Project Performance International

Systems Engineering

Newsletter (SyEN)

SyEN #017 - February 18, 2010

Brought to you by Project Performance International

http://www.ppi-int.com/newsletter/SyEN-017.php

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 stakeholder values.

If you are presently receiving this newsletter from an associate, you may 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 future SE eNewsletters, please reply to this e-mail with "Remove" in the subject line, from the same email address. Your removal will be confirmed, by email.

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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- Postdoc Position on Real-Time Application Models Simulation
- Systems Engineering & Management at UT Dallas

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Some Systems Engineering-Relevant Websites

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Standards and Guides

- ISO/IEC JTC1/SC7 Plenary meeting

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Some Definitions to Close On - Related to Problem Definition

- Desire
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- Goal
- Measure of Effectiveness (MOE)
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- Need
- Operational Effectiveness
- Overall Effectiveness
- Requirement
- Target
- Want

... READ MORE

PPI News

- Free Tutorial by Robert Halligan in La Spezia, Italy
- PPI to Present Courses in Stellenbosch, South Africa

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PPI Events

... READ MORE

A Quotation to Open On

"Engineers participate in the activities which make the resources of nature available in a form beneficial to man and provide systems which will perform optimally and economically" - L. M. K. Boelter (1957)

Feature Article

The Use of English Language in Requirements Specifications

by Robert J. Halligan, FIE Aust
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Ringwood North, Vic, 3134
Australia
Email: rhalligan@ppi-int.com

Anybody who has prepared requirements specifications knows how easy it is to express requirements which are ambiguous, incomplete, factually incorrect, unverifiable, or unclear. Anybody who has used requirements specifications knows about the damage that defective requirements can do within a project.

An effective technique for finding defects in specified requirements is the use of keyword searching, against parts of words, words and phrases, each of which may indicate a defect in a requirement. In this article, we spell out the most problematic terms, and for each term, what to look for in checking its usage. Although written as a list for verifying requirements, the list provided also contains much advice for the original writer of requirements, and requirements specifications, in English.

The list is presented as a table, with an asterisk used to represent a wildcard, e.g. "*ing" means search for any word ending in "ing".

Happy reading, and requirements writing!

Search Term	Checks
*ing	Look for gerunds, such as "displaying", "computing". Check that any usage of gerunds is adequate. Rarely c in requirements.
able	Check whether there is any ambiguity as to whether the item is required to actually do something, and if it is the conditions during which it is required to do it.
accura*	Check that there is an objective criterion for accurate, accurately, accuracy, as applicable.
adequate	Check that there is an objective criterion for adequacy.
all	"All" is an absolute term. Check that "all" is meant literally. Often the term will need qualification, e.g. "all … v
always	"Always" is an absolute term. Check that "always" is meant literally. Often the term will need qualification, e.g
and	"And" may reflect a compound requirement (two or more requirements expressed in the same sentence – ch "and" sometimes gives rise to ambiguity – check this also.
and/or	"And/or" can give rise to ambiguity as to who is to make the decision between "and" and "or". If this term is u check that any ambiguity is acceptable.
and so on	This term implies more scope, usually without defining what that extra scope is required to be. This term sho term is used, check that the vagueness is acceptable.
applicable	Check that an objective criterion for applicability is present.
appropriate	Check that an objective criterion for appropriateness is present.
approv*	Check that approval by whom is included, and that an objective criterion for approval having been given is p

