI staff with technical skills. For example, until recently, the FBI did not adequately value the contributions of intelligence analysts. Special agents historically were promoted to technical leadership positions within the FBI, such as handling information technology upgrades or leading scientific efforts in the laboratory.

Commenting on a February 2005 Trilogy audit report, the OIG Inspector General noted that "the FBI was unable to create and deploy the VCF after more than 3 years and \$170 million budgeted for the project. The OIG audit report concluded that the VCF either would require substantial additional work or would need to be scrapped and replaced by a new system. Moreover, at the time of the audit, the FBI had not provided a realistic timetable or cost estimate for implementing a workable VCF or a successor system."

The Inspector General noted that the OIG audit had identified a variety of causes for the delays and cost increases in the Trilogy project, including:

- poorly defined and slowly evolving design requirements for Trilogy,
- weak information technology investment management practices at the FBI,
- weaknesses in the way contractors were retained and overseen,
- the lack of management continuity at the FBI on the Trilogy project,
- unrealistic scheduling of tasks on Trilogy, and
- inadequate resolution of issues that warned of problems in Trilogy's development.

The OIG report assigned responsibility for Trilogy's success (or lack of it) to several parties: the FBI; the Department; FEDSIM (the component of the General Services Administration that awarded Trilogy contracts on behalf of the FBI); and the two contractors; Computer Sciences Corporation for the two infrastructure components, and Science Applications International Corporation for the user applications component that included the VCF. The report concluded that "these entities, to varying degrees, did not effectively contract for, manage, monitor, or implement the Trilogy project."

While the blame was shared, the OIG report faulted the FBI "for moving forward with contracting for this complex project without providing or insisting upon defined requirements, specific milestones, critical decision review points, and penalties for poor contractor performance." The audit concluded that because of the inability to develop and deploy the VCF, the FBI continued to lack critical tools necessary to maximize the performance of both its criminal investigative and national security missions.

The FBI had acknowledged and was addressing most of the Inspector General's concerns. In its Response to the Draft Report [5], the FBI noted that National security remained uncompromised by the delay of VCF. The FBI's response listed a number of IT improvements and concluded "In short, the FBI's capacity to access, analyze, and share data internally and externally has improved considerably since the OIG began this audit, strengthening our ability to predict and prevent acts of terrorism and otherwise supporting our national security mission. Additional improvements currently underway will further strengthen these capabilities over the next few months."

The FBI was confident it would do better with the Sentinel project. They had been planning it for a year, evaluating commercial off-the-shelf software, creating an enterprise architecture, and establishing a number of IT management oversight boards. They had also provided project management training to 80 IT staff members.

Ken Orr, one of the CSTB “greybeards” thought they were kidding themselves about buying and installing something within a year. He believed the FBI needed to work out “how to bring these new software programs online incrementally and train more than 30,000 people to use them. Then they could focus on converting millions of paper records as well as all of the audio, video, photographic, and physical evidence that has piled up over the years, which will continue to grow at an increasing rate to support the bureau's counterterrorism mission.” His guess was that it would be closer to 2010 or 2011 before the FBI had the complete system up and running.

OIG May 2006 Testimony

So how has the new Sentinel project actually fared since its inception in May 2005? The OIG's May 2006 testimony [6] is encouraging but there are still a few issues. It noted that the OIG's March 2006 audit found the FBI has taken important steps to help prevent the types of problems encountered in the Virtual Case File project. and had developed information technology planning processes that, if implemented as designed, could help the FBI successfully complete Sentinel. Notable improvements included establishing Information Technology Investment Management processes, developing a more mature Enterprise Architecture, and establishing a Program Management Office dedicated to the Sentinel project.

But there were still a few areas of concern. To quote:

- (1) the incomplete staffing of the Sentinel Program Management Office,
- (2) the FBI's ability to reprogram funds to complete the second phase of the project without jeopardizing its mission-critical operations,
- (3) Sentinel's ability to share information with external intelligence and law enforcement agencies and provide a common framework for other agencies' case management systems,
- (4) the lack of an established Earned Value Management process,
- (5) the FBI's ability to track and control Sentinel's costs, and
- (6) the lack of complete documentation required by the FBI's Information Technology Investment Management processes.

The OIG was also concerned that while the FBI had considered its internal needs in developing Sentinel's requirements, it had not yet adequately examined or discussed Sentinel's ability to connect with external systems. The testimony notes: “If such connectivity is not built into Sentinel's design, other agencies could be forced into costly and time-consuming modifications to their systems to allow information sharing with the Sentinel system”.

