

Systems Engineering Newsletter

Brought to you by Project Performance International (PPI)

SyEN #005 - February 18, 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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"Engineering process is useless in the absence of a knowledge of solution technologies relevant to the problem, and creativity in applying that knowledge" - Robert Halligan

Feature Article

The Practice of Cognitive Systems Engineering

Gavan Lintern
 St Kilda, VIC, 3183, Australia
glintern@earthlink.net

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. Somehow, my final edits to that article turned the final paragraph into nonsense. It should have read:

I have initiated this series of articles with definitions because I often perceive confusion or uncertainty about what these terms mean. If Cognitive Systems Engineering is to make any sense at all, a solid understanding of the foundational definitions is crucial. Now that I have defined the central ideas I will, in the next article in this series, introduce some ideas that are central to the practice of Cognitive Systems Engineering.

To make good on what I had intended to promise, I will, in this article, outline some important features of the practice of Cognitive Systems Engineering, discuss the distributed nature of cognitive systems, introduce my personal perspective on design and introduce two popular frameworks for Cognitive Systems Engineering. In

the final two articles, I will elaborate on these two frameworks and illustrate how each can complement existing Systems Engineering processes used in the design of large-scale socio-technical systems.

Cognitive Systems Engineering Frameworks

For those who are unfamiliar with the discipline of Cognitive Systems Engineering, its array of frameworks and methods can be confusing. Cognitive Systems Engineering frameworks offer different tools that can be brought to bear on the design of technological functionality for the support of human work. No single framework or method can satisfy all essential requirements in the development of large-scale socio-technical systems. In the third and fourth articles of this series, I outline two widely used frameworks, Cognitive Task Analysis and Cognitive Work Analysis, and describe a small selection of analytic methods from each. I will argue that these two frameworks in particular are complementary and together offer a powerful set of tools to address the cognitive issues in systems design.

All Cognitive Systems Engineering frameworks take a characteristic approach (Figure 1). Essentially, the challenge is to first elicit knowledge about the work that must be supported (primarily through analysis of how the work is accomplished) and of the constraints of the work environment. That knowledge must then be represented or summarized in a form that supports the design effort. Finally, prototypes are built (often, computer-based models) and evaluated (often, human-in-the-loop simulation with the prototype). The final stages of this process (prototyping and evaluation) are already well-known in Systems Engineering and I will say no more about them in this paper. The first two stages of this process (knowledge elicitation and knowledge representation) offer ideas, not well-known in Systems Engineering, that have the potential to strengthen systems acquisition.

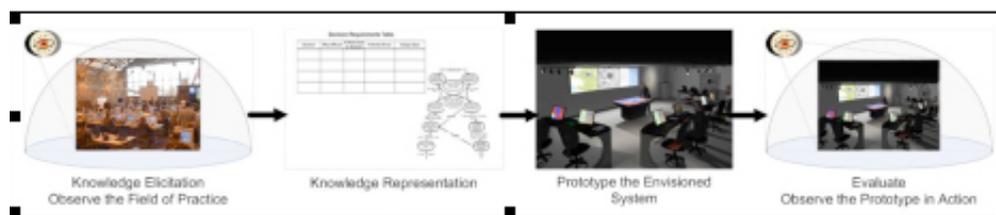


Figure 1: The cognitive design process

There is a multitude of specific methods for Knowledge Elicitation but all fall into one of four basic themes; document analysis, interview, observation or scenario simulation. The variations on these themes should not be neglected but I do not explore them systematically in this series of articles. The product of the Knowledge Elicitation phase is a detailed and specific description. The purpose of Knowledge Representation is to abstract that description in a manner that highlights the critical information and points to potential design solutions.

There is, as for Knowledge Elicitation, a multitude of methods for Knowledge Representation. Some are principled in the sense that they are guided by cognitive theory but others are unprincipled, being developed primarily to summarize information in a convenient way with an eye to the design problem. A principled representational form offers the benefit that it can be validated internally (the concepts and the relationships between concepts must be consistent with the guiding cognitive theory) but in application, the link to the design problem is often obscure. In contrast, those who develop representational forms without a connection to cognitive theory often do so with the design problem uppermost in their minds. There is a largely unrecognized challenge within Cognitive Systems Engineering to combine the strengths of these two approaches. I will describe selected methods of Knowledge Representation later in this series and will reflect further on the distinction between principled- and design-oriented representational forms.

Cognitive Systems are Distributed

Traditionally, we are used to thinking of cognition as an activity of individual minds but Hutchins (1995), and more recently, Hollan, Hutchins and Kirsh (2000), have argued that cognition is a joint activity that is distributed across the members of a work or social group and also across the available work artifacts. Cognition is distributed spatially so that diverse interactions with cognitive products and work artifacts shape cognitive processes. Cognition is also distributed temporally so that products of earlier cognitive processes can shape later cognitive processes. Most significantly, cognitive processes of different workers can interact so that new cognitive capabilities emerge via the mutual and dynamic interplay resulting from both spatial and temporal coordination among distributed human agents. A foremost claim of this view is that distributed cognition is not a theory about a special type of cognition but rather a theory about fundamental cognitive structures and processes (Hollan et al, 2000). Thus, all cognition is distributed.

A (distributed) cognitive system is one that dynamically reconfigures itself to bring subsystems into functional coordination. Many of the subsystems lie outside individual minds; interactions between people as they work with external resources are as important as the processes of individual cognition. Both internal mental activity and external interactions play important roles as do physical resources that reveal relationships and act as reminders. A distributed system that involves many people and diverse artifacts in the performance of cognitive work is therefore properly viewed as a cognitive system.