approximat*	Check that an objective criterion for the degree of acceptable approximation is present.
architecture (product specifications only)	Architecture is an abstract concept. Check that the requirement expresses a verifiable characteristic of the it is factually correct, e.g. avoid the situation where a requirement is placed on the architecture, but the charac item.
assist	Check that an objective criterion is present for the degree and form of acceptable assistance.
bad	“Bad” is a value-based term. Check that an objective criterion is present for what constitutes “bad".
basically	Check that an objective criterion for what constitutes “basically” is present.
best	“Best” is a value-based term. Check that an objective criterion is present for what constitutes “best". “Best” i “best” is meant literally.
better	“Better” is a value-based term. Check that an objective criterion is present for what constitutes “better". Che for the degree of “betterness” is needed.
between	Check whether there is ambiguity as to the inclusion or exclusion of limit values. Check whether there is am or “only a subset of values between”.
but	Check that no contradiction is created through the use of “but”.
can	“Can” is a fact word. Check that a valid requirement is expressed.
capab*	Check that there is no ambiguity regarding “for but not with”, design goal” or “is to actually do” interpretations something, check that the conditions under which it is required to actually do it are present.
certainly	Check that an objective criterion for certainty is present.
clearly	Check that an objective criterion for acceptable clarity is present.
compatibil*	Check that an objective criterion for compatibility is present.
complete*	“Complete” is an absolute term. Check that “complete” is meant literally. Check that an objective criterion is completeness.
consider*	Check that an objective criterion is present, if needed, for the degree of acceptable consideration. If conside the phrase containing the term is not spurious, e.g. background.
correct	Check that an objective criterion is present for correctness.
could	Check that a valid requirement has been specified.
design* (product specifications only)	Check that the requirement expresses a verifiable characteristic of the item. Check that the requirement is fa situation where a requirement is placed on the activity of design, but the characteristic is actually needed of t
do	Check whether necessary performance (how well) is present.
down to	Check whether there is ambiguity as to the inclusion or exclusion of the limit value. Check whether there is a to” or “only a subset of values down to”.
easily	Check that an objective criterion is present for the degree of ease.
easy	Check that an objective criterion is present for the degree of ease.
effective	Check that an objective criterion is present for the degree of acceptable effectiveness.
efficient	Check that an objective criterion is present for the degree of acceptable efficiency.
elegant	Check that an objective criterion is present for what constitutes “elegant”. Rarely will the use of this term be
eliminate	“Eliminate” is an absolute term. Check that “eliminate” is meant literally. Often the term will need qualificatior
enhance	“Enhance” is a value-based term. Check that an objective criterion is present for what constitutes enhancem criterion is needed and present for the degree of enhancement.
enough	“Enough” is a value-based term. Check that an objective criterion is present for what constitutes “enough”.
equivalent	Check that an objective criterion is present for equivalence.
etc.	This term implies more scope, usually without defining what that extra scope is required to be. This term sho term is used, check that the vagueness is acceptable.
every	“Every” is an absolute term. Check that “every” is meant literally.
excellent	“Excellent” is a value-based term. Check that an objective criterion is present for what constitutes “excellent”
feasibil*	Check that an objective criterion is present regarding feasibility. The requirement may need to identify who is when in time the criterion applies.

first rate	“First rate” is a value-based term. Check that an objective criterion is present for what constitutes “first rate”.
frequent*	Check that an objective criterion is present for frequency.
full	“Full” is an absolute term. Check that “full” is meant literally. Check that an objective criterion is present for v
give*	Check that the phrase containing the term is not spurious, e.g. background.
good	“Good” is a value-based term. Check that an objective criterion is present for what constitutes “good”.
great	“Great” is a value-based term. Check that an objective criterion is present for what constitutes “great”.
handle	Handle is a vague term. Check that the action required is specified with adequate precision.
high	If applicable to the use of the term, check that an objective criterion is present for what constitutes “high”.
however	Check that no contradiction is created through the use of “however”.
ideal	Check that an objective criterion is present for what constitutes “ideal”.
improve	Check that an objective criterion is present for the acceptable degree of improvement.
in order to	“In order to” expresses purpose, not requirement. Check that the use of this term is not spurious.
incorrect	Check that an objective criterion is present for what constitutes incorrectness.
Intended use	Check that there is an objective reference for intended use.
intuitive	Check that an objective criterion is present for what constitutes “intuitive”.
is	“Is” is a fact word. Check that a valid requirement is expressed.
its	Check for ambiguity.
large	If applicable to the use of the term, check that an objective criterion is present for what constitutes “large”.
least	Check that an objective criterion is present for “least”.
like	Check that an objective criterion is present for what constitutes “like”.
low	If applicable to the use of the term, check that an objective criterion is present for what constitutes “low”.
match*	Check that an objective criterion exists for what constitutes a match.
maximize	“Maximize” is an absolute term. Check that “maximize” is meant literally. Often the term will need qualificatio
maximum	Check for ambiguity.
may	Check that “may” is used only to express permissive guidance, and only where the giving of a permission is
most	Check that an objective criterion is present for “most”.
minimize	“Minimize” is an absolute term. Check that “minimize” is meant literally. Often the term will need qualification
minimum	Check for ambiguity.
must	Check that must is defined to express a requirement, to avoid the ambiguity of alternative meanings: a state statement of inevitability. Check that “must” and “shall” are not mixed in the requirements specification, unle appropriately defined. Generally, the use of “must” should be avoided.
near*	Check that an objective criterion exists for what constitutes “near”.
necessary	Check that an objective criterion exists for what constitutes “necessary”.
never	“Never” is an absolute term. Check that “never” is meant literally, and is consistent with the context of use o
nominal	Check that “nominal” is used only to amplify, not specify, e.g. “454.54mm (19 inch nominal)”.
none	“None” is an absolute term. Check that “none” is meant literally.
normal*	Check that an objective criterion exists for “normality”. Check for missing requirement(s) relating to abnorma
obviously	Check that the word is not in a spurious phrase not specifying a part of the requirement. If the word is used i that an objective criterion is present for what constitutes “obviously”.
often	Check that the word is not in a spurious phrase not specifying a requirement. If the word is used in specifyin objective criterion is present for what constitutes “often”.
operate	“Operate” means “do something”. It does not mean “do everything”, nor “do something with specified perfor non-functional requirements. If the intention is to cover only functional and performance requirements, chec “shall operate as specified herein”. If the intention is to cover all other requirements, check that “shall operat all other requirements herein” or similar. Or avoid use of the term.
optimize	“Optimize” is an absolute term. Check that “optimize” is meant literally. Check that an objective criterion is p

