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Systems Engineering Newsletter

Brought to you by Project Performance International (PPI)

SyEN #006 - March 23, 2009

Dear Colleague,

SyEN: Informative reading for the project professional, containing scores of news and other items summarizing developments in the profession and related industry, month by month. This newsletter and a newsletter archive are also available at www.ppi-int.com.

Systems engineering can be thought of as the problem-independent, and solution technology-independent, principles and methods related to the successful engineering of systems to meet requirements and maximize value delivered to stakeholders in accordance with their values.

If you are presently receiving this newsletter from an associate, you may elect to receive the newsletter directly in future by signing up for this free service of PPI, using the form at www.ppi-int.com. If you do not wish to receive this SE eNewsletter, please reply to this e-mail with "Remove" in the subject line, from the same email address. Your removal will be confirmed.

The newsletter presents in-depth coverage of the month's news in systems engineering and directly related fields, plus limited information on PPI's activities and events. Please forward this e-mail to friends and colleagues who you think would be interested.

We hope that you find this newsletter to be informative and useful. Please tell us what you think. Email to: contact@ppi-int.com.

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A Quotation to Open On

"I find that the harder I work, the more luck I seem to have." - Thomas Jefferson (1743-1826)

Feature Article

Cognitive Task Analysis and Decision-Centered Design

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Reprise

In the first of a series of articles for this newsletter, I defined Cognitive Work, Cognitive Systems Engineering, Human Systems Integration and Human Factors Engineering. In the second, I outlined some important features of the practice of Cognitive Systems Engineering, discussed the distributed nature of cognitive systems, introduced my personal perspective on design and introduced two popular frameworks (Cognitive Task Analysis and Cognitive Work Analysis) for Cognitive Systems Engineering. In this article, I will outline one these two frameworks. In later articles, I will outline the other framework and illustrate how each can complement existing Systems Engineering processes used in the design of large-scale socio-technical systems.

Recognition-Primed Decisions & the Critical Decision Method

The field research of Klein (1989) on expert decision making generated widespread interest in Cognitive Task Analysis. As more recently reported in Klein (1998), he was interested in understanding how operational experts applied rational decision methods in time-stressed and critical situations. At that time, rational decision methods in which decision-makers would assemble several options and then select the most appropriate through some sort of semiquantitative evaluation, were thought by many to be the basis of all decisions. Klein discovered that his operational experts rarely used a decision method that could be characterized as rational. Rather, they made decisions by recognizing and acting on familiar situational elements.

The result of this work was the Recognition-Primed Model of decision-making (Figure 1). As its name implies, decisions flow from recognition. One or more critical elements of a situation are recognized as being similar to something experienced previously and that recognition encourages development a course of action similar to one that had been effective on the previous occasion. Klein's operational experts did not, it seems, compare options at any point in the decision process.

Some variations on the recognition-primed theme have been observed. In some cases, an expert mentally simulates the likely outcome of an action prior to execution to confirm it will work. If that mental simulation indicates a positive outcome, the expert proceeds, but if not, s/he may refine the course of action or may discard it and review the situation in order to identify a more appropriate course of action.

The implication of this model for time-stressed, critical decisions at least is that, rather than being concerned with computational cognitive processes, we should identify the information that guides decisions, the sort of experience that builds expertise and the mental models that help people evaluate whether a planned course of action will be effective. The Recognition-Primed Model of decision-making constitutes a revolutionary departure from the received theoretical perspective on decision making and offers radically contrasting implications.

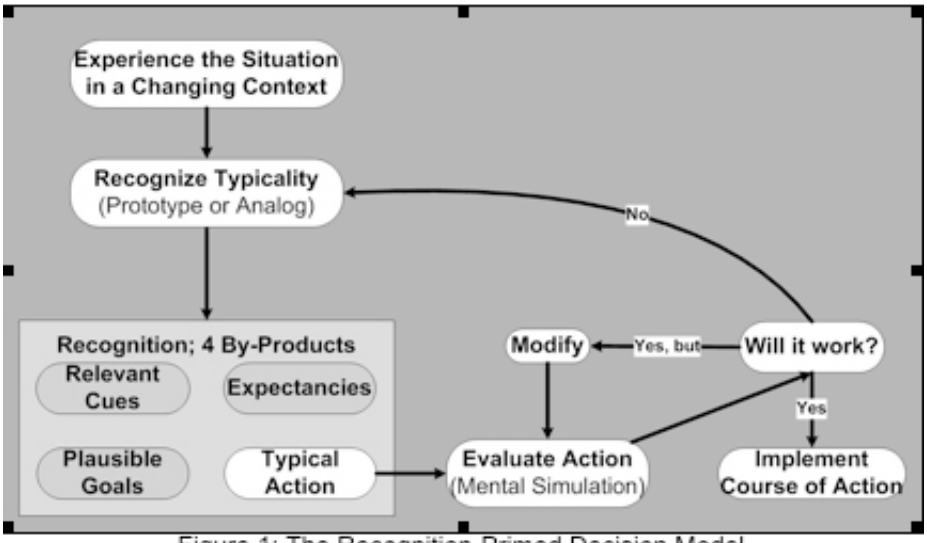

Figure 1: The Recognition-Primed Decision Model

Knowledge Elicitation for Recognition-Primed Decisions uses a Critical Decision Method in which an interviewer elicits information about cognitive functions such as decision-making, planning and sense making within a specific challenging incident. An operational expert is asked to describe decisions s/he made during an incident and also describe the information and rules of thumb s/he used during the decision process. S/he is further asked to identify situational features that might have made decisions difficult and situational elements that characterized the incident as familiar. The interviewing team (usually two, an interviewer and a recorder) works through four sequential sweeps; incident identification, time-line verification, deepening and what if probes, with each sweep progressively expanding understanding of the incident as follows:

- Incident identification; identify candidate incidents and select one with potential for uncovering elements of expertise and related cognitive phenomena, elicit a brief account from beginning to end and use this account as the foundation for the rest of the interview
- Time line; develop a time line of key events and segments for use as the framework for the final two sweeps
- Deepening; go beyond the time elements and basic facts to ascertain perceptions, expectations, goals, judgments, confusions, and uncertainties about the incident as it unfolded
- *What if* probes; invite speculation about how s/he might have allowed the incident to unfold in a different way, use this information to identify potential vulnerabilities for error and to illuminate differences between experts and novices.

Note that an operational expert is always asked to recount an actual incident. Those with experience in this method see less value in asking about hypothetical incidents.

The conceptualisation of Recognition-Primed Decisions and the development of the Critical Decision Method for knowledge elicitation brought a new vitality to the analysis of cognition in operational environments. Much of what had gone before in cognitive science had proved to be of limited relevance to human work environments and, indeed, misleading. There had already been much discussion about cognitive behavior in the field, but Recognition-Primed Decision theory was the first conceptualization to bring with it a focused method of knowledge elicitation. This eminently pragmatic combination of conceptualization and method quickly became established as a powerful presence in applied cognitive research and became one of the motivating forces in the establishment of Cognitive Systems Engineering.

Macro-Cognition, Micro-Cognition, Meta-Cognition

Several other techniques for knowledge acquisition have been developed as this framework has become established but possibly the most valuable development in recent times is the popularization of the concept of macro-cognition, the cognitive functions and processes employed in operational work settings. Figure 2 depicts what is evocatively known as a macro-cognitive cheese wheel; macro-cognitive functions are represented in the upper half of the figure while macro-cognitive processes are represented in the lower half. Note that there is no canonical macro-cognitive cheese wheel; different operational contexts will demonstrate a different constellation of functions and processes.