The theory of distributed cognition forces a shift in how we think about the relationship between minds, social interactions and physical resources. Interactions between internal and external processes are complex and unfold over different spatial and temporal scales and neither internal nor external resources assume privileged status. This view of cognitive systems as distributed is now accepted almost universally in Cognitive Systems Engineering and enables the generalization to teams and organizations of cognitive concepts normally used in discussion of individuals. Thus, we can speak comfortably of concepts such as a team mind and organizational knowledge.

A Perspective on Design

For some, design is a rational and systematic translation of a knowledge representation whereas for others it is a creative leap. Neither of these extreme positions is satisfactory. The first limits the potential for innovation while the second fails to build in any systematic way on the excellent design work that has already been undertaken.

In my own work, I leverage from design patterns and established principles of design. To aid with the design pattern aspect, I file (typically on my computer but sometimes mentally) examples of interesting or evocative designs I come across in my reading, my web surfing or my interactions with other people or the physical world. I search through that library of design patterns whenever I am faced with a design problem to assess whether there is one I might co-opt and adapt for the current purpose. As I implement a pattern, I reflect on relevant design principles to ensure compliance of my prototype or design sketch.

While I have not found explicit accounts of how others approach the design problem, conversations with colleagues suggest to me that this is a rather common approach.

More on Cognitive Systems Engineering Frameworks

There are several major frameworks within Cognitive Systems Engineering that represent different ways of resolving a conceptually similar problem, that being to design systems for the support of cognitive work. They are frameworks rather than methods because they are global constructs that frame suites of methods and specific theoretical constructs. Within a systems acquisition context, these frameworks can be thought of as a Cognitive Systems Engineering tool set. The two dominant frameworks are those of Cognitive Task Analysis combined and Cognitive Work Analysis.

The primary titles of these two frameworks differ only in the second word, task versus work, and so it is useful to distinguish these two terms. A task is something to be achieved, in other words, an outcome (Crandall, Klein & Hoffman, 2006). *Work* is a constellation of responsibilities and activities which is specified in terms of behavior shaping constraints (Vicente, 1999). There is some dissension within the discipline of Cognitive Systems Engineering about whether we should be analyzing tasks or analyzing work, work being a more global construct than task.

Also note that both frameworks analyze tasks but for Cognitive Task Analysis that is the focus of analysis whereas for Cognitive Work Analysis it is a part of the analysis. One of the continuing sources of dissension between practitioners of the two frameworks is a disagreement about what constitutes a task. In promoting the framework of Cognitive Work Analysis, Vicente (1999) defines task to mean actions that can or should be performed to achieve a particular goal. He argues that instead of analyzing tasks we should be analyzing control tasks, which he defines as goals that need to be achieved, independently of how they are to be achieved or by whom. However, as noted in the previous paragraph, Crandall, et al (2006) define task as something to be achieved, which is not all that different to Vicente's definition of control task. Thus the dissension on this issue is based on a misunderstanding, which leaves only the dissension about whether we should focus on the analysis of tasks or whether we should focus on the analysis of work (which includes analysis of tasks) as the single substantive point of disagreement.

I will describe each of these frameworks in more detail in the two forthcoming articles of this series and will argue that Systems Engineers would do well to think of them as complementary rather than competitive frameworks.

Summary

In this article, I introduced you to two popular frameworks of Cognitive Systems Engineering, discussed the distributed nature of cognitive systems and outlined my personal perspective on design. In the final two articles, I will elaborate on these two frameworks and illustrate how each can complement existing Systems Engineering processes used in the design of large-scale socio-technical systems.

References

Crandall, Beth; Klein, Gary & Hoffman, Robert R. (2006). *Working Minds: A Practitioner's Guide to Cognitive Task Analysis*. Cambridge, MA: MIT Press, ISBN 10: 0-262-03351-8.

Hollan, James; Hutchins, Edwin & Kirsh, David (2000). *Distributed Cognition: Toward a New Foundation for Human-Computer Interaction Research*. ACM Transactions on Computer-Human Interaction, Vol. 7, No. 2,

Hutchins, E. 1994. Cognition in the Wild. MIT Press, Cambridge, MA.

Vicente, Kim J. (1999). Cognitive Work Analysis: Towards safe productive and healthy computer based work. Mahwah, NJ: Lawrence Erlbaum.

Featured Society: ASEE Systems Engineering Constituent Committee

The American Society of Engineering Education's (ASEE) Systems Engineering Constituent Committee serves the same purposes as the ASEE overall, as they pertain specifically to systems engineering education, and the promotion of educational exchange, friendly cooperation, and mutual help among its members. The Committee's purposes include promoting educational programs in systems engineering, and providing a forum for discussion by all engineering educators regarding the discipline of systems engineering.

The Committee is chaired by Dennis Buede, Innovative Decisions, Inc., email dbuede@innovativedecisions.com. Program Chair and Chair Elect is Sven G. Bilén, Ph.D., Associate Professor, Engineering Design, Electrical Engineering, and Aerospace Engineering, and Chief Technologist, Center for Space Research Programs, The Pennsylvania State University, USA. Any member of ASEE can elect to affiliate with the Committee, The Committee invites educators with an interest in systems engineering to do so! It is understood that the Committee aims become a Division of the ASEE in due course.

Systems Engineering Software Tools News

EmbeddedPlus Simulation Toolkit v2.5.0 Now Available

EmbeddedPlus has announced the general availability of "Simulation Toolkit" release 2.5.0. Simulation Toolkit is a modeling tool that allows systems engineering modelers to create models based on the Unified Modeling Language (UML) and Systems Modeling Language (SysML) and simulate them to study their behavior. Simulation Toolkit provides the ability to simulate and execute UML2 and SysML models created using Rational Software Modeler/Architect, Rational Systems Developer (RSD) and the EmbeddedPlus SysML Toolkit.