optimize	"optimum".
optimum	Check that an objective criterion is present for what constitutes "optimum".
or	Check for ambiguity.
ordinarily	Check that the word is not in a spurious phrase not specifying a requirement. If the word is used in specifyin objective criterion is present for what constitutes "ordinarily". Check for any missing requirements relating to
possible	Check that an objective criterion is present regarding what constitutes possibility. May need to identify who i when in time the criterion applies.
practicable	Check that an objective criterion is present regarding what constitutes practicability. May need to identify wh and when in time the criterion applies.
process* (product specification only)	Check that the use of this term as a verb does not result in vagueness (inadequate precision) or ambiguity.
propos*	Check that the requirement is expressed as an innate characteristic required of the item, irrespective of the requirements specification.
provide	Check that the vagueness usually associated with this term is acceptable.
quality	Check that an objective criterion is present for what constitutes "quality".
quick	Check that an objective criterion is present for what constitutes "quick".
rapid	Check that an objective criterion is present for what constitutes "rapid".
readily	Check that an objective criterion is present for what constitutes "readily".
real-time	Check that this term is adequately defined (because of the diversity of meanings of this term).
relevant	Check that an objective criterion is present for what constitutes "relevant".
requir*	Check that the requirement is written as a statement of requirement (e.g. The system shall ..) not a statemer
same	"Same" is an absolute term. Check that "same" is meant literally. Check that an objective criterion for what c the requirement is verifiable.
satisfactory	Check that an objective criterion is present for what constitutes "satisfactory".
seamless	Check that an objective criterion is present for what constitutes "seamless".
shall be	Check that passive expression is not used where active is needed (e.g. "Current time shall be displayed").
shall include but not be limited to	This phrase is either incorrect or is ineffective. If the intention was to require more, the phrase is ineffective b the "more". If the intention was to permit but not require more, the phrase is factually incorrect.
should	Check that each "should" expresses a goal, intended to endure as a goal through supply or development (as requirements that should be matched to goals, but are not (e.g. The system shall have a mass not exceedin goal, have a mass not exceeding 20kg.).
significant	Check that an objective criterion is present for what constitutes "significant".
similar	Check that an objective criterion is present for what constitutes "similar".
simple	Check that an objective criterion is present for what constitutes "simple".
skip	Check that the use of this term is not ambiguous.
small	Check that an objective criterion is present for what constitutes "small".
so as	"So as" expresses purpose. The use of this term in a requirement is unlikely to be appropriate.
so forth	This term implies more scope, usually without defining what that extra scope is required to be. This term sho
so that	"So that" expresses purpose. The use of this term in a requirement is unlikely to be appropriate.
some	Check that an objective criterion exists where needed.
sometimes	Check that an objective criterion exists where needed.
subject to	Check for ambiguity. The use of this term is generally ambiguous.
substantial	Check that an objective criterion is present for what constitutes "substantial".
such as	"Such as" expresses example. Check whether an effect was intended, e.g. "such that …". An example shoul requirement, but may be used in a note to a requirement.
sufficient	Check that an objective criterion is present for what constitutes "sufficient".

