

Project Performance International

Systems Engineering

Newsletter (SyEN)

SyEN #021 - June 21, 2010

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Dear Colleague,

SyEN is an independent free newsletter containing informative reading for the technical project professional, with scores of news and other items summarizing developments in the field, including 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 stakeholder requirements and maximize value delivered to stakeholders in accordance with their values.

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A Quotation to Open On

"I believe that quality level is determined primarily by the actual design of the product itself, not by quality control in the production process." - Hideo Sugiura, Chairperson (retired), Honda Motor Company

Featured Article

Modelling as a Tool in the Engineering of Systems of Systems

By Jan Roodt
jan.roodt.nz@gmail.com

Introduction



Golden Gate Bridge¹

Modern engineering is continuing to push the boundaries, just like the civil engineering of the previous centuries did within the context of those days. Building the large span bridges like the Golden Gate Bridge shown above, was not a simple feat. Engineers had to consider new materials, new ways of construction, the geography of the region (on a known planetary fault line and prone to earthquakes), and many other issues. What is interesting is that engineers have been using models since antiquity to first of all sell their concepts, and then to ensure that the final product adhered to the original intent as closely as possible.

In this short article I want to consider the challenges faced by modern system engineers dealing with complexity. A short introduction to the concept of complexity (and why it is relevant to system engineering) will be followed by some ideas around the modelling of systems that exhibit the properties of complex systems.

¹Image by Cary Bass retrieved from Wikimedia and used under the Creative Commons License
http://commons.wikimedia.org/wiki/File:Golden_Gate_Bridge_Yang_Ming_Line.jpg

Complexity surrounds us

There are many definitions and descriptions for the concept of complexity. I like to consider complex systems, mainly because complexity can be thought of as a systemic property [1]. Furthermore, my interest in this article is in those systems with a multitude of interacting, hierarchical elements, some of which may be human, or elements with non-linear behaviour, like fuzzy control systems. The problem with these types of systems is that it is almost impossible to determine how all the elements may interact at any given time, or what sort of system level behaviour may emerge. Given a certain behaviour, it follows that it is also difficult to understand how each of the components contribute to the observed, emergent operation.

Complex systems are sensitive to small perturbations: this immediately raises concerns around repeatability, and what worked last time may turn out not to be a solution this time. If the system adapts over time, as all complex systems do, it implies that a strategy that worked today may not work tomorrow. Casti [2] gives us a few pointers to try and identify complex systems. Complex systems:

1. Have a moderate number of “agents” or elements,
2. Are intelligent (capable of non-linear response) and adaptive,
3. Rely on “Small World” interaction.

Agents are entities with input-output behaviour, acting on information and adaptive, taking history into consideration, so they can compare past with present. It has access to a basic learning algorithm. The number of agents is more than a few, but less than a multitude. This means that there is enough interaction to ensure richness, but not so much that we can approximate the behaviour by statistics. Small world interactions dictate that a network is established between “nearest” neighbours and no single agent has access to all the signals in the environment, but relies on the network for access to information. To design and instantiate any system to work in such an environment or to be a part of such a system, one must understand if it itself will be a complex system and how to bound the design space.

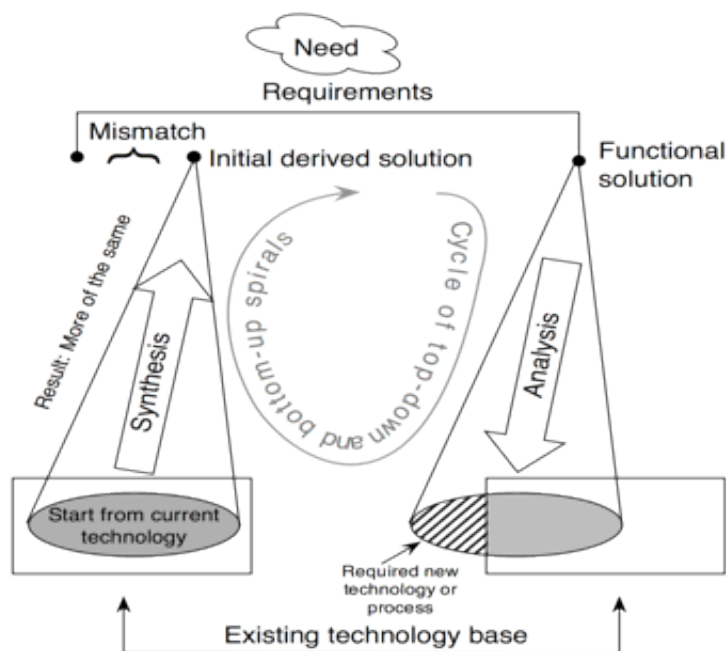
By definition a system has a boundary and complex systems have “ports” or porous boundaries through which they interact with the environment (which one could see as a system too). The complex system derives information from the environment, acts on it and reacts on feedback. This supplies the complex system with context and obviously makes demarcation of the appropriate boundary to the space to be considered during design. Philosophically speaking, if one considers the Universe a system, the big question is where the boundaries are, and how the system is “open”. If it is not open, one can claim that it is not complex! In any socio-technical system (a collection of human or “aware” agents and machine elements that interact in an integrated way), the system behaviour arises from multiple interactions amongst the constituent parts, and in as a result of its contextual connectedness to the environment in which it is embedded [3].

As I am interested in developing some ideas around the engineering of systems-of-systems, my argument is that “boundary” establishment and management must be seen as a crucial part of the initial work. Without understanding how the system interacts with its environment, and where the environment “begins and ends”, the task of defining the system context in any sense – ontologically or phenomenologically, is almost impossible.

In short then, most of our modern systems are of a socio-technical nature and are complex. New service-oriented systems must be devised daily, for example and it is expected that the system engineer will ensure that the delivered solutions match the (rapidly changing) market requirements, that it can be adapted over time and sustained and serviced as needed over its full life cycle, and that it is (and remains) interoperable with other systems [4] amongst other things. How do we go about successfully defining and developing new systems in such an environment?

Modelling to Understand

In a recent book on the topic of the design of complex systems, Aslaksen [5] makes an urgent case for top-down design approaches to ensure that systems achieve their required operational goals. I have adapted his diagram slightly to highlight the process.



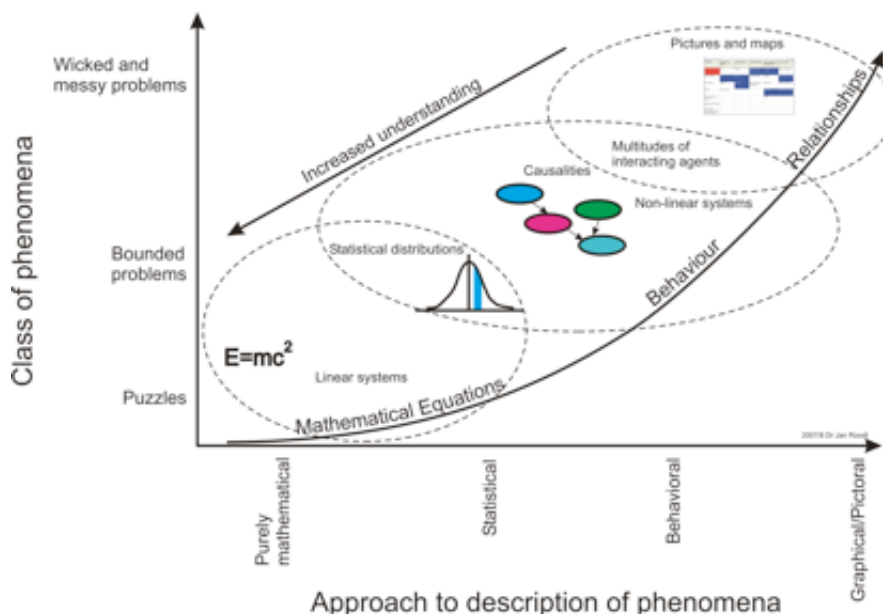
Adapted by Jan Roodt 2009 from Aslaksen, E.W. *Designing Complex Systems*

We are all aware of the fact that almost all the large projects we encounter these days require new technology innovations. What Aslaksen is saying is that if we start from our established base and we design solutions with that context only, we will get more of the same and possibly a large mismatch with the required capability of the system. His counter proposal is to start with the conceptual functional solution. I am saying that a process in a tight cycle with bottom-up methods should be followed and the way to achieve this is to use modelling extensively to synthesise existing and conceptual technologies and processes into a

continuous evolutionary solution space. This does not mean that we have a shifting baseline in the worst sense, but rather that the technology trends can be utilized more effectively to track the changing requirements space as part of a through-life approach to the solution.