[More information.](#)

New MagicDraw® Course in South Africa

No Magic states that, due to the increased popularity of MagicDraw® and recent requests for formal training in South Africa, the company is pleased to announce a new training course "Practical UML and URDAD-based Business Analysis Using MagicDraw®".

[More information.](#)

EB Releases GUIDE Studio 4.0 HMI Tool for Model-based Development

EB has released a new version of the EB GUIDE Studio. EB GUIDE Studio 4.0 is a tool for the model-based development of an HMI environment.

[More information.](#)

Enterprise Architect Corporate Edition 7.1.834

Enterprise Architect is claimed to combine the power of the latest UML 2.1 specification with a high performance, intuitive interface, to bring advanced modeling to the desktop, and to the complete development and implementation team.

[More information.](#)

New version JMCAD-03.054 released

JMCAD is a software program for the modeling and simulation of complex dynamic systems. This includes the ability to construct and simulate block diagrams. The visual block diagram interface offers a simple method for constructing, modifying and maintaining complex system models. The simulation engine provides fast and accurate solutions for linear, nonlinear, continuous time, discrete time, time varying and hybrid system designs. With JMCAD, users can quickly develop software or "virtual" prototypes of systems or processes to demonstrate their behavior prior to building physical prototypes. The user builds his system model by

selecting predefined blocks from a block library and wiring the blocks together. Each block of the diagram performs a function. Users can also create custom blocks in Java and add them to the JMCAD block library. JMCAD is a block diagram language for creating complex nonlinear dynamic systems. Its fast execution speed is said to be suitable for model based operator training, off-line controller tuning, and hardware-in-the-loop testing. JMCAD offers a set of companion products for frequency domain analysis, Java code generation, communications system modeling, DSP and embedded system design, neural networks and real-time analog and digital I/O. To join this project, contact the project administrators (see link below).

[More information.](#)

Systems Engineering Books, Reports, Articles and Papers

Manage Project Requirements Analysis and Design - Ensure Software Requirements are Right so Design Works as Wanted

© Roger Lever, suite101.com, Jan 1, 2009

Project management of software requirements must be managed to ensure right inputs result in the right outputs. Managers as well as the project manager are responsible.

Project managers will have planned for the project requirements phase to be followed by analysis and design and then implementation. However, this is also a time when many projects go wrong resulting in project failure. A key reason for this failure is that people have been unable to either clearly identify or specify requirements with the result that the analysis and design phase either takes much longer than expected or produces the wrong result.

[More information.](#)

UML 2 and SysML: An Approach to Deal with Complexity in SoC/NoC Design

Publisher: Institute of Electrical and Electronics Engineers

UML is gaining increased attention as a system design language, as indicated by current standardization activities such as the SysML initiative and the UML for SoC Forum. Moreover the adoption of UML 2 is a significant step towards a broader range of modeling capabilities. This paper provides an overview of the impact of these recent advances on the application of UML for SoC and NoC development, proposes a model-driven development method taking benefit of the best techniques recently introduced, and investigates the design of power efficient systems with UML.

[More information](#)

Requirements Engineering and Quality

Posted by Alex Papworth, businessanalystmentor.com

This article covers requirement quality or:
*"what does a good requirement look like?
How we can measure the quality of a requirement?"*

The article also explains the context of requirements and warns against over use.

Word of Warning from Mr. Papworth:

Although our end goal is a quality set of requirements, it is critical that we maintain a dialogue with the stakeholders. Always accept the requirements provided by the stakeholders as a draft and work towards improving them. Part of the process of producing quality requirements will be to educate the stakeholders as to what constitutes a quality requirement.

[More information.](#)

Enterprise Architecture: Creating Value by Informed Governance (The Enterprise Engineering Series)

by Martin Op 't Land (Author), Erik Proper (Author), Maarten Waage (Author), Jeroen Cloo (Author), Claudia Steghuis (Author), Publisher: Springer; 1 edition (December 16, 2008), ISBN-10: 354085231X, ISBN-13: 978-3540852315

Publisher's Description:

Twenty years after the first publications and books on enterprise architecture, the domain is evolving from a technology-driven towards a more business-driven approach, thus empowering decision makers to adapt and transform an enterprise in order to keep up with changing business needs. At the same time the discipline of enterprise architecting has matured, leading to a better understanding of the profession of an enterprise architect.

With this book, the authors aim to provide an overview of enterprise architecture including the process of creating, applying and maintaining it, thus taking into account the perspectives of CxOs, business managers, enterprise architects, solution architects, designers and engineers. They explore the results that are produced as part of an enterprise architecture, the process by which these are produced, and the role the architect plays in this process. As such, they do not describe a specific method for developing an enterprise (IT) architecture, nor do they define a specific modeling language for enterprise architecture, rather they offer the reader a fundamental way of thinking about enterprise architecture, which will enable him to select and apply the right approach, architecture framework and tools that meet the objective and context of the architecture work at hand. This approach is emphasized by discussion statements at the end of each chapter, sparking thoughts about benefits, shortcomings, and future research directions.

Covering both theoretical foundations and practical use, and written in close collaboration between industry professionals and academic lecturers, Enterprise Architecture thus offers an ideal introduction for students in areas like business information systems or management science, as well as guidance and background for professionals seeking a more thorough understanding of their field of work.

[Available at Amazon.](#)

Human Reliability and Error in Transportation Systems (Springer Series in Reliability Engineering)

by B.S. Dhillon (Author), Publisher: Springer; 1 edition (July 30, 2007), ISBN-10: 1846288118, ISBN-13: 978-1846288111

Publishers Description:

Each year billions of dollars are being spent to develop, manufacture, and operate transportation systems such as aircraft, ships, trains, and motor vehicles throughout the world. During their operation thousands of lives are lost annually due to various types accidents. Needless to say, approximately 70 to 90 percent of transportation crashes are the result of human error to a certain degree. Moreover, it may be added that human errors contribute significantly to most transportation crashes across all modes of transportation.