Wikipedia Summary

The VCF gets a write-up in Wikipedia [7], which gives provides a good overall summary of the reasons for failure from a software engineering point of view, as follows:

“The project demonstrated a systematic failure of software engineering practices:

- * Lack of a strong blueprint from the outset led to poor architectural decisions.
- * Repeated changes in specification.
- * Repeated turnover of management, which contributed to the specification problem.
- * Micromanagement of software developers.
- * The inclusion of many FBI Personnel who had little or no formal training in computer science as managers and even engineers on the project.
- * Scope creep as the requirements were continually added to the system even as it was falling behind schedule.
- * Code bloat due to changing specifications and scope creep. At one point it was estimated the software had over 700,000 lines of code.
- * Addition of more people and resources to the project as it was falling behind, a violation of Brooks' law.
- * Planned use of a flash cutover deployment which made it difficult to adopt the system until it was perfected.”

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Matthew Patton's October 2002 web discussion board posting

Editor's Note: The following is a reprint of Matthew Patton's October 2002 web discussion board posting, <http://archives.neohapsis.com/archives/isn/2002-q4/0090.html>

The Senator makes an excellent and accurate point. But how do we go about replacing the people we have in gov't NOW who continue to make bad decisions, and also go after the contractors who are implementing really bad security without a second thought?

I work on the FBI's new Trilogy program (replacement for their ineffectual case management system - see 9/11) and at every turn all I get are really lame excuses why security isn't important - the chief one being "we're all good guys, everyone has a gun, and we all have TS security clearances, we use KG84's to encrypt our trunk lines, etc."

Like I'm supposed to be impressed. Proving to me or any auditor that the network is demonstrably secure is impossible. As the very FBI repeatedly asserts, 80+% of the threat is internal. Are they under the delusion that the same figure doesn't apply to them? No less after all the moles and traitors they've unearthed in the not too distant past?

Am I nuts to object strongly to the notion that Windows(tm) can be explicitly and fully trusted to provide authentication and prove identity of the person on the other end of the keyboard, especially when the desktop's security is very much in question and the FBI wants to have non-repudiatable logging of user activity? (not to mention the rather sensitive nature of case contents and that they want to access it via handhelds at some point too) Am I crazy to demand that the most trivial basics of secure web-programming guidelines (eg. Input validation, separation of function, protection of servers/processes from each other, and requiring re-authorization/re-authentication when using and dropping elevated privileges etc.) must be followed regardless of claims of a supposedly secure network and that everybody and I mean EVERYBODY is on the up and up? What about those legions of contractors who have their very fingers on the network infrastructure or the maint/janitorial staff, or the security guards who have access to the cable plant at the very least? It's as if the FBI thinks they are immune to all of those simplistic human failures. "Oh, but we have a policy for that." Yeah, and like anybody actually lives by policies...

What's worse is that the FBI *HAS* appropriate security infrastructure in place to do things better/correctly (small-time PKI rollout and SecureID etc). "This is only a stop-gap solution" is another favourite. As is passing the buck to the "customer" who is, well, your typical information systems customer (let alone a gov't one): buzzwords from a menu, requirements all over the map and no real idea what they want.

Can anyone put me in touch with some heavy-hitting clued-in people over at the FBI that can not only help their own people "get it", but demand some real accountability from the contractors involved? The FBI should have told us to stuff that solution and come up with something that made sense,

but they don't know enough to even comment on a bad idea let alone tear it apart. As a 2-bit journeyman I can't seem to get anyone to pay the slightest attention nor do they apparently (want to) understand just how flawed the whole design is from the get go.

I'd go a few steps up the food chain on my side but I'm not convinced I wouldn't be seen as a yipping dog best removed from the organization let alone the contract. I couldn't believe my ears when the boss said, that if the customer is happy with the security as presented then I should shut up and sit down, that it was none of my concern. And that "you just don't understand, we're not on the Internet."

A year+ from now the FBI will have fielded a MAJOR national-security/law-enforcement impacting system at an incredibly high price tag (I've personally done systems of roughly comparable complexity with a staff of eight, not 200 persons) with but a figleaf for security (and an entertaining disaster recovery plan to boot).

Shouldn't somebody care? Or has "Clinton-esque Accountability" permeated every hall of government? If "trained experts" are not allowed to pull the emergency brake and force a reality check, what chance is there EVER of changing the appalling security in the gov't IT landscape regardless of how many millions get thrown at the problem?

Quotes of the Day

Programming can be fun, so can cryptography; however they should not be combined. -Kreitzberg and Shneiderman

We try to solve the problem by rushing through the design process so that enough time is left at the end of the project to uncover the errors that were made because we rushed through the design process. -Glenford J. Myers

Programming is like sex: one mistake and you have to support it for the rest of your life. -Michael Sinz