According to Cilliers [6], modelling allows us to build an understanding of things. At the same time he is careful to state that complex systems may be problematic in this sense and one of the reasons mentioned [7] is the notion of incompressibility. The idea is that there is no accurate model of the system that is simpler than the system itself: we need to use the system as the model! This is perfectly reasonable from a philosophical perspective, but has limited value in engineering. As a physicist I believe that Cilliers is correct and as an engineer I hold that we must find ways to work around his constraint. Indeed, Cilliers specifically does not argue against modelling, but only argues that no perfect model can be found for a complex system.

Going back to an earlier statement that the system boundary management is a key element of system engineering, it may be possible to use modelling techniques and tools that start from context setting to derive reasonable and appropriate system solutions. The context will dictate the level of detail needed in the functional and ontological sense. Building software models in a cyclic manner, that is, modelling more detail in a functional sense only up to the point that the system elements seem to deliver a coherent solution to the need, may hold the key. The following diagram shows what modelling methods are appropriate to describe what type of phenomena.



Some models in physics approach the laws of nature, like the conservation of energy. It is possible to write down equations for these relationships that accurately describe the phenomenon to the best of our current knowledge. I refer to these on the Y-axis as puzzles. At the other end of the scale are the messy realities where we know that it is difficult to derive an optimal solution. We have no way of knowing that we have indeed discovered an optimal solution, or if one in fact exists. Here the only way to describe the problem would be to have a model that frames the context and relationships, a qualitative model rather than a quantitative one.

The interesting thing is that once such a descriptive and coherent model exists, it becomes possible to derive functional and causal models at the level of system behaviour, which in turn allows us to understand how the system elements may be interacting. This does not mean that we have a full understanding of the non-linearities in the system. It only means that we can isolate contextual blocks that can yield to known design approaches, like SysML [8]. Constantly jumping into the detail and then standing back to evaluate the result allows us to develop a system level model and understanding that may be used to design the first functional description of the complex system we need to develop.

The Case of Command and Control Modelling

Command and Control (C&C) in military systems is not a simple thing to model as it relies heavily on the people making decisions and advanced supporting technologies, like networks, radios, etc. It is a classic social-technical system.

A current project allows us to experiment with the methods described above in this domain of military affairs. The goal is to develop an adaptive doctrine and resulting C&C for use in modern warfare. It was found that setting a context and describing the boundary of the system to be developed highlighted several issues. It was discovered that the C&C remains complex, no matter what functional level or hierarchical level of military organization was designated. C&C remains complex in the sense described by Casti and listed earlier, whether it is studied at the level of an air defence battery, or at the level of a battalion. The

people and their actions and decision processes are core elements that drive the system behaviour.

However, it is recognized that in terms of relationships and patterns, one can make a case for a process description that could scale, given that the human agents are modelled to interact in a non-linear way with the process, in response to a well defined set of environmental stimuli. Mixing event based (process modelling) and agent based modelling seems to yield a system model that has emergent behaviour that is coherent and similar to that of the real systems.

A top-down and bottoms up cycle is used to link functionality required with known technological constraints or parameters. By “stretching” the ability of the technologies or the doctrine or both, better fit with the stated needs can be demonstrated. From the perspective of the discipline of Systems Engineering, this is a promising result, because once the functional description of the system emerges, classic processes can be used to develop the requirements and to turn out feasible solutions. Once this is done, it is possible to procure systems off the shelf or to develop custom modifications to fit with a local requirement.

Conclusion

Although it is not possible to develop absolute models of complex systems, it is still possible to develop a range of models that will allow the systems engineer to gain the upper hand in the design and delivery of real working systems. The new understanding about the nature of socio-technical systems can be used in this endeavour. I argued that proper contextualization and boundary setting is a critical pre-condition for success. Too often the pressure is there to start from the current technology base and building blocks, with the result that more of the same, and mostly off-the-mark solutions are delivered. The expectations that more smart systems will be developed to support humankind, will grow. With it the tools and approaches have to develop rapidly to take the new reality into account.

Reference List

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About Jan Roodt

Jan Roodt is a member of INCOSE and a registered practicing scientist at the Council for Scientific and Industrial Research (CSIR) in South Africa. In his capacity as Contracts R&D Manager he has established several new areas of technology research and application for the RSA DoD, including a capability for applied research in Command and Control and an application area focused on modelling and simulation for acquisition decision support (MSADS). Jan holds a PhD in Engineering Science from the University of Stellenbosch and will relocate to Dunedin in New Zealand during July 2010, where he plans to start a small consultancy.

Systems Engineering News

Call for Papers: MODELS 2010 Doctoral Symposium

The goal of the Doctoral symposium is to provide a forum in which PhD students can present their work in progress and to foster the role of MODELS as a premier venue for research in model-driven engineering. The symposium aims to support students by providing independent and constructive feedback about their already completed and, more importantly, planned research work.

The technical scope of the symposium covers all topics of MODELS 2010.

[More information](#)

Systems Thinking 101: The Magic of Systems Thinking

If you've ever wondered "What is systems thinking?" or wanted to know more about systems thinking in general, check out this handy 7-day series.

[More information](#)

Survey of Systems Engineering for VSMEs and Small Projects

The Systems Engineering for Very Small and Micro Enterprises (SE for VSMEs) Working Group (WG), a WG mandated by INCOSE (International Council on Systems Engineering) and AFIS (Association Française d'Ingénierie Système), is conducting a survey to:

- Identify strengths and weaknesses of product development practices in VSMEs and small projects in various Domains
- Characterize the state of practice of product development in this context
- Identify areas where the practice of systems engineering can better assist product development in this context

The survey can be taken at http://isosurvey.logti.etsmtl.ca/vsme_survey_eng.htm

Upcoming Submission Deadlines and Themes for INSIGHT

INSIGHT is the newsletter of International Council on Systems Engineering. It is published four times per year (January, April, July, October). INSIGHT features status and information about INCOSE's technical work, local chapters, and committees and boards. Additionally, related events, editorials, book reviews, trends, and how-to-do articles that are pertinent to the many aspects of a systems engineer's job are also included, as space permits.

Upcoming submission deadlines and themes for INSIGHT

Issue	Submission Date for General Articles	Theme	Theme Editor	Deadline for Theme Article Proposal*
3rd Qtr 2010	8 Aug 2010**	2010 International Symposium Coverage: Chicago, Illinois, USA	Jack Stein	11 Nov 2009
4th Qtr 2010	15 Oct 2010	Systems Development from Deep Sea to Deep Space: Lessons from the Johns Hopkins Applied Physics Lab	Mike O'Driscoll and Sam Seymour	
1st Qtr 2011	15 Feb 2011	Knowledge Management for Systems Engineering	Regina Griego	21 May 2010
2nd Qtr 2011	15 May 2011	Systems of Systems and Self-Organizing Security**	Rick Dove, Ken Kepchar, Jennifer Bayuk	

*Submission deadline moves according to International Symposium date

** Please contact the theme editor by 18 August 2010 to propose a theme article.

[More information](#)

Please Take Part in the INCOSE UK's Systems Engineering Survey

INCOSE UK is now looking to broaden its knowledge of the UK's systems engineering (SE) community by understanding the work systems engineers do in a little more detail. For example: are they being offered the right challenges and opportunities? Are they using their SE skills as they would like? What do they find most rewarding from their career as a systems engineer? The answers to these and similar questions will guide INCOSE UK in how it continues to support systems engineering across

the UK

[More information](#)

UK Competencies Framework & Guide Available Now

INCOSE Technical Operations announced the release of the UK Competencies Framework and Guide for use by INCOSE members. The documents are posted on INCOSE Connect as INCOSE Technical Products. The INCOSE Open Website has a description of the documents in the [Products & Publications](#) area, with a link to their location in Connect.

v3.2 of Handbook can now be used for Certification Exam

As of May 2010, the INCOSE Systems Engineering Handbook Version 3.2 can now be used to prepare for the certification exam used for CSEP and ASEP. As previously announced by INCOSE, Version 3.1 can also be used to prepare for the certification exam through January 2011 (i.e., you can use either version 3.2 or 3.1 to prepare). After January 2011, only Version 3.2 of the INCOSE Systems Engineering Handbook will be used as the basis for the certification exam, and Version 3.1 will be retired. This timing allows a transition period for those already using Version 3.1 of the handbook to prepare for the examination.