Human Reliability and Error in Transportation Systems is the first book to cover the subject of human reliability across all types of transportation system. The material will be accessible to readers with no previous knowledge in the field, and is supported with a full explanation of the necessary mathematical concepts together with numerous examples and test problems.

[Available at Amazon.](#)

The Art of Systems Architecting, Second Edition

by Mark W. Maier and Eberhardt Rechtin, Publisher: CRC; 2 edition (June 28, 2000), ISBN-10: 0849304407, ISBN-13: 978-0849304408

Publishers Description:

Today's architecting must handle systems of types unknown until very recently. New domains, including personal computers, intersatellite networks, health services, and joint service command and control are calling for new architectures-and for architects specializing in those domains. Since the original publication, of this bestselling text, these new and emerging fields have contributed architectural concepts and tools of their own to the relatively new formalism-and evolving profession-called Systems Architecting. The Art of Systems Architecting, Second Edition restates and extends into the future the classical architecting paradigm, incorporating the most broadly applicable of these contributions. It remains the most innovative, insightful treatment available to the discipline, providing both the academic and the industrial communities with the up-to-date tools, concepts, and techniques needed to conceive and build complex systems.

[Available at Amazon.](#)

Designing Complex Systems: Foundations of Design in the Functional Domain (Complex and Enterprise Systems Engineering)

by Erik W. Aslaksen (Author), Publisher: Auerbach Publications; 1 edition (October 27, 2008), ISBN-10: 1420087533, ISBN-13: 978-1420087536

Publishers Description:

Publisher's Description: According to the publisher of this book, without standardized construction elements such as nuts, bolts, bearings, beams, resistors and the like, the design of physical equipment is hopelessly inefficient, and engineers are continually bogged down with re-designing these elements over and over again. The same can be said for the domain of ideas and performance requirements. Only through a process of standardization of the corresponding functional elements will systems engineering truly live up to its potential of increased efficiency and quality, says the description of this book.

Designing Complex Systems: Foundations of Design in the Functional Domain, introduces students and practitioners in the field of system design to a particular methodology that addresses design issues in a rigorous and consistent top-down fashion. It also reassesses the characteristics of engineering and its place within the field of intellectual activity, in particular, examining the creative aspects of design, as reflected in the difference between engineers and technicians.

Erik W. Aslaksen brings forty years of experience to the table with this work, represented as groundbreaking. He examines how the concept of value can provide a quantitative measure of that wider interaction of the engineered object with its environment. With its approach, claimed to be forward-looking and holistic, this volume is predicted by the publisher to advance the field of knowledge of systems engineering for years to come.

[Available at Amazon.](#)

Requirements Elicitation Techniques

By Kingsley Tagbo

Requirements elicitation is the process of identifying the sources of requirements for a new system and obtaining those requirements from those sources. Potential sources of requirements include users, documents, regulators and even legacy software code.

Requirements elicitation is a crucial part of the Requirements Gathering, Documentation and Analysis Process. It is a very challenging activity that requires focus and skill from the business analyst. Whatever elicitation technique you choose and however you implement the technique, you need to do whatever it takes to understand what the real needs of your customers are.

[More information.](#)

Loving SysML

By Hans N. Beck

Since some weeks I am working with SysML, the special UML profile for Systems Engineering. It uses the most important diagrams of the UML, like Use Case, Activity, Class Diagram, and introduces some additional, like Block diagram and Requirement diagram. The more I work with it, the more I like it because for system engineers it has some advantages over standard UML 2.0:

- The concept of <> is more flexible to use. It has class semantics, so it can have attributes like subblocks and parts, and the aggregation and composition semantics.

[More information.](#)

The Method Framework for Engineering System Architectures

by Donald G. Firesmith (Author), Peter Capell (Author), Charles B. Hammons (Author), DeWitt Latimer (Author), Tom Merendino, Publisher: Auerbach Publications, 1 edition (November 20, 2008), ISBN-10: 1420085751, ISBN-13: 978-1420085754

Publisher's Description:

The architects of today's large and complex systems all too often struggle with the lack of a consistent set of principles and practices that adequately address the entire breadth of systems architecture. The Method Framework for Engineering System Architectures (MFESA) enables system architects and process engineers to create methods for effectively and efficiently engineering high-quality architecture for systems, subsystems, and software components.

Meets the Needs of Specific Projects

The book begins by documenting the common challenges that must be addressed by system architecture engineering. It explores the major principles answering these challenges and forming the basis of MFESA. Next, the authors introduce MFESA, including its primary goals, inputs, tasks, outputs, and assumptions. Then they describe the fundamental concepts and terminology on which the systems architecture engineering is founded. This is followed by a description of each of the ten system architecture engineering tasks including associated goals and objectives, preconditions, inputs, steps, postconditions, work products, guidelines, and pitfalls.

Finally, the book documents the relationship between quality and architecture, explains the quality model underlying MFESA, and provides a summary of MFESA method framework, as well as a list of points to remember and future directions planned for MFESA.

Explains Specific Rationales

Organized as a handy desk reference, this book harnesses more than 100 years of the authors' combined professional experience to provide extensive guidelines, best practices, and tips on avoiding possible pitfalls. It presents a direct rationale of why steps are taken, how things can go wrong, and guidance for how and when to tailor the model for a system's specific context.

[Available at Amazon.](#)

Waterfall V Iterative Development – Whether Or Not to Deliver Software Projects On Time

The History of Waterfall Development

In 1970, Winston W. Royce wrote an article in which he described a sequential model for developing software wherein development flows, waterfall-like, through phases of requirements, analysis, design, implementation, testing, and maintenance. He then went on to explain why this model couldn't work and described an iterative process as a much better alternative. Inexplicably, not only did the software community latch on to the concept of the "Waterfall" approach, but they even credited Royce with having proposed it...