Macro-cognition is to be distinguished from micro-cognition, the cognitive functions and processes examined in cognitive research laboratories. Meta-cognition, a concept also invoked in the framework of cognitive task analysis, refers to the cognitive appraisal of own cognitive function.

Decision-Centered Design

Cognitive task analysis is directed at developing cognitive support systems and at developing efficient and robust team cognition. The process, as depicted in Figure 3, has five steps, preparation for the interview, knowledge elicitation, representation of decision requirements, generation of design concepts and prototype design.

The form of knowledge representation generally used in Cognitive Task Analysis and Decision-Centered Design is a table with four to seven columns. The number of columns and their headings is adapted to the needs of the particular project but the example provided in Figure 4 is typical. The method of knowledge elicitation, often the Critical Decision Method, gathers the information required to populate this table, which is then used as a guide for generating design concepts and for designing a prototype.

Team Design

The methods of Cognitive Task Analysis and Decision Centered Design, first developed for individual cognition, have been applied to teams. Macro-cognitive functions such as tactical decision-making, tactical sense making, tactical planning and collaboration are identified as are supporting processes such as guidance of attention, sharing of information, reconciliation of viewpoints and maintenance of common ground. Figure 5 depicts a macro-cognitive cheese wheel developed from analysis of team decisions. In addition to representing the functions and processes, I have used arrows to identify which processes support the different functions.

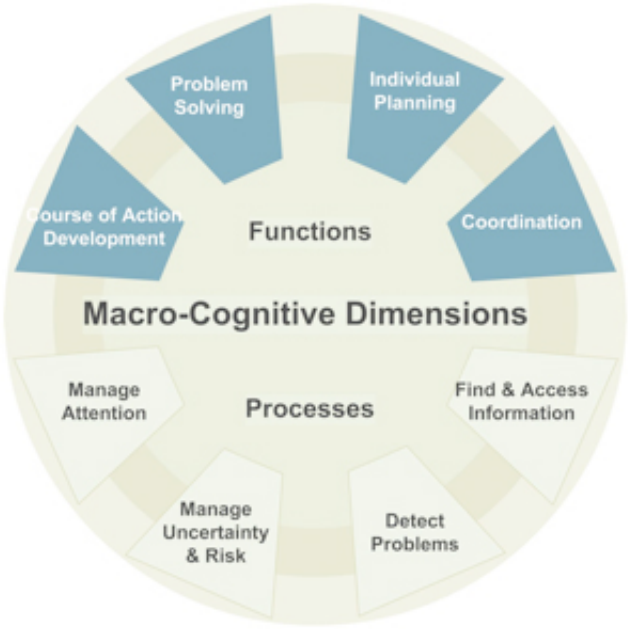

Figure 1: An illustrative macro-cognition cheese wheel

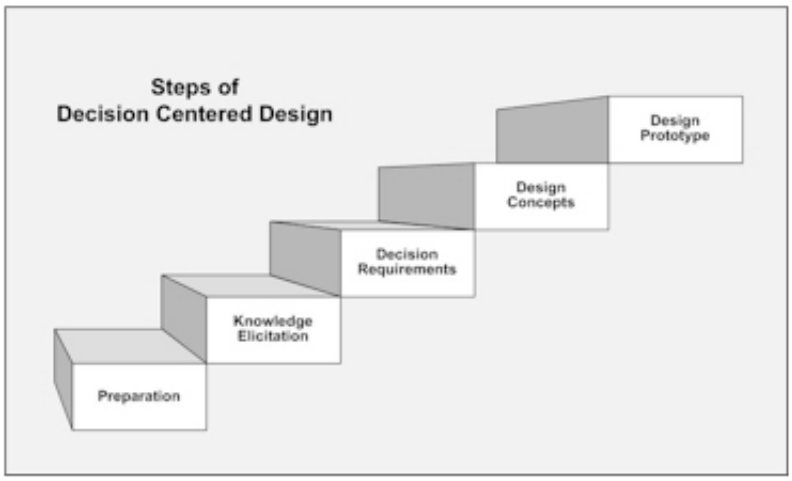

Figure 1: The steps of Decision-Centered Design

Decision	Why Difficult	Critical Cues or Anchors	Potential Errors	Design Ideas

Figure 1: A Decision Requirements Table

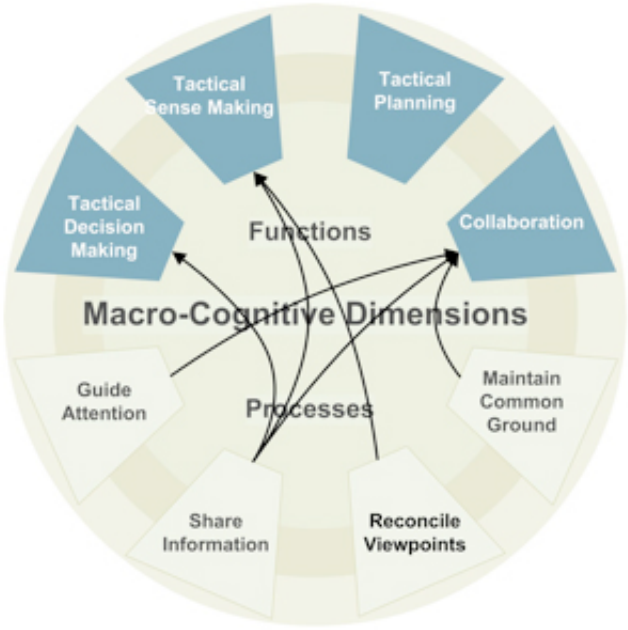

Figure 1: A team-decision macro-cognitive 'cheese wheel'

The work of Klinger and Klein (1999), who sought to improve the effectiveness of an emergency response team within a nuclear power plant, offers a cogent illustration on the value of this approach to the analysis of teamwork. By use of team probes such as “What tasks are not finished?", “What are the essential handoffs and transactions?" and “Who are the key decision makers?", they identified macro-cognitive team functions such as communication of intent and maintenance of shared situation awareness and also meta-cognitive team functions such as collaborative monitoring of team effectiveness.

As a result of this analysis, Klinger and Klein recommended that the layout of the emergency situation room be reorganized, that human roles and functions be clarified, and that staffing assignments be rationalized through consolidation of positions (thereby leading to a reduction in staff). Once implemented, these recommendations led to a dramatic improvement. There was noticeably less noise and confusion during exercises. Paradoxically, workload in this high intensity environment decreased despite the reduction in staffing. Furthermore, those responsible for key decisions were able to expand their time horizon and think ahead instead of continually reacting to events. Despite the fact that Klinger and Klein were responding to a work statement that requested recommendations for new technology to reduce workload, these marked improvements in the team effectiveness resulted entirely from non-technological interventions.

Summary

In this article, the third in the series, I have outlined the framework of Cognitive Task Analysis. In later articles, I will outline the framework of Cognitive Work Analysis and then illustrate how each of these two frameworks can complement existing Systems Engineering processes used in the design of large-scale socio-technical systems.

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Klinger, David & Klein, Gary (1999). An Accident Waiting to Happen. Ergonomics in Design, 7 (3), 20-25.

Systems Engineering News

ESMD Space Grant Systems Engineering Paper Competition

Show off your senior design project and systems engineering skills by forming a team to compete in the 2009 Exploration System Mission Directorate (ESMD) Space Grant Systems Engineering paper competition. The competition is designed to assist NASA with strengthening the agency and the future workforce of the United States.

More information.

INCOSE Systems Engineering Vision 2020 now available

INCOSE has published a vision of Systems Engineering that reflects current practice, trends in industry, government and academia, and projects a vision of the state-of-the-art for 2020. Members also have access via the INCOSE Connect Product Area. All feedback to this document is solicited – INCOSE asks that feedback feedback be sent to vision@incose.org.

