TC-ECBS newsletter

October 2005 Issue

TC-ECBS newsletter is produced as a focal point for news concerning the (related) activities of the IEEE Computer Society Engineering of Computer-Based Systems technical committee. If you have any items for the next issue please contact **ecbs-news@computer.org**.

TC Chair's Column

I expect that somebody sends you emails from time to time with innocently witty remarks made by children. I received one recently that went something like this: "No man is an island, and if he is not an island he must be incontinent."

This captures the CBS engineer's dilemma (or should it be polylemma) rather well. Hardly ever do we have the opportunity to design a system that is not in some way a part of a larger system. At the other end of the scale I am reminded of the pavement artists of my childhood in England. In my rosy recollection they always had a cardboard sign over their creations that read: "All my own work." Rarely do we design systems without other engineers. In our modern teaming world, often those other engineers are from different companies and have different priorities. Rarely do we design systems without components that came from somewhere else. Sometimes those other components are helpful and save us work; often they do not quite match our needs.

All of this leads to the S-word of ECBS. Unless we are continually thinking about the system aspects of our work we are not likely to be very effective. System thinking is not just thinking about the "big picture." It is thinking about a picture that is big enough, but no bigger. Our special interest in ECBS is systems that bring together software, computing hardware and communications – and people. So remember, if you are not an island, you must be incontinent

Byron Purves, chair ECBS-TC

Join TC ECBS

If you have not already done so, you are invited to join online the IEEE Computer Society Engineering of Computer-Based Systems Technical Committee.

Details can be found at the web site http://www.computer.org/tab/ where you can sign-up to TC-ECBS and three others free http://www.computer.org/TCsignup/index.htm

Did you miss the last issue? Check out http://www.infj.ulst.ac.uk/~tc-ecbs/newsletter/2005-1/2005-june-tc-ecbs-news.pdf

Forthcoming: ECBS 2006

Mastering the Complexity of Computer-Based Systems

Potsdam, Germany (Berlin metropolitan area) March 27th-30th, 2006.

The 13th Annual ECBS will be held in Germany at the Hasso-Plattner-Institute for Software Systems Engineering at the University of Potsdam, Potsdam, Germany (Berlin metropolitan area) during March 27th-30th, 2006.

The conference website is available at http://ecbs06.hpi.uni-potsdam.de/

The main conference will consist of reports of practical solutions, trends and new system characteristics for ECBSs including application domains such as: Aerospace Systems, Command and Control, Continuous and Discrete Manufacturing, Environmental Systems, Instrumentation and Control Applications, Internet Technology and Applications, Intelligent Highway-Vehicle Systems (IHVS), Medical Systems, Telecommunication.

WORKSHOPS:

ECBS 2006 will also feature a range of workshops, including the following

1. Engineering of Autonomic Systems (EASe) see www.ulster.ac.uk/ease

2. Joint Workshop:

- Model-Based Development of Computer-Based Systems, see www.proinf.de/mbd and

- Model-based Methodologies for Pervasive and Embedded Software, see www.di.uminho.pt/mompes

3. Refactoring Software at Architectural Level, see www.proinf.de/arch-refactoring/

4. Concepts, Patterns and Mechanisms for the self-organized Integration of Networked Systems, see hnsp.inf-bb.uni-jena.de/ecbs

5. System Testing and Validation, see syst.eui.upm.es/conference/stv06

Focusing on the 2006 theme, *Mastering the Complexity of CBSs*, the conference will also include **PANEL DISCUSSIONS** on current ECBS topics, **POSTER SESSIONS** presenting work in progress, a **DOCTORAL SYMPOSIUM** providing a forum for PhD candidates to present work in progress and

get feedback from the research community, and an **INDUSTRIAL TRACK** providing a forum for short papers on results of industrial research and development.

ISO/IEC 15288

by **Bud Lawson**

What if all or the majority of the people of an organization (independent of their personal background and role) held a shared view concerning:

- what systems are,

- how systems are formed and

- how systems are life cycle managed?

The potential in person to person, project to project, management to and from personnel communications improvement is significant.

The fact that this is possible with the proper utilization of the new international standard ISO/IEC 15288 System Life Cycle Processes is presented in a white paper by Bud Lawson; "What is ISO/IEC 15288? (A Concise Introduction)" available at:

http://www.infj.ulst.ac.uk/~tc-ecbs/newsletter/2005-2/tc-ecbs-what-is-15288.pdf

Working group developing an ECBS Design Book

by **Jonah Z. Lavi**

The ECBS TC working group on Education and training specified a course on ECBS Design as a major topic in its suggested curricula.

Universities and technical colleges interested in teaching this important course face a major problem. The average professor in a university does not have the time to develop the educational material needed to teach such a course. Unfortunately the last good book on CBS Design was published in 1980 by C. Weitzman [Weitzman, C., "Distributed Micro/Minicomputer System - Structure, Implementation & Application", Prentice Hall, NJ, 1980].

An extensive literature search made several years ago has shown the availability of only one additional book by Siewiorek,&, Swarz (Siewiorek, D.P., Swarz, R S., "Reliable Computer Systems: Design and Evaluation", Digital Press,1992). This book is based entirely on DEC's equipment which is not relevant in a contemporary course.