Recent INCOSE Publications Available Online

April Issue of INSIGHT: Reflections on the Technical Engine of INCOSE - <http://www.incose.org/ProductsPubs/periodicals/insight.aspx>

Systems Engineering Volume 13 Issue 1 - <http://www.incose.org/ProductsPubs/periodicals/journalofsystems.aspx>

OMG SysML v. 1.2 Minor Revision Available

The OMG SysML v. 1.2 minor revision, which customizes UML v. 2.3 for systems engineering applications, is now available. The revision can be downloaded from the SysML.org Specifications page

(<http://www.sysml.org/specs.htm>) or the OMG web site.

IIBA Business Analysis Competency Model Version 2 Now Available

A new release of the IIBA® Business Analysis Competency Model, just released, adds:

- new the Performance Competencies and Indicators
- BA Job Profile Definitions
- Work context of Job Profiles
- Expected Techniques used by Job Profile
- Expected minimum level of competence for each Performance Competency by Job Profile

This release the Competency Model and Self Assessment Tool are available as a personal use, read-only copy, free to IIBA members. Non-members can purchase a personal use, read-only copy for \$25USD.

[More information](#)

Featured Societies

OMG Systems Engineering Domain Special Interest Group (SE DSIG)

The Object Management Group™ (OMG™) has been an international, open membership, not-for-profit computer industry consortium since 1989. Any organization may join OMG and participate in its standards-setting process.

Systems Engineering Domain Special Interest Group (SE DSIG) supports evolution of model-based systems engineering

standards to achieve the following goals:

- Provide a standard systems modeling language to specify, design, and verify complex systems
- Facilitate integration of systems and software engineering disciplines
- Promote rigor in the transfer of information between disciplines and tools for developing systems.

Unified Modeling Language (UML) has become a standard modeling language amongst the software engineering community.

A decision to pursue UML for systems engineering (SE) was made following a series of discussions at the International Workshop of the International Council on Systems Engineering (INCOSE) in January, 2001. Dave Oliver represented INCOSE at the OMG Technical meeting in July '2001, to initiate a liaison with the OMG to support evolution of UML for Systems Engineering . At the meeting, a Memorandum of Understanding between OMG and INCOSE was signed, and the Systems Engineering Domains Special Interest Group (SE DSIG) was chartered. Sanford Friedenthal was identified as the INCOSE liaison to the OMG and SE DSIG chair. The SE DSIG kickoff meeting was held on September 13, 2001 in Toronto.

The initial phase of the SE DSIG focused on developing the requirements for UML for Systems Engineering. This effort included several activities including the issuance of a Request For Information (RFI) on how UML is being applied to systems engineering, support for the development of a Systems Engineering Conceptual Model, collaboration activities with the UML 2 Submission Teams, and development of a detailed requirements analysis for UML for SE. This phase culminated at the OMG Technical Meeting in Orlando on March 28, 2003 with the issuance of the UML for Systems Engineering RFP. Refer to the INCOSE 2003 paper entitled : "Extending UML from Software to Systems" for additional background on these activities. The SysML specification was developed in response to the RFP and adopted in July '06. Information on OMG SysML™ can be found at <http://www.omg.sysml.org>.

At the February 2-3, 2005 SE DSIG meeting in Burlingame, SE DSIG participants agreed to pursue a new standard to support the U.S. Department of Defense (DoD) and U.K. Ministry of Defence (MOD) Architecture Frameworks (DODAF and MODAF). At the September, 2005 OMG meeting, the UML Profile for DODAF/MODAF was issued by the OMG through the C4I Domain Task Force. The revised submissions were presented to the OMG at the March '07 OMG meeting in San Diego. Additional information on this activity can be found at <http://syseng.omg.org/UPDM.htm> .

The SE DSIG effort has been closely aligned with the on-going ISO AP-233 standard activity AP-233. AP-233 is focused on developing a data interchange standard for systems engineering, which is intended to provide a neutral data format to exchange systems engineering information among software tools. The ISO AP-233 project is a working group of TC-184 (Technical Committee on Industrial Automation Systems and Integration), SC4 (Subcommittee on Industrial Data Standards), and is part of the larger STEP effort, which provides standardized models and infrastructure for the exchange of product model data. The result of this effort will be part of the existing ISO 10303 standard that will provide an "Application Protocol" for Systems Engineering. One of the joint SE DSIG and AP-233 tasks is the development of the Systems Engineering Conceptual model, which is intended to help align the requirements for UML for SE and the AP-233 data interchange standard.

The SE DSIG effort is focused on establishing standards for system modeling. The system modeling is generally the result of implementing the activities and techniques which are defined by the applicable systems engineering process and methodology. There are several systems engineering process standards, including ANSI/EIA 632, IEEE 1220, and ISO/IEC 15288:2008. Each of these process standards defines the primary activities which must be performed to implement systems engineering.

A variety of other methodologies for implementing the systems engineering process also exist, including both structured and object oriented methodologies. Some examples of systems engineering methodologies are referenced in the UML for SE RFI Responses and many others can be found in the INCOSE systems engineering handbook available from the INCOSE website.

Membership of the OMG is open to companies. Through company membership of the OMG, individuals may participate in the activities of the SE DSIG.

If you are an INCOSE member who wishes to participate in the SE DSIG and your company is not already an OMG member, you may send your request via email to the SE DSIG chair (see below) with your name, email, phone, company, company address, and INCOSE member number for a free six-month OMG membership for your company. The SE DSIG chair is:

Sanford Friedenthal
Lockheed Martin Corporation
(703) 293-5557
sanford.friedenthal@lmco.com

More information: <http://syseng.omg.org/>

INCOSE Technical Operations

Systems Engineering Standards Resource Center

The International Council on Systems Engineering [Standards Technical Committee \(STC\)](#) is one of the most active communities within INCOSE. Its members are working to advance and harmonize systems engineering standards used worldwide.

Current SE Standards

ANSI/GEIA EIA-632, Processes for Engineering a System, 01 Sept 2003

Available for purchase from the Government Electronics and Information Technology Association (GEIA)

Under revision by GEIA G-47 to align with ISO/IEC 15288; early stage of development (next meeting January 2005).

EIA/IS 731.1, Systems Engineering Capability Model, Electronic Industries Alliance (Interim Standard), 01 Aug 2002

Available for purchase from the Government Electronics and Information Technology Association (GEIA)

IEEE 1220-1998, IEEE Standard for Application and Management of the Systems Engineering Process, Institute of Electrical and Electronics Engineers, 01 May 1998

Available for purchase from the Government Electronics and Information Technology Association (GEIA)

Revision to align IEEE 1220 with ISO/IEC 15288 and provide a lower level of detail than 15288 is underway and due out December 2004. After that it will be fast tracked as an ISO standard.