suitable	Check that an objective criterion is present for what constitutes “suitable”.
support	Check for ambiguity. “Shall support” will rarely be appropriate in a requirements specification.
target	Check for any inconsistency with the use of the word “should”. Check for any missing requirement that shou not.
tender*	Check for any ambiguity or incorrectness regarding “tenderer” versus “contractor”.
therefore	Check that the word is not in a spurious phrase not specifying a requirement, or part thereof. Check that usa correct.
transparent	Check that an objective criterion is present for what constitutes “transparent”.
typical	Check that the word is not in a spurious phrase not specifying a requirement. If the word is used in specifyin objective criterion is present for what constitutes “typical”. Check for any missing requirements relating to “at
up to	Check whether there is ambiguity as to the inclusion or exclusion of the limit value. Check whether there is a or “only a subset of values up to”.
user-friendly	Check that an objective criterion is present for what constitutes “user-friendly”.
usually	Check that the word is not in a spurious phrase not specifying a requirement. If the word is used in specifyin use is factually correct. Check for any missing requirements relating to “unusually”.
whether	Check for ambiguity.
will	Check that this word is not used in a requirement, or if it must be used, the word is defined as expressing a consistently throughout the set of requirements. Note that “will” in English language expresses intent or futur
with	Check for ambiguity.
worse	“Worse” is a value-based term. Check that an objective criterion is present for what constitutes “worse".
worst	“Worst” is a value-based term. Check that an objective criterion is present for what constitutes “worst". “Wor that “worst” is meant literally.

Systems Engineering News

UK’s Defence Science and Technology Laboratory chooses Artisan Studio

The UK Defence Science and Technology Laboratory (DSTL) chooses Artisan Studio for a new project requiring compliance with the Ministry of Defence Architectural Framework (MODAF) and recently standardized UPDM Profile

More information

Special Issue IJCIM co-sponsored by INCOSE

Dr Ricardo Valerdi is co-editing a special issue of the International Journal of Computer Integrated Manufacturing with the theme "Managing Through-Life Costs". The goal of this issue is to bring together the work that is currently being undertaken across the lifecycle phases and emerging research that considers integrated approaches for lifecycle costing. INCOSE members are encouraged to submit relevant papers on the subject of lifecycle costing. The deadline for manuscript submission is 5th March, 2010.

See the Call for Papers.

EuSEC 2010 Registration Open

The 7th European Systems Engineering Conference (EuSEC 2010) is being held in Stockholm, Sweden over May, 23 - 26, 2010.

THe theme for this years conference is "Systems Engineering and innovation".

Beginning January 25th until 31st March it is possible to register for EuSEC 2010 with an early-bird discount.

More details available at the EuSEC website.

SSE Webinar with Sarah Sheard, INCOSE Fellow, on "Types of Complexity"

Date: Mar 10, 2010
Time: Noon - 1:00 PM
Calendar: School of Systems & Enterprises
Contact: Deidre Moore
Location: Online via Wimba

Stevens Institute of Technology

More information

Kepler Receives Systems Engineering Award

“Systems engineering is a core competency of NASA’s highly skilled workforce and has been recognized as one of the ”secrets” of the Agencies success in the Apollo program and many other Programs and Projects since then.”

“The Office of the Chief Engineer (OCE) has established the first annual NASA Systems Engineering Award. Each center nominated several highly deserving projects and each was worthy of recognition. After a very difficult and competitive review process the OCE is pleased to announce the 2010 award recipients.”

More information

INCOSE eNote: News and Notes from the INCOSE Network

Vol 6 Issue 9 - 1 Dec 2009 (01 Dec 09)

INCOSE to Bestow Award

In a special awards ceremony conducted during the International Workshop in Mesa, Arizona, USA, INCOSE will recognize 14 members as Expert Systems Engineering Professionals (ESEP).

Included in the ceremony will be Eileen Arnold, Jerry Fisher, Kevin Forsberg, Terje Fossnes, Karl Geist, John Gill, David Hall, Chuck Halligan, Ken Kepchar, Bill Mackey, John Muehlbauer, Yoshi Ohkami, Garry Roedler, Mr. Hillary Sillitto, Dan Surber, Bob Turk and Mark Wilson.