International Journal of Intelligent Defence Support Systems Special Issue on Systems Engineering Education - Call for Papers

The International Journal of Defence Support Systems is a new Journal published by Inderscience Enterprises Ltd in the UK, ISSN 1755-1587 (www.inderscience.com/ijidss). For the purposes of this journal, the editors define support systems to be all those systems other than the platform itself. Such systems can be technical or socio-technical in nature. The journal accepts papers from across the range of topics that need to be tackled in the creation and sustainment of defence capabilities, that is, technology through to systems engineering.

More information.

INCOSE Foundation Seeks Applications for Stevens Institute Doctoral Award

The purpose of this award is to inspire and recognize innovative doctoral-level research related to the field of systems engineering and integration. This award carries a US$5,000 grant to the doctoral student, along with a plaque, and recognition at the annual INCOSE International Symposium to take place in Singapore over July 19-23. Application and recommendation forms can be downloaded from the INCOSE Foundation Web site at http://www.incose.org/about/foundation/index.aspx. Completed application forms and faculty references must be received by 15 April.

More information.

U.S.A. SASC Hearing Preview: Call to Boost Systems Engineering

Sen. Carl Levin begins the hard and probing work about just how to fix the Pentagon's acquisition efforts Tuesday morning during the first of a series of hearings on the subject. We've gotten an advance look at some of the testimony. Expect very concrete recommendations from Paul Kaminski, former head of Pentagon acquisition, about the critical need for extensive and high-quality systems engineering very early in the process, as well as the importance of restoring a step that was abolished during the heyday of "acquisition reform" in the 1990s.

Kaminski, who headed a committee on pre-Milestone A systems engineering of the National Research Council's Air Force Studies Board, prepared testimony that lists what should be done early in the acquisition process.

"A few of the things that need to be taken care of before Milestone A and just after it are the following: the consideration of alternative concepts (solutions) up front; the setting of clear, comprehensive key performance parameters (KPPs) and system requirements; and early attention to interfaces and interface complexity, to the concept of operations (CONOPS), and to the system verification approach. It is these early-stage processes that are covered in this report. The importance of stable requirements and funding between Milestone B and the achievement of initial operational capability (IOC) is stressed, as are processes including good configuration management and change control," the written testimony says.

Kaminski ruefully notes that "Many of the conclusions reached and recommendations made by the [NRC] committee are similar to those of previous reviews. Most of the past recommendations were never implemented, so one of this committee's most critical thoughts relates to the importance of implementation."

But he is still willing to take a stab at it. Kaminski says that “few formal" systems engineering processes are applied to Air Force development programs before the Milestone A review. That results in much of the often huge increase in life cycle costs later in the program, he writes: “About three-quarters of total system life cycle costs are influenced by decisions made before the end of the concept refinement phase at Milestone A, while about three-quarters of life cycle funds are not actually spent until after Milestone C. This means that although high-quality SE is necessary during the entire acquisition cycle, the application of SE to decisions made in the pre-Milestone A period is critical to avoiding (or at least minimizing) cost and schedule overruns later in a program."

Part of the problem is Air Force program managers just aren’t doing their jobs as well as they should. The testimony says that the NRC committee he led “found many gaps and inconsistencies in the way that the Air Force manages pre-Milestone A activities. The committee heard from presenters of some cases for which required documents were completed pro forma and filed away, never to be seen again, or for which required steps were skipped completely."

To help remedy that, he recommends that the Air Force leadership “should require that Milestones A and B be treated as critical milestones in every acquisition program." His committee’s recommendation: “A development planning function should be established in the military departments to coordinate the concept development and refinement phase of all acquisition programs to ensure that the capabilities required by the country as a whole are considered and that unifying strategies such as network-centric operations and interoperability are addressed."

One of the most interesting things about Kaminski’s recommendations is that most of them have already been arrived at by one group in the Air Force, those beleaguered souls involved in space acquisition. But space operates under different regulations than do standard major acquisition programs and its practitioners live in very separate worlds in the Air Force so there isn’t much discussion between the two communities.

These people will be testifying in addition to Kaminski: Michael Sullivan, director of the GAO’s acquisition and sourcing management; Jack Gansler, chairman of the Defense Science Board’s task force on industrial structure for transformation and former head of acquisition; Pete Adolph, chairman of DSB’s task force on developmental test and evaluation.

More information.

INCOSE Foundation and Johns Hopkins University Applied Physics Laboratory Seek Applicants for a New Scholarship Award and Paid Internship

The INCOSE Foundation, in partnership with the Johns Hopkins Applied Physics Laboratory (JHU/APL), is soliciting applications for the first Alexander Kossiakoff Systems Engineering Scholarship. The scholarship carries an award of $5,000, a plaque, and recognition at the annual INCOSE International Symposium. The awardees will also be offered a paid summer internship at JHU/APL working on relevant systems engineering problems.

The applicants must be U.S. citizens and admitted students in a Masters or Doctoral Program in Systems Engineering at an accredited university. Applications are to include the following documentation: a complete resume/vitae, a brief bio-sketch, description of the study/research areas of interest (at least 3-4 pages), two faculty references, and a discussion of the contribution and expected outcomes that will benefit applications of interest to the Laboratory (1-2 pages). See http://www.jhuapl.edu/ for possible applications of interest. The research should also contribute to the publication of a paper in a systems engineering journal or conference. Any questions about the documentation criteria should be addressed to Dr. Sam Seymour at JHU/APL. Phone number: (240) 228-5711; email: Sam.Seymour@jhuapl.edu. The complete application package must be received by 15 April 2009. Electronic applications should be submitted to Dr. William Ewald, Chief Executive Officer of the INCOSE Foundation, at William.m.ewald@macrointernational.com.

CALL FOR PAPERS: IEEE Transactions on Computers, Special Section on Science of Design for Safety Critical Systems

IEEE Transactions on Computers seeks original manuscripts for a special section on Science of Design for Safety-Critical Systems.

The correct operation, availability and reliability of safety-critical systems are of premier concerns as human lives might depend on their correct and continued operation. Examples of such systems are control systems in avionics, automotive, missiles, industrial processes and bio-medical prosthetic devices etc. These being real-time, not only need guarantee of functional correctness, they must also guarantee timeliness, and dependability.

More information.

INCOSE Webinars are Here

INCOSE advises that the first webinar "Introduction to INCOSE" was a great success!

Each webinar reserves 125 'seats', which will be given to participants in the order that they call in to the seminar. Multiple callers from the same connection are considered a single 'seat'. If you would like to participate in a webinar but are unable, do not fear: INCOSE has arranged to record the audio and visual portions of each and will post them in an archive in INCOSE Connect for Members to review at their leisure.

INCOSE Publications Available In Digital Format

The Journal of Systems Engineering, published by Wiley-Blackwell, and INSIGHT, published by INCOSE, are now available in digital form. It is still possible to subscribe to receive a paper copy. Electronic copies are included in the cost of membership.

You may access the SE Journal via the Wiley website at http://www.interscience.wiley.com. If you need help registering with Wiley, please check out these instructions in INCOSE Connect in the shared documents folder. You may access INSIGHT via the INSIGHT Library on INCOSE Connect.

Newsworthy items and INCOSE events for the INCOSE website can be sent to news@incose.org or comms@incose.org.