ECSS-E-10 Space Engineering

Systems Engineering Part 1B: Requirements and process, 18 Nov 2004

Systems Engineering Part 6A: Functional and technical specifications, 09 Jan 2004

Systems Engineering Part 7A: Product data exchange, 25 August 2004

Available for download from [European Cooperation for Space Standardization](#)

ISO/IEC 15288: 2002 - System Life Cycle Processes

Available for purchase from the International Organization for Standardization (ISO)

JTC1/SC7/WG7

Harmonization of ISO/IEC 15288 and ISO/IEC 12207:1995 & 2 Addendum 2002, 2004 (software life cycle processes) is under development. This is nearing WD.1 (working draft 1) stage.

ISO/IEC 19760:2003 - A Guide for the Application of ISO/IEC 15288

Available for purchase from the International Organization for Standardization (ISO)

ISO/IEC 15504: 2004 - Information Technology - Process Assessment

JTC1/SC7/WG10

Available for purchase from the International Organization for Standardization (ISO)

Part 1: Concepts and vocabulary (2004)

Part 2: Performing an assessment (2003)

Part 3: Guidance on performing an assessment (2004)

Part 4: Guidance on use for process improvement and process capability determination (2004)

Part 5: An assessment model and indicator guidance (1999)

ISO 10303-AP233, Industrial automation systems and integration -- Part 233: Systems engineering data representation

TC184/SC4/WG3/T8

Additional information available on the AP-233 website

Currently in working draft form

Other Standards**ANSI/AIAA G-043-1992, Guide for the Preparation of Operational Concept Documents**

Being upgraded now by INCOSE and AIAA partnership

IEEE 1471, 2000: IEEE Recommended Practice for Architectural Description of Software-Intensive Systems

Available for purchase from IEEE

Capability Maturity Model Integration (CMMI)

All you need to know is available from the Carnegie Mellon Software Engineering Institute's CMMI website

Merger of SW-CMM (from SEI) and SECM (EIA/IS 731)

Released in July 2000 (Combined SE/SW model)

Later release with IPD elements (version 1.01), Nov 2000

Might be developed into full standard by EIA

Unified Modeling Language (UML)Available for download from the [Object Modeling Group \(OMG\)](#)

To be issued as ISO standard

Version 1.5 is released; version 2.0 is in finalization

Systems Modeling Language (SysML)

Latest draft is available for download from the SysML Partners website

The INCOSE Modeling & Tools Technical Committee is working with the OMG and SysML Partners to create an extension to UML version 2.0 to support systems engineering.

Ed. note: Whilst the above information is the latest which we have been able to access as a consolidated overview, many, many standards developments have taken place with participation of INCOSE since the activities reported above. These developments are reported on elsewhere in editions of SyEN. The above piece should be regarded as historical.

Systems Engineering Software Tools News

PivotPoint Doubles Down on Business Process Modeling with Advanced BPMN 2 + UML 2 Training

PivotPoint Technology Corporation announced that it is expanding its business process modeling training and is supporting the synergistic usage of two leading modeling language standards—BPMN and UML. PivotPoint's new advanced business process modeling workshops will extend its popular Essential BPMN Applied™ workshops for business analysts and software developers.

[More information](#)

eDev Technologies Launches inteGREAT Enterprise 2010

eDev launched inteGREAT Enterprise 2010 for automated requirements definition on April 6th 2010 at Microsoft Canada Head Quarters.

[inteGREAT](#), a Microsoft BlueSky award winning product, is a requirements definition, simulation, validation, collaboration and test document automation technology that provides bidirectional integration with Team Foundation Server 2010.



Part of the offering is this [inteGREAT Acquisition Business Case and Return on Investment](#).



New Interoperability Tools for IBM Rational DOORS users

SODIUS has just released MDConnect™ for DOORS solutions that help the DOORS® user community navigate through their requirement data in Eclipse and interoperate with other applications.

IBM Rational DOORS is often used in conjunction with other lifecycle tools of various types and from multiple vendors, creating increasing challenges to design and maintain traceability throughout these projects. All the necessary interactions between those applications make integration and interoperability questions more and more critical.

This new offering enforces SODIUS's commitment to bring innovative solutions to address interoperability challenges and allow lifecycle tools to work together

[More information](#)

Atego launches Artisan Studio 7.2

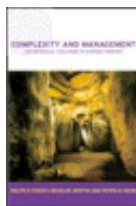
Atego has launched Artisan Studio 7.2, a major new version of its flagship model-driven development tool suite.

Artisan Studio 7.2 delivers a variety of significant new modeling capabilities and functions. Artisan Studio has been re-architected to provide role-based Editions which have been specifically designed to make the working environment more relevant and efficient for the specialist needs of Enterprise Architects, Systems Engineers and Software Engineers. Artisan Studio also adds DoDAF capabilities to complete its support for the OMG's UPDM 1.0 standard for defense architectural frameworks. Artisan Studio 7.2 also extends Artisan Studio Reviewer with metric reporting and simplifies the user interface to Artisan Publisher as well as continuing to improve core technologies with a new model comparison tool, the Artisan Model Differencer, and adds more functionality for the Automatic Code Synchronizer and Activity Modeling.

[More information](#)

Systems Engineering Books, Reports, Articles and Papers

Complexity and Management Fad or Radical Challenge to Systems Thinking?



Author: Ralph D. Stacey
Publisher: Routledge, UK, 2000

ISBN: 978-0-415-24761-0 (paperback)

978-0-415-24760-3 (hardback)

978-0-203-18468-4 (electronic)

Summary:

Complexity theory is generating increasing interest amongst strategic thinkers. This fascinating book covers issues such as predictability, creativity and relationships as it considers how complexity, and its central principles of emergence and self-organization, are being used to understand organizations. The book:

- introduces the variety of views put forward by different writers on complexity and management
- outlines and critiques the way that complexity theory is frequently interpreted purely in the context of systems thinking
- draws a new perspective on using complexity sciences to understand organizational stability and change by focusing on the emergence of novelty and creativity in the course of everyday processes
- calls for a radical re-examination of management thinking.

Timely and controversial, Complexity and Management is essential reading for anyone interested in strategy, systems thinking, organization and management theory, and organizational change.

[More Information](#)

Process Improvement and CMMI® for Systems and Software



Ron S. Kenett, KPA, Ltd., Raanana, Israel;

Emanuel Baker, Process Strategies, Inc., Los Angeles, California, USA

Publisher: CRC Press, March 09 2010

ISBN: 9781420060508

ISBN 10: 1420060503

Summary:

Presenting the state of the art in strategic planning and process improvement, Process Improvement and CMMI® for Systems and Software provides a workable approach for achieving cost-effective process improvements for systems and software. Focusing on planning, implementation, and management in system and software processes, it supplies a brief overview of basic strategic planning models and covers fundamental concepts and approaches for system and software measurement, testing, and improvements.

The book represents the significant cumulative experience of the authors who were among the first to introduce quality management to the software development processes. It introduces CMMI® and various other software and systems process models. It also provides readers with an easy-to-follow methodology for evaluating the status of development and maintenance processes and for determining the return on investment for process improvements.

The authors examine beta testing and various testing and usability programs. They highlight examples of useful metrics for monitoring process improvement projects and explain how to establish baselines against which to measure achieved improvements. Divided into four parts, this practical resource covers:

- Strategy and basics of quality and process improvement
- Assessment and measurement in systems and software
- Improvements and testing of systems and software
- Managing and reporting data

The text concludes with a realistic case study that illustrates how the process improvement effort is structured and brings together the methods, tools, and techniques discussed. Spelling out how to lay out a reasoned plan for process improvement, this book supplies readers with concrete action plans for setting up process improvement initiatives that are effective, efficient,

and sustainable.

[More information](#)

Systems Thinking: A Technique to Find Project Problems

Posted on 16. Jun, 2009 in NETWORK by Bas de Baar

Finding the real cause of a project problem can be a difficult task. You have to look for patterns ...