The Iterative Alternative

Royce set the scene for iterative development, although it must be recognised that it was not a new concept: other scientific and engineering disciplines had been following an iterative approach for generations, if often informally. The simple rationale is that if you're doing something new, first explore the technical boundaries and constraints, by experimentation or some other means, then, when you know what is technically viable, review the design with the customer and confirm that both the technical and functional content are acceptable and justifiable...

[More information.](#)

The Engineering Design of Systems: Models and Methods, 2nd Edition

Dennis M. Buede, ISBN: 978-0-470-16402-0, February 2009

Publisher's Description:

The Engineering Design of Systems compiles a wealth of information from diverse sources, providing a unique, one-stop reference of current methods and models for systems engineering. This updated edition features important new information on Systems Modeling Language (SysML), more descriptive material on usage scenarios based on literature from use case development, updated homework assignments, and use of the software product CORE to generate the SysML figures. This book serves as an excellent introductory reference suitable for students and professionals alike.

Rational Choice and Judgment: Decision Analysis for the Decider

by Rex Brown, Publisher: Wiley-Interscience; 1 edition (April 21, 2005), ISBN-10: 0471202371, ISBN-13: 978-0471202370

"This book will be particularly useful to people who must make complex decisions for their organizations. It is very clearly written and well-organized. General readers will find it interesting and accessible." — Robert Pirie, Former Under Secretary of the Navy and Assistant Secretary of Defense.

"In the 40 years since we worked together on the beginnings of decision analysis at Harvard Business School, Brown has adapted it to the practical needs of real deciders and become a uniquely successful decision aider to top executives. He has distilled this experience here for real-world deciders with unmatched authority, clarity and candor." — Andrew Kahr, business strategist, described as one of the "great visionaries" of the financial world (by Joseph Nocera, A Piece of the Action).

"This is a lively, readable, yet intellectually honest introduction to decision analysis by one of the field's leaders. While it does not review the scholarly literature, it is informed by that literature. The exercises and examples seem excellent because they are realistic (or humorous, or both). The coverage is thorough, practical and well-written." — Jonathan Baron, author of Thinking and Deciding.

International Journal of Information System Modeling and Design (IJISMD)

An Official Publication of the Information Resources Management Association - New in 2010

Call for papers:

The Editor-in-Chief of the International Journal of Information System Modeling and Design (IJISMD) would like to invite you to consider submitting a manuscript for inclusion in this scholarly journal. The following describes the mission, the coverage, and the guidelines for submission to IJISMD.

Mission:

The mission of the International Journal of Information System Modeling and Design (IJISMD) is to provide an international forum for modeling experts and design professionals for exchanging innovative ideas. IJISMD enables presentation of original work in the development of models for business alignment with computerized services in order to make both organizational and technical systems more effective. It especially focuses on semantic integrity between business process and data, as well as on new methods for identification of semantic inconsistency, incompleteness, redundancy, and ambiguity of information system specifications. Targeting researchers, practitioners, and academicians, this journal promotes innovative findings in emerging disciplines of informatics on enterprise system modeling, design, integration, and evolution.

[More information.](#)

Conferences and Meetings

IIBA Webinar Series: Key Elements to Successfully Conducting a Stakeholder Analysis (members only)

Presented by Alain Arseneault, IIBA Vice President, Marketing and Communications, Tuesday February 17, 2009 12:00 pm - 1:00 pm E.D.T (Toronto, Ontario, Canada)

[More information](#)

Program Management Academy Workshop: Getting Great Requirements

Feb 20, 2009. 8:30 am - 4:30 pm (Pacific Time), Courtyard by Marriott, 15868 SW Sequoia Parkway, Tigard, Oregon 97224, USA

[More information](#)

Open Design Spaces supporting User Innovation (ODS '09) in conjunction with 2nd International Symposium on End User Development (EUD 2009)

March 2, 2009 Siegen, Germany

[More information](#)

MBSE'09, Second International Conference on Model-Based Systems Engineering

Herzeliya and Haifa, Israel, March 2 - 5, 2009

[More information](#)

8th International Conference on Aspect-Oriented Software Development

March 2 - 6, 2009, Charlottesville, Virginia USA

[More information](#)

Software Engineering within Social Software Environments (SENSE09)

Fraunhofer Institute Experimental Software Engineering, Kaiserslautern, Germany, March 3, 2009

[More information](#)

Systems Engineering Summit: Harnessing Best Practices

March 3 - 4, 2009. Huntsville, AL, USA

[More information](#)

IET Training Course - Introduction to SysML

March 12 - 13, 2009. Swansea, England

[More information](#)

Third Workshop on Engineering Complex Distributed Systems (ECDS 2009)

March 16-19, 2009, Fukuoka, Japan

<http://voyager.ce.fit.ac.jp/conferences/ecds2009/>

International Conference on Complex, Intelligent and Software Intensive Systems (CISIS) 2009

March, 16th - 19th 2009, Fukuoka Institute of Technology (FIT), Fukuoka, Japan

<http://www.cisis-conference.eu/conf/>

Fifth Workshop on Model-Based Testing (MBT) 2009

March 22, 2009, York, UK

<http://react.cs.uni-sb.de/mbt2009/>

The 2nd International Conference on Industrial Informatics and Systems Engineering (IISE 2009)

Leipzig, Germany, 23-25 March 2009

[More information](#)

IEEE International Systems Conference

Vancouver, Canada, March 23 - 26, 2009

[More information](#)

SEPG North America 2009

March 23 - 26, 2009. San Jose, California, USA

[More information](#)