Future INCOSE INSIGHT Themes

Publication	Date	Theme
2nd Qtr 2009	15 May 2009	The Interplay of Architecture, Security, and Systems Engineering
3rd Qtr 2009	13 Aug 2009*	East Meets West: The Human Dimension to Systems Engineering
4th Qtr 2009	15 Oct 2009**	Model-Based Systems Engineering: *The* New Paradigm
1st Qtr 2010	15 Feb 2010	Technical Operations - Dick Kitterman
3rd Qtr 2010	8 Aug 2010*	2010 International Symposium Coverage: Chicago, Illinois, USA

Spirula Organizes Cosysmo Training: "The Constructive Systems Engineering Cost Model (COSYSMO)"

April 23, 2009 – 9:00 to 17:00. Paris, France.

The process of accurately estimating systems engineering cost continues to be a challenge for organizations that develop or acquire complex systems. Building on the synergy between systems engineering and software engineering, we have developed a parametric cost model to address this need: the Constructive Systems Engineering Cost Model (COSYSMO). The objective of COSYSMO is to more accurately estimate the effort associated with performing the system engineering tasks defined by ANSI/EIA 632 through the system life cycle phases described in ISO/IEC 15288.

This workshop describes the model development methodology, the model parameters that help estimate systems engineering cost, and the process for calibrating COSYSMO for specific companies to improve estimation accuracy. A simple implementation of COSYSMO is also provided along with associated lessons learned from its development and validation* resulting from the usage experience within the U.S. aerospace industry and the U.S. Air Force.

Special emphasis is placed on the undergoing improvements of COSYSMO including risk modeling, reuse impact analysis and harmonization with other parametric cost models. Heuristics are discussed that shed light on the development, calibration and usage of cost models. Finally, a review of commercial and proprietary implementations of COSYSMO is provided to illustrate different approaches taken by tool vendors and aerospace companies to estimate systems engineering cost.

*Data for the industry calibration of the model were provided by: BAE Systems, Boeing, General Dynamics, L-3 Communications, Lockheed Martin, Northrop Grumman, Raytheon, and SAIC.

This training is provided by Ricardo Valerdi.

More information.

Featured Society: Cybernetics

What is Cybernetics?

Cybernetics has been defined as the interdisciplinary study of the structure of regulatory systems. Cybernetics is closely related to both control theory and systems theory. In its origins and in its evolution in the second-

half of the 20th century, cybernetics is said to be equally applicable to physical and social (that is, language-based) systems.

Cybernetics is preeminent when the system under scrutiny is involved in a closed signal loop, where action by the system in an environment causes some change in the environment and that change is manifest to the system via information/feedback that causes changes in the way the system then behaves. This "circular causal" relationship is said to be necessary and sufficient for a cybernetic perspective.

The Cybernetics Society

The Cybernetics Society is the UK national learned society and professional body promoting pure and applied cybernetics.

It holds scientific meetings, conferences, and social events, and engages in other activities to encourage public understanding of science and to extend and disseminate knowledge of cybernetics and its associated disciplines. In particular, it aims to support the Continuing Professional Development of its members.

The Cybernetics Society is one of the 35 societies or institutions affiliated to the World Organisation of Systems and Cybernetics (WOSC). For more information visit the WOSC website: www.cybsoc.org/wosc

The American Society for Cybernetics (ASC)

The American Society for Cybernetics encourages:

- a) The advancement of cybernetics as a science:
- b) The development of cybernetic research methods and techniques that improve the manageability of complex systems;
- c) The systematic accretion, evaluation and exchange of cybernetic knowledge and its application across disciplinary, national and ethnic boundaries;
- d) The application of cybernetics towards improving the informational condition of man and the social use of communication and information processing technology;
- e) The practice of self-government.

The American Society for Cybernetics was founded in 1964 by a group of people in Washington, DC, USA who were interested in the then new field of cybernetics. The founding members of the Society wanted to follow and to encourage the development of this interdisciplinary field.

In 1995, a home office for the American Society for Cybernetics was established in the Center for Social and Organizational Learning at The George Washington University. The Society now holds an annual conference, conducts seminars on the fundamentals of cybernetics, manages a listserver, and maintains contacts with cyberneticians in countries outside of the USA.

More information.

IEEE Systems, Man, and Cybernetics Society (IEEE SMCS)

The IEEE Systems, Man, and Cybernetics Society aims to be recognized as the world leading society for the advancement of theory and application in systems science and engineering, human-machine systems, and cybernetics.

The mission of the IEEE Systems, Man, and Cybernetics Society is to serve the interests of its members and the community at large by promoting the theory, practice, and interdisciplinary aspects of systems science and engineering, human-machine systems, and cybernetics. This is accomplished through conferences, publications, and other activities that contribute to the professional needs of its members.

Interests of the IEEE SMSC include development of systems engineering technology, including problem definition methods, modeling, and simulation, methods of system experimentation, human factors engineering, data and methods, systems design techniques and test and evaluation methods.

Interests also include integration of the theories of communication, control, cybernetics, stochastics, optimization, and system structure towards the formulation of a general theory of systems, and application at hardware and software levels to the analysis and design of biological, ecological, socio-economic, social service, computer information, and operational man-machine systems.

IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS is published monthly in three parts. Part A, published in odd numbered months of the year, is devoted to systems and humans. Part B, published in even numbered months of the year, is devoted to cybernetics. Part C is published bimonthly in January, March, May, July, September and November.

IEEE SMCS supports a number of chapters worldwide: Baoding Chapter, Croatia Chapter, Central-South Italy Chapter, Beijing Chapter, Germany Chapter, Hungary Chapter, Japan Chapter, Japan Section - Hiroshima Chapter, Singapore Chapter, South-Eastern Michigan Chapter, Taipei Chapter, UK&RI Chapter, and Student

Branch Chapters: Hebei University, HIT Shenzen Graduate School, Hong Kong (PolyU) and National Taiwan University of Science and Technology

More information.

INCOSE Technical Operations

Article#1: INCOSE Technical Operations Summary

by Alwyn Smit.

Introduction

The value of INCOSE to it's stakeholders is primarily realised through it's Technical Operations. We will endeavour to summarise these operations over a series of articles covering the activities of each of the working groups. The purpose is to draw specific attention to the INCOSE technical activities from newsletter readers that may otherwise not have visited the INCOSE website where this information originates from.

To start off the series, this article summarises the "Technical Infrastructure" of INCOSE through which the value is realised.

INCOSE Technical Operations

The mission of INCOSE Technical Operations is to bring value to INCOSE stakeholders through providing technical information by means of technical events, technical products, technical interactions among stakeholders, and technical information repositories. Technical Operations is based on the thoughts that:

- We need some things to enable the practice of systems engineering, such as knowledge, processes and technology
- The practice of systems engineering is applied in domains, such as industry, academia and government

So, to execute its mission, INCOSE's Technical Operations has a functional structure that reflects these thoughts, as summarized in the illustration below:

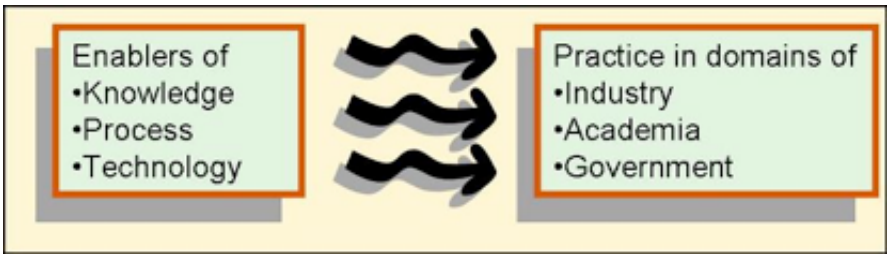

Figure 1: Systems engineering draws on knowledge, processes and technology to develop its capabilities, then applies them to multiple domains

The actual Technical Operations structure consists of all INCOSE Working Groups, supported by six Assistant Directors plus an Internal Operations Group. There is a direct linkage between each Working Group and a specific Assistant Director.