“These patterns are dynamic systems in action, a human system seen over a time period. Patterns are trends over time and involve dependencies with other systems. To spot such trends in projects we use metrics as indicators. If I have the right metrics I can ignore everything around me and focus just on the dashboard.”

A technique that can be used to find patterns and the real cause-effect-chains in projects is systems thinking. “Systems Thinking” is one of the 5 disciplines described in the famous book “The Fifth Discipline” by Peter Senge (for an overview view my posting “Fifth Discipline: What To Do When All Your Projects Are Failing”).

This is the first post in a series that will describe this technique and how to use it in your projects.

[More Information](#)

Conferences and Meetings

3rd Workshop on Model-based Testing in Practice

June 15 - 16, 2010, Paris, France, in conjunction with ECMFA 2010

[More information](#)

The Fifth Workshop "From code centric to model centric: Evaluating the effectiveness of MDD (C2M:EEMDD)"

Held in conjunction with ECMFA 2010

June 15 - 18, 2010, University Pierre & Marie Curie, Paris, France

[More information](#)

2nd International Workshop on Model-driven Product Line Engineering

Held in conjunction with ECMFA 2010,

June 15th-18th, 2010, University Pierre & Marie Curie, Paris, France

[More information](#)

6th European Conference on Modelling Foundations and Applications (ECMFA 2010)

June 15-18, 2010, Paris, France

[More information](#)

3rd Workshop on Model-Driven Tool & Process Integration

Held in conjunction with ECMFA 2010

June 16, 2010, University Pierre & Marie Curie, Paris, France

[More information](#)

An Introduction to Requirements

June 16, 2010, Cranfield University, Cranfield, Bedfordshire, UK

[More information](#)

117th Annual American Society for Engineering Education Conference

June 20 - 23, 2010, Louisville, Kentucky, USA

[More information](#)

2nd International Workshop on Abstractions for Petri Nets and Other Models of Concurrency

a satellite event of Petri Nets 2010

June 21, 2010, Braga, Portugal

[More information](#)

International Workshop on Formalization of Modeling Languages

Colocated with ECOOP 2010

June 21 or 22, 2010 – Maribor, Slovenia

[More information](#)

31st International Conference on Application and Theory of Petri Nets and Other Models of Concurrency (PETRI NETS 2010)

10th International Conference on Application of Concurrency to System Design (ACSD 2010)

June 21-25, 2010, Braga, Portugal

[More information](#)

PETRI NETS 2010

June 21-25, 2010, Braga, Portugal

[More information](#)

ACSD 2010: 10th International Conference on Application of Concurrency to System Design

Colocated with Petri Nets 2010

June 21-25, 2010, Braga, Portugal

[More information](#)

IEEE International Conference on Systems of Systems Engineering

June 22 - 24, 2010, Henry Ford College, Loughborough University, UK

[More information](#)

Swiss Requirements Day 2010

June 23, 2010, Kongresshaus, Zurich, Switzerland

[More information](#)

ISARCS 2010 - 1st International Symposium on Architecting Critical Systems Federated with CompArch 2010

June 23-25 2010 Prague, Czech Republic

[More information](#)

Conference on Systems Thinking & System Dynamics in the classroom

June 26-28, 2010, Babson Conference Center, Wellesley, Massachusetts, USA

[More information](#)

1st International Workshop on Collaborative Modeling & Simulation - CoMetS'10

June 28 - 30, 2010, TEI of Larissa (Greece)

[More information](#)

ICMT2010 - Intl. Conference on Model Transformation

Co-located with TOOLS Europe 2010, ICSMP 2010, SEAFOOD 2010, TAP 2010

June 28-July 2 2010 - Malaga, Spain

[More information](#)

1st Workshop "RE in Small Companies (RESC)"

Held in conjunction with REFSQ 2010, Essen, Germany

June 29, 2010, Essen, Germany

[More information](#)

CREARE - 1st Workshop on Creativity in Requirements Engineering

Held in conjunction with REFSQ 2010, Essen, Germany

29th June 2010, in Essen, Germany

[More information](#)

First International Workshop on Product Line Requirements Engineering and Quality (PLREQ'10)

Held in conjunction with REFSQ 2010, Essen, Germany

June 30, 2010, Essen, Germany

[More information](#)

2nd International Workshop on Model Transformation with ATL

In conjunction with Tools 2010 Federated Conferences.

June 30, 2010 - Malaga, Spain

[More information](#)

16th International Working Conference on Requirements Engineering: Foundation for Software Quality (RefsQ 2010)

30 June – 2 July, 2010, Essen, Germany

[More information](#)

3rd International Symposium for Engineering Education

University College Cork, Ireland

June 30th (Opening) - July 2nd 2010

[More information](#)

IV Brazilian e-Science Workshop

(in conjunction with CSBC 2010)

July 2010, Belo Horizonte, MG, Brazil

[More information](#)

Transformation Tool Contest 2010

Satellite workshop to TOOLS 2010, 1 - 2 July, 2010, Malaga.

[More information](#)

2010 International Conference on System Science and Engineering (ICSSE2010)

July 1-3, 2010, National Taipei University of Technology, Taipei, Taiwan

[More information](#)

10th International Conference on Web Engineering

July 5 - 9, 2010 in Vienna, Austria

[More information](#)

Resilient & Secure Architectures – Afternoon Seminar

July 6, 2010, Auditorium, Engineers Australia National Office, Barton Australia

[More information](#)

Dutch Model Checking Day

Friday July 9, 2010, Eindhoven University of Technology

[More information](#)

Sixth Workshop on Model Checking and Artificial Intelligence (MoChArt 2010)

At AAI-2010, Twenty-Fourth AAI Conference on Artificial Intelligence

July 11, 2010, Atlanta, Georgia, USA

[More information](#)

Summer Computer Simulation Conference (SCSC 2010)

July 11–14, 2010, Ottawa, Canada

[More information](#)

20th Annual INCOSE International Symposium (IS10)

11 - 15 July, 2010, Rosemont, IL, USA.

[More information](#)

Eighth International Workshop on Dynamic Analysis (WODA 2010)

Co-located with [ISSTA 2010](#)

July 12th or July 13th 2010, Trento, Italy

The 2010 International Conference on Information and Knowledge Engineering (IKE'10) 

July 12 - 15 2010
Las Vegas, Nevada, United States
[More information](#)

The 2010 International Conference on Modeling, Simulation, and Visualization Methods (MSV'10)

July 12 - 15 2010
Las Vegas, Nevada, United States
[More information](#)

4th ACM International Conference on Distributed Event-Based Systems (DEBS 2010)

July 12-15, 2010, Cambridge, United Kingdom
[More information](#)

4th IEEE International Workshop on Requirements Engineering For Services (REFS'10)

In conjunction with COMPSAC 2010
Seoul, Korea, July 19 - 23, 2010
[More information](#)

1st International Workshop on Complexity and Real World Applications Using the Tools and Concepts from the Complexity Sciences to Support Real World Decision-making Activities

July 21-23, 2010, Southampton, England, UK
[More information](#)

System Dynamics Society 2010 Conference

July 25 – 29, 2010, Seoul, Korea
[More information](#)

2010 International Conference of Organizational Innovation (2010 ICOI) 

August 4 - 6, 2010, Siam University, Bangkok, Thailand
[More information](#)

ECAI 2010 Workshop on Intelligent Engineering Techniques for Knowledge Bases

August 16, 2010, Lisbon, Portugal
[More information](#)

2nd International Workshop on Open Design Spaces (ODS 2010) - Socially Crafting Interactive Experiences

in conjunction with DIS 2010
August 17 2010, Aarhus, Denmark
[More information](#)

The 7th Annual INCOSE SA Conference

August 17 - 19, 2010, CSIR International Convention Centre, Pretoria, South Africa

[More Information](#)

The 2nd International Workshop on Enterprise Architecture Challenges and Responses

To be held in conjunction with ICIS 2010

August 18 – 20, 2010, Yamagata University, Yonezawa, Japan

[More information](#)

The Second International Conference on Advances in System Testing and Validation Lifecycle (VALID 2010)

August 22-27, 2010 - Nice, France

[More information](#)

Improving Systems and Software Engineering Conference (ISSEC 2010)

23 - 26 August 2010

Brisbane Convention & Exhibition Centre, Brisbane, Australia

[More information](#)

Workshop on Multi-Agent Systems and Simulation (MAS&S)

August 30 – Sep 3, 2010, Lyon (France)

[More information](#)

2nd International Workshop on Model-Driven User-Centric Design & Engineering (MDUCDE'10)

September 1st & 2nd, 2010, Valenciennes/France

[More information](#)

European Systems & Software Process Improvement and Innovation

1-3 September 2010, Grenoble Institute of Technology, France

[More information](#)

INTERACT 2011 - 13th IFIP TC13 Conference on Human-Computer Interaction

September 05-09, 2011, Lisbon, Portugal.