Safe Model Workshop 2009

Co-located with LMO 2009. March 25 - 27, 2009, Nancy, France

[More information](#)

INCOSE U.K. Annual Spring Conference

March 30 – April 1, 2009

[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

Moscow, Russia, 3-5 June 2009

[More information](#)

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

8 - 12 June 2009, Amsterdam, The Netherlands

[More information](#)

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

Amsterdam, The Netherlands, June 8-9, 2009

[More information](#)

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

8-9 June 2009, Amsterdam, The Netherlands
held in conjunction with CAiSE' 09

[More information](#)

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

In conjunction with CAiSE'09 June 8 - 9, Amsterdam, The Netherlands

[More information](#)

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

In conjunction with CAiSE 2009, June 8 - 9, Amsterdam, The Netherlands

[More information](#)

The First International Workshop on Domain Engineering

In conjunction with CAiSE 2009, June 9th, 2009, Amsterdam, The Netherlands

[More information](#)

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

Telecom Bretagne, Brest, France, June 8 - 12, 2009

[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

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

[More information](#)

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

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

[More information](#)

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

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

[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

Seattle, Washington, July 20 - 24, 2009.

[More information](#)

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

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

[More information](#)

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

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

[More information](#)

2009 International Conference of the System Dynamics Society

Albuquerque, New Mexico, July 26 - 30, 2009

[More information](#)

3rd IEEE International Symposium on Theoretical Aspects of Software Engineering (TASE 2009)

July 29 - 31, 2009. Tianjin, China.

[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](#)

Improve Systems and Software Engineering Conference (ISSEC 2009)

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

[More information](#)

Workshop on Logical Aspects of Fault Tolerance (LAFT)

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

[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 Alcalá, Spain.

[More information](#)

AIAA Space 2009 - Joint Space Systems Engineering and Economics Track

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

[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](#)

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](#)

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](#)

24th IEEE/ACM International Conference on Automated Software Engineering

Auckland, New Zealand. November 16 - 20, 2009.

[More information](#)

Education

Postdoc Position at CEA-LIST

First-class candidates are sought for conducting original research in model-based, analysis-aided, multi-criteria optimization of embedded systems. Specifically, the position is for a motivated researcher to work in two European projects in collaboration with large companies from the automotive and transport industries (e.g., Continental, Volvo, Alstom, Thales, EADS, ABB). Among the main activities assigned to this position are to lay the groundwork for integrating model-based design and multiple analytic techniques for evaluating/guaranteeing performance and reliability properties of embedded systems. The thrust of the research will be on the definition of optimized architectural patterns guaranteeing generic properties by-construction, and adapting search strategy algorithms to guarantee correct composition (e.g., deadline-missing, deadlock, and error free) of different architectural solutions of a given design decision problem.

[More information](#)

Penn State named collaborator in first DoD-funded Systems Engineering

Penn State will serve as a designated research collaborator in a first-of-its-kind center funded by the Department of Defense (DoD), to focus on systems engineering issues facing the DoD and related defense industries.

Known as the Systems Engineering Research Center (SERC), the effort is the nation's first University Affiliated Research Center devoted to systems engineering research. Penn State will participate as part of a consortium of 18 leading collaborator universities and research centers throughout the United States. The center will be led by Stevens Institute of Technology, with the University of Southern California serving as its principal collaborator.

[More information](#)

Research scientist position in Formal Methods

Highly motivated applicants are being sought to work on the automation of component-based systems: from a sea of available components, which should be selected and how should they be connected, integrated, and assembled so that system-level requirements are satisfied? We are exploring all aspects of this problem, including:

- the development of model-based languages for describing systems
- declarative specification languages for describing assembly constraints
- the use of decision procedures based on SAT, pseudo-boolean solving, SMT, and related technologies for solving various aspects of the system assembly problem

[More information.](#)

Postdoc Position on Formal Methods and Model Checking

National University of Singapore

Highly motivated applicants are being sought to work on developing automated model checking techniques for infinite state systems. The postdoc will work with the software engineering and formal methods group at National University of Singapore on further developing the PAT toolkit (<http://pat.comp.nus.edu.sg>).

PAT is a powerful self-contained system modeling, simulating, and verification framework. Complementary verification techniques for finite state systems (e.g., reachability analysis, temporal logic verification with or without a variety of fairness, refinement checking, etc.) have been realized in PAT. PAT has been applied to many case studies and successfully found previously unknown bugs. PAT is designed to support multiple modeling languages and verification algorithms. The applicant will conduct research on verifying infinite-state systems, including real-time systems, parameterized systems, web services, etc. The approach is to identify/develop abstraction techniques which can be fully automated and then develop (possibly domain specific) abstraction modules in PAT, which then generates finite state machines which are subject to PAT's built-in algorithms for system verification. The position involves conducting basic research, developing tools, working as part of a research team, traveling, and giving presentations. The working language is English.

[More information](#)

- the development of model-based languages for describing systems
- declarative specification languages for describing assembly constraints
- the use of decision procedures based on SAT, pseudo-boolean solving, SMT, and related technologies for solving various aspects of the system assembly problem

[More information.](#)

People

Vale Richard Harwell

It is with sadness that we report the death of Mr. Richard Harwell. Mr. Harwell, a leader within Lockheed Martin in the United States, will be sorely missed by his many friends and colleagues within the worldwide systems engineering community.