Assistant Directors and Related Working Groups

The six Assistant Directors and the related Working Groups (WG) and WG Chairs for each are:

- **1. Knowledge - Bill Miller**
  - a) Architecture - Charles Dickerson
  - b) Complex Systems - Sara Sheard
  - c) Research - TBD
  - d) Intelligent Enterprises WG - Steve Else
  - e) Process Improvement - Karen Bausman
  - f) Resilient Systems - Scott Jackson
  - g) Standards - Randy Case
- **2. Processes - Mark Powell**
  - a) Cost Engineering - Ed Casey
  - b) Human Systems Integration - Jennifer Narkevicius
  - c) Lean Systems Engineering - Dave Cleotelis
  - d) Measurement - Paul Frenz
  - e) Requirements - Jeremy Dick
  - f) Risk Management - Jack Stein
  - g) System Safety Integration - Mark Carlson

    - h) Systems Security Engineering - John Wirsbinski
    - i) Verification & Validation - Ben Mancuso
- **3. Technology - John Nallon**
    - a) Model-driven System Design - Phil Spiby
    - b) Technology Life Cycle - Ayman El-fatatry
    - c) Tools Database - Randy Bullard
    - d) Tools Integration & Interoperability - John Nallon
- **4. Industry - Ted Sanders**
    - a) Air Transportation - Ashok Jain
    - b) Biomedical - Mike Celentano
    - c) Information Systems - Adrian Boyer
    - d) Infrastructure - Alain Kouassi
    - e) Net-centric Operations - John Hsu
    - f) Systems Engineering in the Commercial World - Ted Sanders
- **Academia - Tim Ferris**
    - a) Education - TBD
    - b) Accreditation - TBD
    - c) Motor Sports - Jack Ring
- **Government - Carl Landrum**
    - a) Anti-terrorism International - Jim Long
    - b) Defense Systems - Eric Belle
    - c) GEOSS - Larry McGovern
    - d) Intelligent Transport & Transit Systems - Anne O'Neil
    - e) Power and Energy Systems - Ray Beach
    - f) Space Systems - Dennis Rohn

Internal Operations

Technical Operations also include an Internal Operations element that focuses on technical events, technical communications, planning, procedures and publications. Specifically:

1. Technical Communication - Tim Dilks
2. Technical Events - Terje Fossnes
3. Technical Information - Dick Wray
4. Technical Planning - TBD
5. Technical Review - Joe Carl, Assistant Director

Technical Operations is led by INCOSE's Technical Director (Dick Kitterman) and Deputy Technical Director (Regina Griego)

Working Groups

The heart of INCOSE's Technical Operations effort is its more than 30 Working Groups. The current list of active Working Groups can be found at http://www.incose.org/practice/techops/index.aspx#.

Working Groups are composed of INCOSE members who:

1. Are interested in building their expertise and contacts in a particular area of systems engineering by working and networking with others with an interest and expertise in the same area, and/or;
2. Have expertise to some level and are interested in sharing that with others as well as, on a voluntary basis, participating in the creation of Working Group products that will bring value to INCOSE stakeholders.
3. Working Group members participate in such things as:

    - a) creating products unique to the Working Group for INCOSE stakeholder use (e.g. Measurement Guide, Tools Database, etc.)
    - b) reviewing papers in their area that have been submitted for an INCOSE International Symposium, or an INCOSE co-sponsored event
    - c) forming and/or participating in a panel or tutorial sponsored by the Working Group
    - d) helping to develop or review international standards
    - e) developing supporting material for standards (e.g. application guides, training checklists, references to sources of information, etc.) for use by INCOSE stakeholders and possible publication for wider use
    - f) collaborating with other Working Groups on similar projects that require expertise from different areas
    - g) supporting a technical initiative aimed at furthering the realization of the INCOSE Vision 2020, a view of the future of systems engineering
    - h) participating with INCOSE Chapters to set up and hold regional technical events
    - i) researching practices to support INCOSE Corporate Advisory Board (CAB) needs

If you have an interest in an area not shown and know of others who share that interest, you collectively can get a new Working Group chartered. To start the process, contact techdir@incose.org

More information.

Systems Engineering Software Tools News

MacA&D 3.0 Automates Requirements Management and Software Design

Excel Software began shipping MacA&D 3.0 for system analysts, software designers and programmers. The new software is a Universal Binary application for native performance on all Mac OS X computers. It has enhancements to the user interface, integrated help, manual set, report scripting engine, installer plus new features to add, remove, duplicate and individually lock or unlock editing on diagrams.

More information.

Artisan Announces Artisan Workbench

To quote from Artisan's press release of February 27, 2009, "Artisan® Software Tools, the world's largest independent supplier of industrial-grade, collaborative modeling tools for complex, mission and safety-critical embedded systems and software, has announced Artisan Workbench™, which provides a fully integrated, collaborative engineering framework for the trouble-free deployment and maintenance of best-in-class tools for mission and safety-critical embedded systems and software development.

Artisan Workbench provides a standard access portal for all of an organization's embedded design tools, facilitating the implementation of best design practices, enabling large, geographically dispersed teams of analysts, systems and software engineers to Work-as-One™ modeling systems and software for the complete project lifecycle," said Hedley Apperly, VP Marketing of Artisan Software Tools. "It provides an ultra-efficient collaborative working environment that maximizes output and also keeps projects on time and on budget."

More information.

Vitech CORE Software for Systems Engineering

Vitech Corporation's CORE software now provides complete support for the U.S. Department of Defense Architecture Framework Version 1.5 (DoDAF 1.5), according to Vitech.

This component of CORE leverages Vitech's model-based systems engineering (MBSE) approach to provide delivery of a complete, consistent set of DoDAF views, and an integrated executable architecture for a system.

CORE 5.1.5 delivers a complete set of integrated, consistent DoDAF views available upon demand from the design repository, including:

- AV-1 Overview and Summary Information
- AV-2 Integrated Dictionary
- OV-1 Operational Concept
- OV-2 Operational Node Connectivity Description
- OV-3 Operational Information Exchange Matrix
- OV-4 Organization Relationships Chart
- OV-5 Operational Activity Model
- OV-6 Operational Activity Sequence and Timing Description
- OV-7 Logical Data Model
- SV-1 Systems & Services Interface Description
- SV-2 Systems & Services Communications Description
- SV-3a Systems-Systems Matrix
- SV-3b Services-Systems Matrix
- SV-3c Services-Services Matrix
- SV-4 Systems Functionality Description
- SV-5a Operational Activity to Systems Function Traceability Matrix
- SV-5b Operational Capability to Systems Function Traceability Matrix
- SV-5c Operational Capability to Services Traceability Matrix
- SV-6 Systems & Services Data Exchange
- SV-7 Systems & Services Performance Parameters Matrix
- SV-8 Systems & Services Evolution Description
- SV-9 Systems & Services Technology Forecast
- SV-10 Systems & Services Functionality Sequence Model
- SV-11 Physical Schema
- TV-1/2 Technical Standards Profile and Forecast

More information.

Systems Engineering Books, Reports, Articles and Papers

Types of Model Prototyping from Planes to Automobiles

By: Low Jeremy

Rapid prototyping is an intensive process of collecting information on requirements and on the adequacy and functionality of fairly new product designs. Model prototyping is an important data resource during the different stages of product development. Model prototyping makes use of various kinds of rapid prototyping techniques to provide the right model types used for different testing procedures. Such techniques may require the use of requirements animation, incremental, and evolutionary prototyping.

More information.