[More information](#)

Summer School 2010: Verification Technology, Systems & Applications

September, 06th-10th, 2010, University of Luxembourg, Luxemburg

[More information](#)

3rd Workshop on Autonomic and SELF-adaptive Systems

September 8, 2010, Valencia, Spain

[More information](#)

1st International Workshop on Reuse in Business Process Management (rBPM 2010)

September 13, 2010, Hoboken, New Jersey – USA

[More information](#)

Modeling Business Information Systems (MoBIS 2010)

September 15-17, 2010, Dresden, Germany

[More information](#)

7th International Conference on Quantitative Evaluation of SysTems (QEST) 2010

September 15 - 18, 2010, Williamsburg, Virginia, USA at the College of William & Mary, Computer Science Department,

[More information](#)

First International Workshop on Evolution Support for Model-Based Development and Testing (EMDT2010)

Co-located with the International Scientific Colloquium (IWK2010)

September 16, 2010, Ilmenau, Germany

[More information](#)

15th International Workshop on Formal Methods for Industrial Critical Systems (FMICS 2010)

September 20-21, 2010, Antwerp, Belgium

[More information](#)

12th International Workshop on Verification of Infinite-State Systems (INFINITY 2010)

September 21, 2010, Singapore

[More information](#)

8th International Symposium on Automated Technology for Verification and Analysis (ATVA 2010)

21-24 September 2010, Singapore

[More information](#)

EPEW 2010: 7th European Performance Engineering Workshop

University Residential Center of Bertinoro, Italy

23-24 September 2010

[More information](#)

Challenges of Systems Engineering - International Workshop (RuSEC2010)

September 23-24, 2010, Moscow, Russia

[More information](#)

ACM International Conference on Design of Communication (SIGDOC'10)

September 26-29, 2010, São Carlos - São Paulo - Brazil

[More information](#)

1st Brazilian Workshop on Model-Driven Development

September 27, 2010, Salvador, Bahia, Brazil

[More information](#)

Fourth IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO 2010)

September 27-October 1, 2010, Budapest, Hungary

[More information](#)

Workshop on Socio-Economics Inspiring Self-Managed Systems and Concepts (SEISMYC 2010)

Located at SASO 2010

September 27th, 2010, Budapest, Hungary

Doctoral Symposium @ RE2010

September 27, 2010, Sydney, Australia

[More information](#)

Third International Workshop on Managing Requirements Knowledge (MaRK'10)

September 27, 2010, Sydney, Australia

[More information](#)

54th Annual Meeting of the Human Factors and Ergonomics Society

September 27-October 1, 2010, San Francisco

[More information](#)

The 18th International Requirements Engineering Conference (RE 2010)

Sep 27, 2010 - Oct 1, 2010, Sydney, Australia

[More information](#)

Fourth IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO 2010)

September 27-October 1, 2010, Budapest, Hungary

[More information](#)

Model-based Testing and Test Automation - From Research into Practice (MoTes2010)

September 27 – October 2, Leipzig, Germany

[More information](#)

Fifth International Conference on Graph Transformation

27 September - 2 October, 2010. University Of Twente, Enschede, The Netherlands

[More information](#)

REET'10 Fifth International Workshop on Requirements Engineering Education and Training



In conjunction with the 18th IEEE International Requirements Engineering Conference
September 28, 2010, Sydney, Australia

[More information](#)

RELAW'10 Third International Workshop on Requirements Engineering and Law

In conjunction with the 18th IEEE International Requirements Engineering Conference
September 28, 2010, Sydney, Australia

[More information](#)

REV'10 Fifth International Workshop on Requirements Engineering Visualization

In conjunction with the 18th IEEE International Requirements Engineering Conference
September 28, 2010 - Sydney, Australia

[More information](#)

1st Workshop on The Web and Requirements Engineering (WeRE'10)

To be held in conjunction with the RE 2010 Joint Conference
September 28, 2010, Sydney, Australia

[More information](#)

4th International Workshop on Graph Based Tools

A satellite event of ICGT'10
September 28th 2010, University of Twente, Enschede, The Netherlands

[More information](#)

PDMC 2010

9th International Workshop on Parallel and Distributed Methods in verifiCation

Joint with 2nd International Workshop on High Performance Computational Systems Biology (HiBi 2010)
September 30 - October 1, 2010, Twente, The Netherlands

Co-locating with

5th International Conference on Graph Transformation (ICGT 2010), 29 September - 1 October, 2010

17th Annual workshop on Software Model Checking (SPIN 2010), 27 September - 29 September, 2010

[More information](#)

First Workshop on Model Driven Interoperability (MDI'2010)

In Conjunction with Models 2010
October 3-5, 2010, Oslo, Norway

[More information](#)

3rd International Workshop on Model Based Architecting and Construction of Embedded Systems



In Conjunction with Models 2010
October 3-5, 2010, Oslo, Norway

[More information](#)

5th International Workshop models@run.time

In Conjunction with Models 2010
October 3-8, 2010, Oslo, Norway
[More information](#)

Workshop on OCL and Textual Modelling **NEW**

In Conjunction with Models 2010
October 3-8, 2010, Oslo, Norway
[More information](#)

ACM/IEEE 13th International Conference on Model Driven Engineering Languages and Systems

October 3-8, 2010, Oslo, Norway
[More information](#)

Fourth Asia-Pacific Conference on Systems Engineering (APCOSE 2010)

4 - 6 October, 2010. Keelung, Taiwan.
[More information](#) | [Brochure](#)

2010 isee User Conference

October 4-6, 2010, The Westin Providence, Providence, Rhode Island, USA
[More information](#)

IFM 2010: Integrated Formal Methods 8th International Conference

October 11 – 14, 2010, Nancy, France
[More information](#)

Sixth Nordic Conference on Human-Computer Interaction (NordiCHI 2010)

October 16 – 20, Reykjavik Iceland
[More information](#)

World Engineering Congress and Exhibition: ENGINEERING 2010 – ARGENTINA: **NEW** “Technology, Innovation and Production for Sustainable Development”

October 17 - 20 2010, Buenos Aires, Argentina
[More information](#)

International Institute of Business Analysis (IIBA) Conference **NEW**

October 17-21, 2010, Alexandria, VA, USA
[More information](#)

Dynamic Languages Symposium 2010

Co-located with SPLASH 2010
In cooperation with ACM SIGPLAN (PENDING)
October 18, 2010, Reno, Nevada, USA
[More information](#)

FMCAD 2010 - Formal Methods in Computer Aided Design

October 20 – 23, 2010, Lugano, Switzerland

[More information](#)

MIT Systems Thinking Conference **NEW**

October 21-22, 2010, Broad Auditorium, 7 Cambridge Center, Cambridge, Massachusetts, USA

[More information](#)

NDIA 13th Annual Systems Engineering Conference

October 25-28, 2010, Hyatt Regency Mission Bay, San Diego, CA, USA

[More information](#)

Requirements Days 2010

October 26 – 28, 2010, München, Germany

[More information](#)

5th International Workshop on Enterprise Integration, Interoperability and Networking (EI2N'2010)

October 27-28, 2010, Hersonissou, Crete, Greece

[More information](#)