“The ESEP serves to validate the credibility of systems engineers who are leaders within their respective organizations, to give them visibility as role models for other systems engineers, and to acknowledge their status among their peers, superiors, clients, and customers,” according to David Walden, INCOSE Certification Program Manager.

http://govconwire.com/2010/01/incose-to-bestow-award/

INCOSE Track at IEEE International Systems Conference 2010

April 5-8, 2010, Hyatt Regency Mission Bay Spa and Marina, San Diego, CA, USA

This year, INCOSE and IEEE have established an INCOSE Track at the IEEE International Systems Conference. There are twelve 30-minute open presentation slots. This notice is a call for abstracts and biographies for evaluation to fill those slots.

Theme: Engineering of Complex Systems - to include Systems-of-systems, Systems Engineering, Systems Integration, and Systems Thinking

More information

The School of Systems and Enterprises presents an SSE Invited Talk - Lean Enablers for Systems Engineering

Dr. Bo Oppenheim

Winner of Best INCOSE Product Award 2010, and Professor of Mechanical and Systems Engineering, and Graduate Director of Mechanical Engineering at Loyola Marymount University, Los Angeles, California

Wednesday, February 17, 2010, 12:00pm-1:00pm (EST)

More information

Featured Societies - American Society for Engineering Management (ASEM)

What is ASEM?

ASEM was founded in 1979 by a group of 20 visionary engineering managers from industry, education, and government who recognized that in an increasingly complex and technically based society:

The ability to manage and administer large technical engineering and research projects and budgets will continue to challenge engineering management skills; That approximately two-thirds of all engineers were spending a substantial portion of their professional careers as managers; That the management of technology required improved management processes; and That a career path that places engineers in management must be supported by engineering management education and organizations that strive to develop and enhance management skills. Since it's founding, ASEM has grown in membership, services, and recognition in the engineering management profession. Annual conferences have been held each fall since 1980 at locations from Washington D.C. to Portland, Oregon.

The 1986 Conference was held as part of the First International Conference on Engineering Management (ICEM) in September of 1986 in Arlington, Virginia. The 1989 conference was held as part of the Second International conference on Engineering Management (ICEM-II) in Toronto, Canada.

Today, ASEM is a major professional organization dedicated to the science and art of engineering management. ASEM transcends many engineering disciplines, supporting specialties, professional affiliations, and sectors of the engineering and technical community in industry, government, private practice, and education in strategic and important roles that advance engineering management.

What does ASEM provide?

A high-quality, technical journal which speaks to the state of the art of engineering management and helps engineering managers in their professional development;

Local sections that serve as a forum where the engineering manager may meet with their peers to exchange information on common management problems;
National and international forums for the exchange of information between other managers from industry government, and educational institutions;
A newsletter with current information on activities in ASEM and the engineering management community;
The opportunity to work with peers in developing guidelines and standards of performance for the engineering manager and accreditation standards for the engineering management education;
Student chapters at educational institutions to encourage students to become aware of engineering management;
Special recognition of outstanding engineering management achievements and performance through the annual ASEM awards program.

Ref: *http://www.asem.org/about/index.html*

Vision

To speak for the Engineering Management profession

Mission

Provide Engineering Management Solutions to leadership and management challenges to create and lead technical organizations

Promote the development and practice of the engineering management profession

Goals

- Be the custodian of the engineering management body of knowledge
- Grow and share the engineering management body of knowledge
- Guide and enhance engineering management educational programs
- Advance the careers of engineering management professionals
- Connect engineering management professionals
- Foster and recognize engineering management best practices

Ref: *http://www.asem.org/home.html*

Leadership

President: Dawn Utley

President-Elect: Joette Sonnenberg

Ref: *http://www.asem.org/leaders/index.html*

Website: http://www.asem.org

INCOSE Technical Operations

Model Driven System Design Working Group

http://www.incose.org/practice/techactivities/wg/mdsd/

Charter

Characterize model driven system design and identify transition strategies from present document driven approaches.

Leadership

Chair: Phil Spiby
Co-Chair: Roger Burkhart

Contact Model-Driven System Design Working Group for additional information or to join this group.

Accomplishments/Products

- Publicity for MDSD and INCOSE model-driven support activities
- Requirements, evaluation, and ongoing user feedback for modeling frameworks e.g. AP233 and SysML
- Inputs and products from research and demonstration activities of MBSE Initiative
- Educational and example material

Planned Projects

- Organize electronic communications and work sites
- Develop white paper on AP233 and SysML relationship
- Develop capability roadmap for progressive linkage of model-driven methods
- Develop requirements and process roles for PLM support of Systems Engineering

2008 International Workshop Model Driven System Design WG Summary Presentation (Size: 200K)

Systems Engineering Software Tools News

Galorath SEER® for Hardware, Electronics & Systems Update Focuses on Affordability and Latest Technologies

Galorath Incorporated announced major enhancements to its SEER For Hardware, Electronics & Systems (SEER-H™ 7.1) software release. Galorath has added numerous enhancements and refined estimation of development labor, materials, cost schedule and reliability; production labor, material, reliability; and operations and support effort, schedule support approaches.