Envisioning a future decision support system for requirements engineering: a holistic and human-centered perspective

Doctoral thesis by Beatrice Alenljung, (Linköping University, Department of Computer and Information Science) (Linköping University, The Institute of Technology)

Abstract: Complex decision-making is a prominent aspect of requirements engineering (RE) and the need for improved decision support for RE decision-makers has been identified by a number of authors in the research literature. The fundamental viewpoint that permeates this thesis is that RE decision-making can be substantially improved by RE decision support systems (REDSS) based on the actual needs of RE decision-makers as well as the actual generic human decision-making activities that take place in the RE decision processes. Thus, a first step toward better decision support in requirements engineering is to understand complex decision situations of decision-makers. In order to gain a holistic view of the decision situation from a decision-maker's perspective, a decision situation framework has been created. The framework evolved through an analysis of decision support systems literature and decision-making theories. The decision situation of RE decision-makers has been studied at a systems engineering company and is depicted in this thesis. These situations are described in terms of, for example, RE decision matters, RE decision-making activities, and RE decision processes. Factors that affect RE decision-makers are also identified. Each factor consists of problems and difficulties. Based on the empirical findings, a number of desirable characteristics of a visionary REDSS are suggested. Examples of characteristics are to reduce the cognitive load, to support creativity and idea generation, and to support decision communication. One or more guiding principles are proposed for each characteristic and available techniques are described. The purpose of the principles and techniques is to direct further efforts concerning how to find a solution that can fulfill the characteristic. Our contributions are intended to serve as a road map that can direct the efforts of researchers addressing RE decision-making and RE decision support problems. Our intention is to widen the scope and provide new lines of thought about how decision-making in RE can be supported and improved.

More information

Requirements Testing

Requirements seem to be ephemeral. They flit in and out of projects, they are capricious, intractable, unpredictable and sometimes invisible. When gathering requirements we are searching for all of the criteria for a system's success. We throw out a net and try to capture all these criteria.

As soon as we have a single requirement in our net we can start testing. The aim is to trap requirements-related defects as early as they can be identified. We prevent incorrect requirements from being incorporated in the design and implementation where they will be more difficult and expensive to find and correct.

More information.

User Acceptance Testing - a business analyst's perspective

User acceptance testing is one of the many flavours of testing that has emerged over the last twenty years or so. As the software development life cycle has become more sophisticated and rigorous (or, in the case of agile, more lightweight), the testing phase has been broken down into many different aspects and styles of testing.

This article explains user acceptance testing from the business analyst's perspective. It describes the history, how it fits into the project life cycle, the objectives of UAT and how the business analyst can be involved.

More information.

Automated Learning of Operational Requirements

Requirements Engineering involves the elicitation of high-level stakeholders goals and their refinement into operational system requirements. A key difficulty is that stakeholders typically convey their goals indirectly through intuitive narrative-style scenarios of desirable and undesirable system behaviour, whereas goal refinement methods usually require goals to be expressed declaratively using, for instance, a temporal logic. Currently, the extraction of formal requirements from scenario-based descriptions is a tedious and error-prone process that would benefit from automated tool support.

The user presents an ILP methodology for inferring requirements from a set of scenarios and an initial but incomplete requirements specification. The approach is based on translating the specification and scenarios into an event-based logic programming formalism and using a non-monotonic ILP system to learn a set of missing event preconditions. We then show how this learning process can be integrated with model checking to provide a general framework for the elaboration of operational requirements specifications that are complete with respect to high-level system goals. The contribution of this work is twofold: a novel application of ILP to requirements engineering, which demonstrates also the need for non-monotonic learning, and a novel integration of model checking and inductive logic programming.

More information.

Requirements Engineering: From System Goals to UML Models to Software Specifications

by Axel van Lamsweerde, ISBN-10: 0470012706, ISBN-13: 978-0470012703
Publishers Description:

The book presents both the current state of the art in requirements engineering and a systematic method for engineering high-quality requirements, broken down into four parts. The first part introduces fundamental concepts and principles including the aim and scope of requirements engineering, the products and processes involved, requirements qualities to aim at and flaws to avoid, and the critical role of requirements engineering in system and software engineering.

The second part of the book is devoted to system modeling in the specific context of engineering requirements. It presents a multi-view modeling framework that integrates complementary techniques for modeling the system-as-is and the system-to-be. The third part of the book reviews goal-based reasoning techniques to support the various steps of the KAOS method. The fourth part of the book goes beyond requirements engineering to discuss the mapping from goal-oriented requirements to software specifications and to software architecture.

Online resources will accompany the book and will add value to both classroom and self-study by enabling students to build models and specifications involved in the book's exercises and case studies, helping them to discover the latest RE technology solutions. Instructor resources such as slides, solutions, models and animations will be available from an accompanying website.

Publisher: Wiley, March 3, 2009

Conferences and Meetings

INCOSE U.K. Annual Spring Conference

March 30 – April 1, 2009
More information

NYC SPIN Meeting - The Voice of the Customer

April 1, 2009 Bank of America, New York City
More information

The International Council on Systems Engineering Spring 09 Conference

April 2 – 4, 2009
Hosted by INCOSE Region V Chapters at the Virginia Modeling, Analysis and Simulation Center (VMASC), Suffolk, VA, USA.
More information

American Society for Engineering Education (ASEE) Spring 2009 Northeast Conference

University of Bridgeport, April 3-4, 2009
More information

The First NASA Formal Methods Symposium

April 6 - 8, 2009 Moffett Field, California
More information

IDEAS 2009- XII Iberoamerican Conference on Requirements Engineering and Software Environments

Medellín, Colombia, 13-17 April 2009
More information

Conference on Systems Engineering Research (CSER) 2009

Loughborough, UK, 20 - 22 April, 2009
More information

Systems & Software Technology Conference (SSTC) 2009

"Technology: Advancing Precision", 20-23 April 2009, Salt Lake City, Utah
More information

The 7th International Workshop on Modelling, Simulation, Verification and Validation of Enterprise Information Systems (MSVVEIS-2009)

co-located with the International Conference on Enterprise Information Systems (ICEIS), 6 - 10 May, 2009, Milan, Italy.
More information

31st International Conference on Software Engineering (ICSE) 2009

Vancouver, Canada, May 16-24, 2009
More information

Early Aspects at ICSE: aspect-Orientated Requirements Engineering and Architecture Design (EA 2009)

to be held in conjunction with ICSE 2009: 31st International Conference on Software Engineering 09, May 18, 2009, Vancouver, Canada
More information

Software & Systems Engineering Essentials 2009

Steigenberger Hotel Berlin, Los-Angeles-Platz 1, 10789 Berlin, Germany Workshops - 25th May 2009, Conference - 26th & 27th May 2009
More information

ICMISE 2009: International Conference on Medical Information Systems Engineering

Tokyo, Japan, May 27-29, 2009
More information

EJC 2009 - 19th European Japanese Conference on Information Modelling and Knowledge Bases

Maribor, Slovenia, June 1-5, 2009
More information

13th IFAC Symposium on Information Control Problems in Manufacturing

June 3 - 5 2009. Moscow, Russia
More information

The 21st International Conference on Advanced Information Systems (CAiSE09)

June 8 - 12, 2009. Amsterdam, The Netherlands
More information

RefsQ`09 The 15th International Working Conference on Requirements Engineering: Foundation for Software Quality

June 8 - 9, 2009. Amsterdam, The Netherlands
More information

Exploring Modeling Methods in Systems Analysis and Design (EMMSAD) 2009

Held in conjunction with CAiSE' 09. June 8 - 9, 2009. Amsterdam, The Netherlands
More information