Related News

INCOSE SE Certification Tutorial at SSTC 2009

Interested in Systems Engineering certification? John Clark, Director of Education & Training for the INCOSE Hampton Roads Area Chapter, and a Chief Engineer in the Northrop Grumman Corporation, will present a 2-day tutorial on 18-19 April 2009 immediately preceding the Systems and Software Technology Conference (SSTC) in Salt Lake City UT, see <http://www.sstc-online.org/>. This tutorial provides an overview of the INCOSE SE Handbook to help you prepare for the INCOSE SE Certification exam. The tutorial covers the Certified Systems Engineering Professional (CSEP) process as well as the sections and appendices of the SE Handbook, Version 3.1 (the basis for the certification exam), in a study group format. It also provides example exam questions and tips on filling out your CSEP application. The tutorial consists of 14 sections from Saturday, April 18 through Sunday, April 19, from 8:00 a.m. - 5:00 p.m. each day. For More information on the CSEP application process, and to apply on-line in advance of the tutorial, see <http://www.incose.org/educationcareers/certification/> or contact John Clark at (john.clark@incose.org). Registrants are encouraged, but not required, to attend the SSTC. Course Cost: \$395, including materials, refreshments, and lunches.

INCOSE Track at SSTC 2009

INCOSE and the Systems and Software Technology Conference (SSTC) have partnered once again to present an INCOSE Track at the SSTC in Salt Lake City UT from 20-23 April 2009. INCOSE has selected several excellent tutorials and presentations to advance the state of the art and practice of systems engineering in industry, academia, and government. The INCOSE Track promises to be an excellent opportunity to experience the art and practice of systems engineering and to network with fellow system engineers, so don't miss it! For More information on the SSTC and the INCOSE Track, see <http://www.sstc-online.org/> or contact John Clark at (john.clark@incose.org).

IIBA Introduces Tips & Techniques Bulletin for Members

The International Institute of Business Analysis (IIBA) has introduces for members a monthly bulletin containing tips or helpful techniques that you can put to use right away on the job. If there is a particular area

in which a member can use some help, the member may also write to the IIBA at kathleen.barret@theiiba.org. The question could be featured in an upcoming bulletin.

The first bulletin discusses process models versus use cases.

IIE Members Vote to Retain Current Name of Institute

The Institute of Industrial Engineers election results are in, and IIE members have voted not to change the name of the association from the Institute of Industrial Engineers to the Institute of Industrial and Systems Engineers.

"The Board of Trustees and members of the Institute are to be commended for resolving this issue that has been debated for many years," said IIE Executive Director Don Greene. "With this vote, the members have affirmed the breadth of industrial engineering. Although our profession undoubtedly encompasses a systems approach, it isn't necessary to communicate the broad reach that IE has through our name alone. Instead, industrial engineers around the world express who we are and what we do through our accomplishments. Particularly in our current economy, organizations are looking to industrial engineers to positively impact productivity and efficiency. Now is the time for IEs to step forward and make a difference."

Results of the votes for individual positions will be made public on the IIE Web site and in Industrial Engineer after all candidates have been contacted.

Mapping Between SysML and AP233

A working session to develop a mapping between SysML and AP233 was held on 31 January 2009 at the International Workshop of the International Council on Systems Engineering (INCOSE) at a San Francisco Airport Hotel.

A report on the workshop is being prepared, and is intended to be posted at http://www.omgwiki.org/OMGSysML/doku.php?id=sysml-ap233:mapping_between_sysml_and_ap233, along with presentations from the workshop. The workshop focus was SysML Blocks and related features, and their mapping into AP233 structures.

SysML is a general purpose modeling language for systems engineering applications (see www.sysml.org). AP233 is a STEP-based data exchange standard targeted to support the needs of the systems engineering community, consistent with emerging standards in CAD, structural, electrical, engineering analysis and support domains (see www.ap233.org).

Some Systems Engineering-Relevant Websites

<http://www.sei.cmu.edu/ccmi/cmmi.html>

The Software Engineering Institute (SEI) is a federally funded research and development center sponsored by the U.S. Department of Defense through the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. Its purpose is to help others make measured improvements in their software engineering capabilities.

<http://www.ciptool.ch>

This Software Engineering website holds information on working with the CIP Method (Communication Interacting Processes) and how the software "CIP Tool" can help make the process easier.

<http://www.value-eng.com>

Systematic Analytic Methods and Innovations (SAMI) is dedicated to helping their clients add to profitability and get the best value. To do this SAMI uses proven, highly organized processes that generate innovations. In addition to other techniques, SAMI is fully qualified in the use of various Value Improvement Processes, including but not limited to Value Method procedures and facilitation of "value studies."

http://www.plm.automation.siemens.com/en_us/

Siemens PLM Software, a business unit of the Siemens Industry Automation Division, is a leading global provider of product lifecycle management (PLM) software. PLM is the platform for turning more ideas into successful products because only PLM can provide the application depth and breadth needed to digitally author, validate and manage the detailed product and process data necessary to support continuous innovation.

<http://www.risktrak.com>

RST has developed RiskTrak™, claiming it to be the most advanced tool for the management of risk in the

industry. RiskTrak™ enables you to identify risk before it becomes a problem and the impact is greater. Using RiskTrak, you can analyze, report and manage risk over a project's duration and across organizational units.

<http://www.cyber.rdg.ac.uk>

The site is dedicated to Cybernetics, the science of information and its application, and the role it will play in everyday life.

<http://www.cybsoc.org>

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.

<http://www.robustdecisions.com>

Robust Decisions focus on the processes of product information development and decision-making, and in particular assessment, needs identification, training and solutions implementation. In other words, Robust Decisions provides decision management solutions.

<http://www.galorath.com>

From complex software projects to intricate manufacturing processes, Galorath's SEER Suite of Tools enables project managers, cost analysts and engineers to make timely, accurate, and insightful decisions. SEER tools are powerful, analytical tools that allow you to identify, evaluate and manage the complex array of cost, labour, schedule, reliability and risks associated with organizations' critical projects.