Complex Systems Design & Management 2010

October 27-29, 2010, Paris, France

[More Information](#)

12th IEEE International High Assurance Systems Engineering Symposium (HASE 2010) **NEW**

Co-Located with the 21st IEEE International Symposium on Software Reliability Engineering (ISSRE)

November 1-4, 2010, San Jose, CA, USA

[More information](#)

29th International Conference on Conceptual Modeling

1-4 November 2010, Vancouver, BC, Canada

[More information](#)

Seventh International Workshop on Web Information Systems Modeling (WISM 2010)

(Held in conjunction with ER 2010)

November 1-4, 2010, Vancouver, BC, Canada

[More information](#)

2010 IITA International Conference on Control, Automation and Systems Engineering (CASE 2010)

Nov 7, 2010 - Nov 8, 2010. Taipei, Taiwan

[More information](#)

No Magic World Conference  **NEW**

November 7-10th, 2010, American Airlines Conference Center, Fort Worth, TX

[More information](#)

Annual Systems Engineering Conference 2010 (ASEC10)

November 8-10, 2010, Heythrop Park Hotel, Chipping Norton, Oxfordshire, UK

[More information](#)

SEPG Latin America 2010

November 10-12, 2010, Medellín, Colombia

[More information](#)

**Association for the Advancement of Artificial Intelligence (AAAI)
Fall Symposium: Complex Adaptive Systems: Resilience, Robustness, and Evolvability**  **NEW**

November 11 - 13, 2010, Arlington, VA

[More information](#)

5th Trends in Enterprise Architecture Research (TEAR2010) workshop

November 12, 2010 as part of the Enterprise Engineering Week at the Delft University of Technology, Delft, The Netherlands from the 9th of November to the 12th of November

[More information](#)

CMMI 10th Annual Technology Conference and User Group

November 15-18, 2010

Hyatt Regency Tech Center – Denver, Colorado, USA

[More information](#)

Third IEEE International workshop UML and Formal Methods  **NEW**

Held in conjunction with the 12th International Conference on Formal Engineering Methods, ICFEM 2010

November 16th, 2010, Shanghai, China

[More information](#)

5th International Forum on Engineering Education (IFEE2010) & European SDPROMO II Conference  **NEW**

November 23 - 25, 2010, Sharjah-Dubai, UAE, United Arab Emirates

[More information](#)

1st International Chemical and Environmental Engineering Conference 2010  **NEW**

November 26 - 28, 2010, Kuala Lumpur, Malaysia

[More information](#)

22nd International Conference Software & Systems Engineering and their Applications (ICSSEA 2010)

December 7-9, 2010, Paris, France

[More information](#)

National Institute of Technology – National Systems Conference 2010

December 10-12, 2010, National Institute Technology Karnataka, Surathkal, India

[More information](#)

ICISE 2010: International Conference on Intelligent Systems Engineering

December 18, 2010, Bangkok, Thailand

[More information](#)

ICECSE 2011 "International Conference on Electrical, Computer and Systems Engineering"

January 25-27, 2011, Dubai, United Arab Emirates

[More information](#)

Second ACM/SPEC International Conference on Performance Engineering (ICPE 2011)

March 14-16, 2011 Karlsruhe, Germany

[More information](#)

Risk-Based Approaches to Major Decisions (Risk '11)

May 13 - 14, 2011, Falmouth, Cornwall, United Kingdom

[More information](#)

Education & Academia

Institute for Advanced Systems Engineering

The Institute for Advanced Systems Engineering (IASE) is an interdisciplinary research unit in the Department of Industrial Engineering and Management Systems at the University of Central Florida, U.S.A. It is home to cross disciplinary research and education programs in systems engineering, and is committed to developing advanced solutions and tools for systems engineering problems in a variety of application domains. IASE based projects are conducted through partnerships with industry leaders and government, bringing together faculty and students from multiple academic departments and colleges across the university and Central Florida industry partners.

IASE mission

The IASE mission is to serve the systems engineering community at large in Central Florida and around the world by:

- Providing access to experienced researchers in multiple disciplines of engineering
- Conducting leading-edge research projects jointly developed by industry leaders and university experts
- Exchanging ideas and collaboration among academia, industry and government on crucial systems engineering issues
- Delivering on-campus and on-line graduate education in systems engineering
- IASE was established at University of Central Florida to advance and support central Florida research in Systems Engineering.

[More information](#)

Research Fellow - University of Surrey - Faculty of Engineering & Physical

Sciences, Surrey Space Centre

Applications are invited for the position of Post-Doctoral Research Fellow at the Surrey Space Centre (SSC) on System Modelling and Requirements Verification of Robotic Spacecraft for a period of 24 months. This position involves in depth systems engineering of robotic spacecraft leading to development of accurate system level models for verification of requirements using IBM Rhapsody software- Systems Modelling Language (SysML) and Telelogic Doors.

[More information](#)

Some Systems Engineering-Relevant Websites

<http://www.gradschools.com/search-programs/systems-engineering>

GradSchools.com is an online graduate school guide to find the best graduate schools and graduate degree programs.

<http://systemthinker.org/>

Systemthinker.org is managed by a team of enthusiasts on Cybernetics, System Dynamics, Systems Thinking, Simulation and General Systems Theory. Their main goal is the creation of an efficient knowledge base and learning center that will aid the achievement of the Natural Systemic Thinking.

http://education-portal.com/articles/Online_Systems_Engineering_Degree_and_Certificate_Program_Information.html

Original Articles and Videos for Researching Schools, Degree Programs, Careers, and Online Courses – Claiming to be the Web's Largest Education Portal

Standards and Guides

Tutorial: Architectural Rendering with ISO/IEC 42010

At 4th European Conference on Software Architecture
August 23, 2010, IT University of Copenhagen, Denmark

IEEE Standard 1471, Recommended Practice for Architectural Description of Software-Intensive Systems, was published in 2000 as the first standard aimed at architecture description. In 2007, it was adopted by ISO and since then has been jointly updated by IEEE and ISO as ISO/IEC/IEEE 42010, Systems and software engineering — Architecture description.

This tutorial introduces the key concepts and mechanisms of the newly revised standard, in the context of practical approaches to architectural rendering of software-intensive systems.

[More information](#)

Some Definitions to Close On

Military Doctrine

Doctrine: Fundamental principles by which the military forces guide their actions in support of objectives. It is authoritative but requires judgment in application.

Source: NATO

Military doctrine: is a formal expression of military knowledge and thought, that the army accepts as being relevant at a given

time, which covers the nature of conflict, the preparation of the army for conflict, and the method of engaging in conflict to achieve success... it is descriptive rather than prescriptive, requiring judgment in application. It does not establish dogma or provide a checklist of procedures, but is rather an authoritative guide, describing how the army thinks about fighting, not how to fight. As such it attempts to be definitive enough to guide military activity, yet versatile enough to accommodate a wide variety of situations.

Source: *the Canadian Army*

Military doctrine: those concepts, principles, policies, tactics, techniques, practices, and procedures which are essential to efficiency in organizing, training, equipping, and employing its tactical and service units.

Source: *a U.S. Air Force Air University staff study in 1948*

Military doctrine: a state's officially accepted system of scientifically founded views on the nature of modern wars and the use of the armed forces in them... Military doctrine has two aspects: social-political and military-technical. The social-political side encompasses all questions concerning methodology, economic, and social bases, the political goals of war. It is the defining and the more stable side. The other side, the military-technical, must accord with the political goals. It includes the creation of military structure, technical equipping of the armed forces, their training, definition of forms and means of conducting operations and war as a whole.

Source: *The Soviet Dictionary of Basic Military Terms*

Military doctrine: the concise expression of how military forces contribute to campaigns, major operations, battles, and engagements.