The 10th Workshop on Business Process Modeling, Development, and Support (BPMDS'09)

Held in conjunction with CAiSE' 09. June 8 - 9, 2009. Amsterdam, The Netherlands
More information

5th International Workshop on Enterprise & Organizational Modeling and Simulation (EOMAS 2009)

Held in conjunction with CAiSE' 09. June 8 - 9, 2009. Amsterdam, The Netherlands
More information

The First International Workshop on Domain Engineering

In conjunction with CAiSE 2009, June 9, 2009, Amsterdam, The Netherlands
More information

International Workshop on Value-driven Engineering of Systems of Things (VEST 2009)

Held in conjunction with CAiSE' 09. June 8 - 9, 2009. Amsterdam, The Netherlands
More information

14th International Conference on Reliable Software Technologies - Ada - Europe

Telecom Bretagne. June 8 - 12, 2009. Brest, France
More information

SEPG Europe 2009 - Software and Systems Process Improvement Conference

June 9 - 12, 2009. Prague, Czech Republic
More information

PETRI NETS 2009

June 22 - 26, 2009. Paris, France
More information

TiSto 2009 - International Workshop on Timing and Stochasticity in Petri nets and other models of concurrency

A satellite event of Petri Nets 2009 30th International Conference on Application and Theory of Petri Nets and Other Models of Concurrency. June 23, 2009. Paris, France
More information

The 21st International Conference on Software Engineering and Knowledge Engineering (SEKE 2009)

Hyatt Harborside at Logan Int'l Airport, July 1 - 3, 2009. Boston, USA
More information

Third International Conference on Software Engineering Approaches for Offshore and Outsourced Development (SEAFOOD)

July 2 - 3, 2009. ETH Zurich, Switzerland
More information

The First International Workshop on the Critical Computer-Based Systems (CCBS'09) 2009

July 13 - 16, 2009. Monte Carlo Resort, Las Vegas, Nevada, USA
More information

WER'09: 12th Workshop on Requirements Engineering

July 16 - 17, 2009. Valparaiso, Chile
More information

INCOSE 19th Annual International Symposium (IS) 2009

July 20 - 23, 2009. Singapore
More information

33rd Annual IEEE International Computer Software and Applications Conference (COMPSAC) 2009

July 20 - 24, 2009. Seattle, Washington
More information

3rd Annual International Workshop on Requirements Engineering for Services (REFS'09)

In conjunction with COMPSAC 2009, July 20 - 24, 2009. Seattle, Washington
More information

2nd IEEE International Workshop on Industrial Experience in Embedded Systems Design (IEESD 2009)

In conjunction with COMPSAC 2009, July 20 - 24, 2009. Seattle, Washington
More information

2009 International Conference of the System Dynamics Society

July 26 - 30, 2009. Albuquerque, New Mexico
More information

PICMET '09 Conference: "Technology Management in the Age of Fundamental Change"

August 2 - 6, 2009. Hilton Portland and Executive Tower, Portland, Oregon, USA
More information

Improving Systems and Software Engineering Conference (ISSEC 2009)

Co-located with the 6th Annual Project Management Australia Conference (PMOZ 2009). August 10 - 12, 2009. Canberra, Australia
More information

Workshop on Logical Aspects of Fault Tolerance (LAFT)

(affiliated with LICS 2009). August 15, 2009. University of California, Los Angeles, USA
More information

17th IEEE International Requirements Engineering Conference (RE'09)

31 August - 4 September 2009, Atlanta, Georgia, USA
More information

European Systems & Software Process Improvement and Innovation (EuroSPI2)

September 2 - 4, 2009. University of Alcala, Spain
More information

AIAA Space 2009 - Joint Space Systems Engineering and Economics Track

Within the conference is a joint Space Systems Engineering and Economics Track that has room for slots for four space systems engineering papers. September 14 - 17, 2009. Pasadena, CA, USA

Download Call for Papers

Additional Conference Information

Third IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO'09)

(IEEE approval pending)

The aim of the SASO conference series is to provide a forum for laying the foundations of a new principled approach to engineering systems, networks and services based on self-adaptation and self-organization.

Self-adaptive systems work in a top down manner. They evaluate their own global behavior and change it when the evaluation indicates that they are not accomplishing what they were intended to do, or when better functionality or performance is possible. A challenge is often to identify how to change specific behaviors to achieve the desired improvement.

Self-organizing systems work bottom up. They are composed of a large number of components that interact locally according to typically simple rules. The global behavior of the system emerges from these local interactions. Here, a challenge is often to predict and control the resulting global behavior.

More information

14th System Design Languages Forum

September 22 - 24, 2009. Ruhr-University of Bochum, Germany
More information

ICISE 2009 - International Conference on Industrial and Systems Engineering

September 23, 2009, Toronto, Canada
More information

Ninth International Workshop on Automated Verification of Critical Systems (AVoCS 2009)

Swansea University Computer Science, September 23 - 25, 2009.
More information

ACM/IEEE 12th International Conference on Model Driven Engineering Languages and Systems (formerly the UML series of conferences)

Denver, Colorado, USA, October 4 - 9, 2009.
More information

Track Systems Engineering 2009

Munich, Germany, October 7 - 8, 2009.

More information

International Conference on Man-Machine Systems (ICoMMS)

October 11 - 13, 209. School of Mechatronic Engineering, University of Malaysia Perlis
More information

12th Annual Systems Engineering Conference

San Diego, CA - October 26 - 29, 2009
More information

Formal Methods for Industrial Critical Systems (FMICS) 2009

November 2 - 3, 2009, Eindhoven, The Netherlands.
More information

28th International Conference on Conceptual Modeling

November 9 - 12, 2009, Gramado, RS, Brazil.
More information

Education & Academia

University of Minnesota establishes Program in Industrial and Systems Engineering

In response to the growing industry need for engineers who can design large-scale systems and processes to save time and money, the University of Minnesota has established an independent Program in Industrial and Systems Engineering.

More information

Post-Doctoral research position on 'flexible management of business processes'

1 Year Post-Doctoral research positions on “flexible management of business processes" at LIMOS, University of Blaise Pascal, Clermont-Ferrand, France.

More information

INCOSE FOUNDATION NEWS: INCOSE Foundation Seeks Applications for Stevens Institute Doctoral Award

The INCOSE Foundation, in cooperation with the Stevens Institute of Technology, is soliciting applications for the Doctoral Award for Promising Research in Systems Engineering and Integration. The purpose of this award is to inspire and recognize innovative doctoral-level research related to the field of systems engineering and integration. This award carries a US $5,000 grant to the doctoral student along with a plaque and recognition at the annual INCOSE International Symposium.

This Doctoral Award was initiated in 2002. It has been presented to individuals at the Missouri University of Science and Technology (2008) and the Institut National des Sciences Appliquees de Toulouse (also in 2008), University of Southern California (2007), the Southern Methodist University (2006), University of Pennsylvania (2005), Stanford University (2004), Stevens Institute (2003), and Leeds in the UK (2002).

Applicants must submit a completed application form, and must have two academic faculty references submit recommendations on their behalf. Application and recommendation forms can be downloaded from the INCOSE Web site under the icon of "Advancing the Practice". The Foundation also requests a brief bio-sketch from each candidate. Completed application forms, faculty references, and the bio-sketch must be received by 15 April 2009.

To be eligible, an applicant must be a qualified doctoral student in a degree program with an approved research proposal. The applicant must submit an electronic application, and applicants may not receive more than one award.

Please submit applications to Dr. William Ewald, Chief Executive Officer of the INCOSE Foundation at

William.M.Ewald.