<http://www.wvisa.org>

The Institute of Software Architects, Inc. is a nonprofit corporation founded to accelerate the establishment of the profession of software architecture and to provide information and services to software architects and their clients.

<http://www.building-requirements-consensus.com>

This site is about the Building Requirements Consensus™ Methodology to enable organizations to realize our mission. Cook Enterprise Corporation is a group of people who want to help other organizations succeed better than they currently do today through the application of this approach and methodology.

<http://www.omgarte.org>

This is the official OMG MARTE Web site - Modeling and Analysis of Real-time and Embedded Systems. From the website, the specification of a UML® profile addressed by this website adds capabilities to UML for model-driven development of Real Time and Embedded Systems (RTES). This extension, called the UML profile for MARTE (in short MARTE), provides support for specification, design, and verification/validation stages. This new profile is intended to replace the existing UML Profile for Schedulability, Performance and Time (formal/03-09-01).

<http://mbse.sysmod.de>

This Model Based Systems Engineering site of Robert Karban and the SE² MBSE Challenge team provides useful insight into, and resources related to, model-based systems engineering (MBSE). From this website, "Model-based systems engineering (MBSE) is the formalized application of modeling to support system requirements, design, analysis, verification and validation activities, beginning in the conceptual design phase and continuing throughout development and later life cycle phases (INCOSE-TP-2004-004-02, Version 2.03, September 2007). A model is an approximation, representation, or idealization of selected aspects of the structure, behavior, operation, or other characteristics of a real-world process, concept, or system (IEEE 610.12-1990), i.e. an abstraction. A model usually offers different views in order to serve different purposes. A view is a representation of a system from the perspective of related concerns or issues (IEEE 1471-2000)."

The site provides a number of papers and examples relating to the application of SysML to the development of large optical telescopes.

<http://school.nomagicasia.com>

This is a site of the tool vendor No Magic Inc. for the UML and SysML CASE tool MagicDraw. No Magic guides the visitor through tutorial trails that explain practical modeling, diagramming, and engineering techniques with MagicDraw UML™.

Standards and Guides

Operational Concept Description Guides and Standards

In SyEN #004, we considered definitions of the terms Operational Concept Description (OCD) and Concept of Operations (CONOPS). Noting a long history of use of both terms, we now list some of the public domain (and PPI proprietary) guides and standards with which we are familiar. The guides and standards are listed in date order, most recent first.

OCD Guides and Standards

1. Department of Defense Architectural Framework (DoDAF) version 1.5, April 2007, OV-1 High Level Operational Concept Graphic
2. U.K. Ministry of Defence Architectural Framework (MODAF) version 1.1, 10 April 2007, OV-1
3. ANSI/AIAA G-043-200x Draft 2.0, August 2006 "Guide for the Preparation of Operational Concept Documents" - 29 August 2006
4. PPA-ME04-000950-2, "Operational Concept Description" DID, PPI, 14 December 2005
5. DID-ENG-DEF-OCD-V1.2 (Australian DoD OCD DID) - undated
6. DID-ENG-DEF-OCD-VG (Australian DoD OCD DID) - undated
7. TAA-ME04-000962 - 4"Operational and Support Concept Description" DID, PPI, 17 April 2003
8. IEEE Std. 1362-1998, IEEE Guide for Information Technology - System Definition - Concept of Operation (ConOps) Document – Description – 22 December 1998
9. IEEE P1362, Guide for Concept of Operations Document, 1996
10. DI-IPSC-81430A, "Operational Concept Document (OCD)" DID, 10 January, 2000
11. DI-IPSC-81430, "Operational Concept Document (OCD)" DID, 5 December 1994
12. SDD (DRAFT MIL-STD-498) OCD DID – 27 May 1994
13. SDD (DRAFT MIL-STD-498) OCD DID – 5 December 1994
14. AIAA G-043 "Guide for the Preparation of Operational Concept Documents", 1 January 1992 (ISBN-10: 1563470500)
15. DI-MCCR-80023, "Operational Concept Document (OCD)" DID – 4 June 1985

CONOPS Guides and Standards

1. PPA-004023-1, "Concept of Operations (CONOPS)" DID, PPI, 24 November 2007

If you are aware of any other public domain OCD standards and guides, please let us know and we will update the list.

Robert Halligan.

A Definition to Close On

Constraint: something that limits (Oxford English Dictionary)

Note: Every requirement is a constraint (that is its purpose). Every constraint is not a requirement.

Robert Halligan.

Project Performance International News

On-Site Training

PPI will be delivering on-site systems and software engineering training over the next few weeks in the following countries: United Kingdom, Spain (Canary Islands), Japan, Australia.

Project Performance International Events

Systems Engineering 5-Day Courses

Upcoming locations include:

- Spain
- Sydney, Australia
- Adelaide, Australia
- Las Vegas, USA
- Sao Jose dos Campos, Brazil
- London, UK

[View 2009 Systems Engineering Course Schedule](#)

Requirements Analysis and Specification Writing 5-Day Courses

Upcoming locations include:

- Adelaide, Australia
- Las Vegas, USA
- Cape Town, South Africa

[View 2009 RA&SW Course Schedule](#)

Requirements Engineering 5-Day Courses

Upcoming locations include:

- Yokohama, Japan

[View 2009 Requirements Engineering 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:

- Melbourne, Australia
- 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:

Robert Halligan, Managing Editor, email: rhalligan@ppi-int.com

Alwyn Smit, Editor, email: asmit@ppi-int.com

Julie May, Production, email: jmay@ppi-int.com

Michael Halligan, Production, email: halliganm@ppi-int.com

Project Performance International

PO Box 2385, Ringwood, Vic 3134 Australia

Tel: +61 3 9876 7345

Fax: +61 3 9876 2664

Web: www.ppi-int.com

Email: contact@ppi-int.com

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