So, there is an urgent need to develop a new text book on CBS Design which has to be based on real contemporary examples and experience and up-to-date technical data.

It is suggested that the TC will form a new working group developing such an urgently needed text book.

The text book should meet the following specification outlined in the past in the TC ECBS curricula.

ECBS Design Courses Description 1

* CBSs Architectures and Components *

This topic/course deals with the study of common CBSs architectures and their evaluation. After completing the topic/course a student will:

1. Describe typical distributed CBS hardware architectures
2. Describe current hardware components of CBS
3. Generate feasible hardware architectures for a specific family of applications
4. Analyze relative merits of possible solutions.
5. Select hardware components, such as computers and communications devices, based on the performance and dependability requirements of the system.
6. Topics to be covered in the course may include:
   - Hardware architecture representation techniques (e.g. VHDL, Petri Nets, CORBA)
   - Distributed hardware architectures of CBS (loosely and tightly coupled topologies)
   - Fault tolerant architectures
   - Hardware, firmware and interconnection schemes
   - CBS architectures and the related software architectures
   - Comparison methods of CBS architectures and related software architectures

* CBS Design and Performance Analysis *

This topic/course deals with the architectural design and performance of a CBS for a specific family of applications After completing the topic/course a student will:

1. Design a computer-based system satisfying given requirements using a disciplined process
2. Analyze CBSs behavior and performance
3. Select a feasible CBS solution using analytical approaches
4. Specify and select its hardware, software, communications, with appropriate use of existing products (components and subsystems)
5. Present the design rationale of the proposed system.
6. Prepare and document the requirements specification for each of the component subsystems
7. Be aware of Computer Aided Systems and Software Environment (CAS2E- Computer Aided Systems and Software) tools
8. Understand the tracking and design management needed during the system's life

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[1] These course specifications are taken from the ECBS TC papers on education published during recent years.

Topics to be covered in the course may include:
- Systematic design of a CBS for a specific family of applications meeting the system requirements
- Selection of available components and their properties (reuse and COTS)
- Performance characterization of computing resources
- Allocation of the software architecture to the system and subsystem components
- Trade-offs between possible CBS hardware, software, communication and HMI architectures
- Allocation of the requirements to the system and subsystem components
- Factors affecting the performance of CBS
- CBS performance analysis methods
- Factors affecting the reliability of CBS
- CBS reliability analysis methods
- Design for change
- Economic considerations affecting the design
- Implementability and testability of the design (instrumentation)
- Exposure to computer aided systems and software tools and environments

TAB News

By **Stephanie M. White**
Vice President for Technical Activities

TAB (TECHNICAL ACTIVITIES BOARD) has made significant progress in meeting its 2005 goals. Recently TAB approved the creation of two new Task Forces: (1) Autonomous and Autonomic Systems, and (2) Nanotechnology, Nanocomputing, and NanoArchitecture. The TF-AAS can trace some of its routes to the ECBS EASe workshop series.

Joe Bumblis, Chair of the TC on Computer Communications, presented an enlightening report to TAB on the reduction in industry and government personnel attending CS conferences and participating as CS volunteers, and made a number of recommendations to make the Society more valuable to practitioners. One excellent recommendation, that the Society is investigating, is the creation of educational courses developed by CS professionals, and offered by the Computer Society at company and other sites.

SAB (STANDARDS ACTIVITIES BOARD) and TAB have been working to promote interoperability, a primary Computer Society goal. At the request of SAB, TC Chairs updated a draft high-level mapping between Technical Committees and Standards Committees. The mapping shows that the domains of twenty-five TCs are aligned with the work of IEEE CS standards committees. Visibility has led to additional TC interest in standards involvement. For example, the Real Time Systems TC and Co-Design TC are coordinating efforts in Embedded Systems, and are talking with SAB about participating in

or organizing standards efforts related to this area.

TAB has been working on refining the definition of Steering/Coordination Committee to encourage interoperability across technical committees, standards committees, publication editorial boards, and other society entities.

To provide tool support for committee coordination, and to provide increased services to members, TAB is investigating peer-to-peer online communities. Through these facilities, we envision better communication taking place. For example, members can interact with colleagues who have similar professional interests and obtain early insight into new advances. Academics and practitioners can work together in ways that make both more successful.

Reprint from ECBS Proceedings

The Impact of Agile Methods on Software Project Management
Michael Coram, Shawn Bohner,
ECBS'05 pp. 363-370

As more and more software projects engage Agile Methods, there are emerging patterns of success and failure. With growing adoption of Agile Methods, project managers increasingly need to understand the applicability to their projects and factors that drive key project performance characteristics. While some organizations affirm that Agile Methods solve all their problems, few have shown consistent success over a range of typical software projects. Agile Methods have advantages, especially in accommodating change due to volatile requirements. However, they also present concomitant risks with managing the many dependent pieces of work distributed across a large project. Use of Agile Methods therefore presents a set of tradeoffs. This paper examines the impact of Agile Methods on the people involved in a project, the process under which a project is developed, and on the project itself in an attempt to allow project managers to evaluate the applicability using an agile method.

http://www.infj.ulst.ac.uk/~tc-ecbs/newsletter/2005-2/2005-oct-tc-ecbs-paper.pdf

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