People

Dr. Raúl Leal

Dr. Raúl Leal, Business Development Manager, Centre for Systems Engineering, University College London, has taken up a role as point of contact for the newly re-formed London Area Group of the UK Chapter of the International Council on Systems Engineering.

Some Systems Engineering-Relevant Websites

http://powerofinnovation.blogspot.com/

By Yugandhar Reddy, this blog provides insights into emerging areas of Business Intelligence, Analytics, Dashboards, Process Management, forecasting etc. This is a collection of Yugandhar Reddy's experience and opinions from BI Consultants, Technology Architects, Analysts and Business users who share a passion for Business Intelligence and views on emerging architectures. The edition that prompted this entry carries a piece on User Stories, essentially the same as Operational Concept Descriptions.

http://www.thinking.net/Systems_Thinking/systems_thinking.html

The Thinking Page, your source for information on improving organizational and individual thinking. The Thinking Page is divided into five sections, each with its own perspective on thinking and its own unique insights. Systems thinking is a perspective that helps us see and understand the big picture in new ways.

http://www.pegasuscom.com/aboutst.html

Pegasus Communications is dedicated to providing resources that help individuals, teams, and organizations understand and address the challenges they face in managing the complexities of a changing world. Pegasus has served the community of systems thinking and organizational development practitioners through its conferences, newsletters and other publications, and audio and video materials. The company continues to develop new ways to communicate and apply the ideas, principles, and tools of systems thinking and related disciplines to an ever-widening audience of leaders, managers, and educators across industries and around the world.

http://www.doc.ic.ac.uk/~md/icgol/

This is the home page for the Systems Engineering Studios project funded by the DFEE through the Government Office for London. Support has been provided through the Centres of Excellence in IT Training and Skills Challenge Initiative. The funding for this project which started 27th July 1998 is £0.6M. The Systems Engineering Studios will provide the infrastructure for a centre of excellence delivering advanced training in Systems Engineering with special attention to systems requirements engineering. This will include training in associated communication, facilitation, and group working skills. These pages will allow you to follow the progress of the project.

http://www.uspi.nl

A formal Association of process industry companies with the mission: "To develop, maintain and promote the use of international standards and best practices for product and plant life cycle information"

http://www.posccaesar.com

Product Data Management standardisation across all STEP protocols.

http://www.uml.org

Unified modelling language for object-orientated CASE.

http://www.omg.org/mda

Model Driven Architecture.

http://www.omg.org/homepages/mfg/index.html

Manufacturing Domain Task Force

Standards and Guides

AP233 - SYSML MAPPING

The first, and extremely successful “Future STEP” workshop, was held at the International Council on Systems Engineering (INCOSE) meeting held January 31st in San Francisco. The overarching purpose was to examine making STEP work with modern-day Web standards. The workshop, chaired by Allison Barnard Feeney, was so well received that almost two dozen more attendees participated than had originally signed up. Participants worked on mapping blocks/ports/parts from SysML (Object Management Group’s standard for systems engineering data elements) into ISO 10303-233, STEP for systems engineering data) and identified the next priority areas and a date for the next mapping workshop in conjunction with the Washington, DC OMG meeting. This meeting commences on 23 March, 2009. The documentation of the mapping will be written up as an annex to the SysML standard. An annex in SysML already covers alignment with AP233, but this information is out of date.

DoDAF and MODAF Modelling Unite

A new industry standards group, the UPDM Group, has been established to build on previous efforts within the Object Management Group (OMG) to develop a modeling standard that supports both the US Department of Defense Architecture Framework (DoDAF) and the UK’s Ministry of Defence Architecture Framework (MODAF). The modeling standard is called the Unified Profile for DoDAF and MODAF (UPDM). The group’s mission statement is the following: “The UPDM Group is committed to creating a unified profile for MODAF and DoDAF, leveraging the capabilities of UML, SysML and other OMG standards.” Read the full press release here: http://updmgroup.org/

A Definition to Close On

Requirement and Need

Requirement: an order, a demand, an imperative, a dependence for success or fulfillment (Oxford English Dictionary)

Need: a condition of lacking or requiring some necessary thing, either physically or psychologically (Oxford English Dictionary)

Discussion: “requirement” and “need” have much in common in English language. But there is also difference – requirement implies pursuit of solution, whereas need is silent on the matter of pursuit. Needs simply exist. For example, you may need to go to meetings in New York and in London at the same time. You decide to go to New York, leaving your need to go to London unsatisfied. A requirement to get yourself to New York has come into existence.

To use a more technical example, a designer decides that she/he needs a resistor to be of 10 ohms +/-2% in value. That becomes a requirement on the resistor.

Most needs give rise to corresponding requirements. Some do not, for reasons of conflicting needs, infeasibility, error. Often the words can be used, in context, interchangeably. But sometimes not.

If the designer defined a requirement for the resistor of 10 ohms +/-2%, but actually needed 15 ohms +/-2%, the requirement would be invalid. Needs provide a reference for validation of requirements (and many other things).

Project Performance International News

Multicultural Courses Delivered

Robert Halligan was privileged to deliver a 5-day requirements engineering course over 9-13 March at Keio University, Tokyo, Japan, Graduate School of System Design and Management, to Masters and Doctoral program students from Japan, China, Sri Lanka, Turkey and Viet Nam. This course closely followed a 5-day systems engineering course in Italy, delivered to Masters Program students from Greece, Italy, Bulgaria, Turkey, sponsored by industry, as well as to students from Italy.

New PPI Website, New LinkedIn, New Twitter

PPI has released a new website, aimed at providing an easier registration process, as well as offering valuable technical content, for example, a new and expanding Systems Engineering FAQ, produced by Mr. Robert Halligan.

PPI has also created a LinkedIn group for past delegates. The aim of this group is to encourage discussion between past course delegates and to create a community in which you may ask questions or gain assistance from like-minded people.

Managing Director and Course Presenter, Mr. Robert Halligan, will be posting links to useful articles and tweeting Systems-Engineering related quotes regularly on the social networking platform, Twitter.

- Visit new PPI website
- Past delegates join PPI's LinkedIn Group
- Follow Mr. Robert Halligan on Twitter

Project Performance International Events

Systems Engineering 5-Day Courses

Upcoming locations include:

- Las Vegas, USA
- São José dos Campos, Brazil
- London, UK
- Ankara, Turkey
- Pretoria, South Africa
- Amsterdam, The Netherlands
- Melbourne, Australia

View 2009 Systems Engineering Course Schedule

Requirements Analysis and Specification Writing 5-Day Courses

Upcoming locations include:

- Adelaide, Australia
- Las Vegas, USA
- Amsterdam, The Netherlands
- Cape Town, South Africa

View 2009 RA&SW Course Schedule

OCD/CONOPS 5-Day Courses

Upcoming locations include:

- Melbourne, Australia
- Adelaide, Australia

View 2009 OCD/CONOPS Course Schedule

Software Engineering 5-Day Courses

Upcoming locations include:

- Munich, Germany
- Adelaide, Australia

View 2009 Software Engineering Course Schedule

PPI Upcoming Participation in Professional Conferences

- 23 - 27 March, 2009 - **IEEE Systems Conference 2009** - Vancouver, Canada (Exhibiting)
- 30 June - 2 July, 2009 - **Defence + Industry 2009** - Adelaide, Australia (Exhibiting)
- 20 - 23 July, 2009 - **INCOSE International Symposium 2009** - Singapore (Exhibiting)

Kind regards from the SyEN team:
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Tell us what you think of SyEN: email to contact@ppi-int.com

If you do not wish to receive a copy monthly of SyEN in future, please reply to this e-mail with "Remove" in the subject line. All removals are acknowledged; you may wish to contact us if acknowledgement is not received within 7 days.