More information

Free URN tool: jUCMNav 4.2.0 now available

jUCMNav is a free, Eclipse-based graphical editor and an analysis and transformation tool for the User Requirements Notation (URN). URN is intended for the elicitation, analysis, specification, and validation of requirements. URN combines two complementary views: one for goals provided by the Goal-oriented Requirement Language (GRL) and one for scenarios provided by the Use Case Map (UCM) notation.

More information

Cradle® February 2010 Newsletter

http://www.threesl.com/pages/webletter-February10/index.php

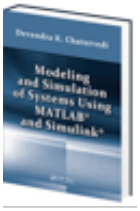
Systems Engineering Books, Reports, Articles and Papers

A Method for Tradespace Exploration of Systems of Systems

Systems of Systems (SoS) are a current focus of many organizations interested in integrating assets and utilizing new technology to create multi-component systems that deliver value over time. The dynamic composition of SoS along with the managerial independence of their component systems necessitates systems engineering considerations and methods beyond those of traditional systems engineering, particularly for SoS concept design. Qualitative and heuristic-based guidance is available in the literature, but there is a need for a method that will allow decision makers to quantitatively compare diverse multi-concept SoS designs on an equal basis in order to select value robust designs during concept exploration. Development of a quantitative method for SoS conceptual design will enable the consideration of many more architecture options than is possible through qualitative methods alone, facilitating a more complete exploration of a SoS design space. In this thesis, a quantitative method for SoS conceptual design, known as System of Systems Tradespace Exploration Method (SoSTEM), is presented. This method is based on the existing Dynamic Multi-Attribute Tradespace Exploration (MATE) which is a formal methodology for tradespace exploration during system design that allows the decision maker to make trades between both stakeholder preferences and systems early in the design process and includes the consideration of dynamic issues such as unarticulated stakeholder preferences and changing system context.

More information

Modeling and Simulation of Systems Using MATLAB and Simulink



By Devendra K. Chaturvedi
Publisher: CRC Press, Publication Date: December 16, 2009
ISBN-10: 1439806721, ISBN-13: 9781439806722

Summary:

- Provides a basic understanding of systems and their modeling and simulation
- Presents a step-by-step procedure for modeling using top-down, bottom-up, and middle-out approaches
- Develops models for complex systems and reduces their order so they can be applied effectively in online applications
- Uses soft computing techniques for modeling nonlinear, ill-defined, and complex systems
- Contains extensive references and related literature for further study
- Includes a CD-ROM with simulation code in MATLAB and Simulink, enabling quick and useful insight into real-world systems

More information

Systems Thinking in a Complicated World

…But I think the world in which this mechanistic, linear, “if this, then that” thinking works is quickly coming to a close. Or, at least, that thinking may need to be applied in a different way…

…The problem with linear and mechanistic solutions is that when things get complicated – when the world becomes a dense ball of complexity and interconnection – those kinds of solutions often become Band-Aids that treat the symptom, but miss the root cause…

…This much is obvious: the society-environment relationship is a complex system. It might even be the most complex system, period. When problems within the system come to our attention, they deserve some serious thinking – not just a wave of the hand, followed by “Eh, technology’ll take care of it.”...

More information

MacArthur Foundation Funds Systems Thinking in Education Project

In this time of budgetary constraints and funding cutbacks, the news that the MacArthur Foundation is funding research on the development of systems thinking in middle school students is a heartening turn of events. According to a press release from Indiana University, professors Melissa Gresalfi and Kylie Peppler will be principal investigators on the three-year study called "Grinding New Lenses: A Design Project to Support a Systems View of the World." They are partnering with Nichole Pinkard, visiting professor at DePaul University, and Katie Salen, executive director of the Institute of Play, to create curricula to help sixth graders see and interpret the world with a "systems thinking disposition."