Source: http://en.wikipedia.org/wiki/Military_doctrine

Military doctrine: the concise expression of how military forces contribute to campaigns, major operations, battles, and engagements. It is a guide to action, not hard and fast rules. Doctrine provides a common frame of reference across the military. It helps standardize operations, facilitating readiness by establishing common ways of accomplishing military tasks. Doctrine links theory, history, experimentation, and practice. Its objective is to foster initiative and creative thinking. Doctrine provides the military an authoritative body of statements on how military forces conduct operations and provides a common lexicon for use by military planners and leaders.

Source: http://dictionary.babylon.com/military_doctrine/

Military doctrine: provides a coherent and consistent framework of concepts, tenets, and principles that are applicable in planning and conducting operations, that are intended to assist in developing and executing operational plans.

Source: *Military Doctrine: A Reference Handbook, By Bert Chapman, ISBN 878-0-3123-35233-1*

Project Performance International News

Training, Training and More Training

PPI announces a major expansion of short courses to complement our traditional week-long in-depth courses which have been so popular over decades. The new short courses, in most cases available worldwide, on-site, immediately, include:

- Introduction to Cognitive Systems Engineering (1-day)
- Overview of Cognitive Systems Engineering (2-day)
- Getting the Most from Integrated Product Teams (2-day)
- Integrated Product Team Facilitation (3-day+)
- Introduction to Software Development Principles & Processes (2-day)
- Introduction to Requirements Analysis (1-day)
- Overview of Requirements Analysis (2-day)
- Introduction to Specification Writing (1-day)
- Specification Writing (2-day)
- Requirements Analysis & Specification Writing (2-day)
- IT Project Management Principles & Processes (2-day)
- Scientific and Engineering Presentations in English for Speakers of Asian Languages (2-day)
- Project Risk Management (3-day)
- Introduction to Systems Engineering Management (1-day)
- Systems Engineering Management Overview (2-day)
- Systems Engineering Management (3-day)
- Systems Engineering Management in Depth (5-day).

[Contact PPI](#) now regarding on-site delivery worldwide. For some locations, a program of short courses may be appropriate. Public offerings of these courses, and more, will be rolled out over the next few months. Call, or monitor PPI's website.

Welcome to Clive Tudge

PPI is delighted to announce the appointment of Clive Tudge as a Principal Consultant, a role that will draw upon Clive's decades of relevant experience in systems engineering management and systems acquisition, to expand PPI's training and consulting offerings in these fields. Based in Brisbane, Clive will serve PPI's worldwide client base.

CTI Goes Public with CSEP Training

PPI subsidiary Certification Training International (CTI) is up and running to deliver to you outstanding CSEP (Certified Systems Engineering Professional) 4-Day training worldwide. CTI's CSEP training is based on advanced adult learning techniques, is not the least bit boring, and has no "death by powerpoint" content *at all*. Total focus is on passing the CSEP examination conducted by INCOSE, painlessly and efficiently. The training accommodates CSEP based on the INCOSE Systems Engineering Handbooks V3.1 (effective to 31 December 2010) and V3.2 (effective commencing 1 January 2011).

CTI has been a member of the Corporate Advisory Board of the International Council on Systems Engineering (INCOSE) since 2008, sitting alongside other industry leaders in influencing the direction of systems engineering. Visit CTI's website for dates and places of public offerings of this training worldwide, and to register on-line. [Contact PPI](#) now regarding on-site delivery.

[More information](#)

Managing Successful Programmes (MSP®) Education

PPI announces an new range of educational opportunities in the field of managing successful programs (MSP). MSP® is a proven program management methodology. MSP represents the best practice of both private and public sector organizations in successfully delivering transformational change. It is designed to help organizations achieve their objectives through the implementation of a dossier of projects and activities to achieve outcomes and realize benefits of strategic importance.

PPI offers, in alliance with MetaPM, a leading program management training provider accredited for MSP® delivery:

- Managing Successful Programmes - Foundation Course & Examination (3 day)
- Managing Successful Programmes - Practitioner Course & Examination (2 day)
- Managing Successful Programmes - Foundation & Practitioner Courses (combined, 3 day + 2 day)

Visit PPI's website for dates and places of Australian public offerings of these courses, and to register on-line. [Contact PPI](#) now regarding on-site delivery worldwide. For some locations, a program of short courses may be appropriate.

[More information](#)

PRINCE2® Project Management Education

PPI announces an expanded range of education opportunities in the PRINCE2® project management methodology. PRINCE2® is a structured approach to project management. It provides a method for managing projects within a clearly defined framework. PRINCE2® describes procedures to coordinate people and activities in a project, how to design and supervise the project, and what to do if the project has to be adjusted if it doesn't develop as planned. In the method, each process is specified with its key inputs and outputs and with specific goals and activities to be carried out, which gives an automatic control of any deviations from the plan. Divided into manageable stages, the method enables an efficient control of resources. On the basis of close monitoring, the project can be carried out in a controlled and organized way. Being a structured method widely recognized and understood, PRINCE2® provides a common language for all participants in the project. The various management roles and responsibilities involved in a project are fully described and are adaptable to suit the complexity of the project and skills of the organization.

PPI offers, in alliance with MetaPM, a PRINCE2® Registered Training Organization:

- PRINCE2® Foundation Course & Examination (3 Days)
- PRINCE2® Practitioner Course & Examination (2 Days)

- PRINCE2® Foundation & Practitioner Courses Combined Package (3 + 2 days)
- PRINCE2® Foundation Self-Study & 1 Hour Examination
- PRINCE2® Practitioner Re-Registration Preparation & Exam (Self Study)
- PRINCE2® Practitioner Preparation Course & 2.5 Hour Exam (Self Study)
- PRINCE2® Foundation Upgrade Workshop & Exam (1 Day)
- PRINCE2® Project Board Members Course (Half Day)
- PRINCE2® Overview Course (1 Day)
- PRINCE2® Refresher Workshop (1 Day)

Visit PPI's website for dates and places of Australian public offerings of the courses, and to register on-line. Contact PPI now regarding on-site delivery worldwide. For some locations, a program of short courses may be appropriate.

[More information](#)

Project Performance International Events

Systems Engineering 5-Day Courses

Upcoming locations include:

- Melbourne, Australia
- Las Vegas, USA
- São José dos Campos, Brazil
- Rio de Janeiro, Brazil
- Stellenbosch, South Africa
- London, UK

[View 2010/2011 Systems Engineering Course Schedule](#)

Requirements Analysis and Specification Writing 5-Day Courses

Upcoming locations include:

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

[View 2010/2011 RA&SW Course Schedule](#)

OCD/CONOPS 5-Day Courses

Upcoming locations include:

- Adelaide, Australia
- Bristol, UK
- Las Vegas, USA
- Pretoria, South Africa

[View 2010/2011 OCD/CONOPS Course Schedule](#)

Software Engineering 5-Day Courses

Upcoming locations include:

- Pretoria, South Africa
- Las Vegas, USA

- Sydney, Australia

[View 2010/2011 Software Engineering Course Schedule](#)

Cognitive Systems Engineering 5-Day Courses

Upcoming locations include:

- Adelaide, Australia

[View 2010/2011 Cognitive Systems Engineering Course Schedule](#)

PPI Upcoming Participation in Professional Conferences

- July 12 - 15, 2010 - **INCOSE International Symposium 2010 (IS10)** - Chicago, IL, USA (Sponsor/Exhibiting)
 - August 12 - 13, 2010 - **SPOLM 2010** - Rio de Janeiro, Brazil (Exhibiting)
 - August 17-19, 2010 - **INCOSE SA Annual Conference 2010** - Pretoria, Gauteng, South Africa (Sponsor/Exhibiting)
 - September 23-24, 2010 - **RuSEC 2010** - Moscow, Russia (Exhibiting)
 - September 28 - October 1, 2010 - **XI SIGE** - São José dos Campos, Brazil (Sponsor/Exhibiting)
 - October 4 - 6, 2010 - **APCOSE 2010** - Keelung, Taiwan (Exhibiting)
 - October 25 - 28, 2010 - **NDIA SE Conference** - San Diego, CA, USA (Exhibiting)
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