More information

Systems Research Forum (SRF)
Volume: 3, Issue: 2 (December 2009)

PAPERS:

1. The Art and Science of Systems Engineering by Michael Ryschkewitsch, Dawn Schaible and Wiley Larson
2. Smart Systems Architecting: Computational Intelligence Applied To Trade Space Exploration And System Design by Cihan H. Dagli, Atmika Singh, Jason P. Dauby And Renzhong Wang
3. Model-Based Technical Planning: An Evaluation Of Description Techniques by Jonas Andersson And Tomas Huldt

CASE STUDY:

1. System and Context Modeling — The Role of Time-Boxing and Multi-View Iteration by Gerrit Muller

More information

Competitive Engineering: A Handbook for Systems Engineering, Requirements Engineering, and Software Engineering Using Planguage

By Tom Gilb
Publisher: Butterworth-Heinemann, Publication Date: June 25, 2005
ISBN-10: 0750665076, ISBN-13: 978-0750665070

Book Overview:

Competitive Engineering documents Tom Gilb's unique, ground-breaking approach to communicating management objectives and systems engineering requirements, clearly and unambiguously.

Competitive Engineering is a revelation for anyone involved in management and risk control. Already used by thousands of project managers and systems engineers around the world, this is a handbook for initiating, controlling and delivering complex projects on time and within budget. Competitive Engineering copes explicitly with the rapidly changing environment that is a reality for most of us today.

Elegant, comprehensive and accessible, the Competitive Engineering methodology provides a practical set of tools and techniques that enable readers to effectively design, manage and deliver results in any complex organization - in engineering, industry, systems engineering, software, IT, the service sector and beyond.

More information

Introduction to Systems Engineering

By Andrew P. Sage
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Product Description

An easy-to-use, comprehensive guide to systems engineering methods.

Systems engineering (SE), or the engineering of large-scale systems, is key to achieving reliable, efficient, cost-effective products and services in diverse fields, including communication and network systems, software engineering, information systems, manufacturing, command and control, and defense systems acquisition and procurement. This book offers a unique introduction to the world of systems engineering, focusing on analysis and problem-solving techniques that can be applied throughout the life cycle of product systems and service systems. While the authors provide a framework for the functional levels involved in systems engineering processes and system management, the bulk of the discussion is devoted to the practical application of formulation, analysis, and interpretation methods.

Through the use of real-world examples and useful graphs, readers will learn to:

- Choose the most appropriate methods and tools for a given project
- Apply issue formulation methods to assure that the right problem has been identified
- Work with formal analysis methods to assure that the problem is solved correctly
- Apply issue interpretation methods to insure that decisions reflect human values and technological realities, and thereby make interpretation work for them in the decision-making process
- Develop an appreciation for the engineering and troubleshooting of large systems

More information

Conferences and Meetings

1st Workshop on Semantically-Enabled Systems Engineering (SENSE-2010)

15 - 18 February, 2010. Andrzej Frycz Modrzewsk Cracow College, Krakow, Poland.
More information

IESS 1.0: First International Conference on Exploring Services Sciences

17 - 19 February, 2010. Geneva, Switzerland.
More information

INCOSE North Texas Chapter – Creating the System Engineering Body of Knowledge

February 18, 2010
More information

The 1st Workshop on Model Based Engineering for Embedded Systems Design

March 12, 2010 - Dresden, Germany
More information

DoD Architectures: System of Systems Engineering Forum

15 - 17 March 2010, Washington, DC, United States
More information

Automatic Verification and Analysis of Complex Systems 1st AVACS Spring School

15-19 March 2010, Oldenburg, Germany
More information

NDIA Systems Engineering “Top Systems Engineering Issues” Workshop NEW

March 17-18, 2010, National Defense Industrial Association, 2111 Wilson Blvd, Suite 400, Arlington, VA 22201
More information

CSER 2010 8th Annual Conference on Systems Engineering Research

17-19 March, Honoken, NJ, USA
More information

Sixth Workshop on Model-Based Testing (MBT 2010)

Satellite workshop of ETAPS 2010

March 21, 2010, Paphos, Cyprus
More information

Track on REAL-TIME SYSTEMS at ACM SAC 2010

21 - 26 March, 2010. Sierre, Switzerland.
More information

7th Workshop on System Testing and Validation (STV10)

In conjunction with IEEE ECBS 2010, Oxford, UK

March 22-26, 2010
More information

The Third Edition of the Requirements Engineering Track (RE-Track'10)

22 - 26 March, 2010. Sierre, Switzerland.
More information

Systems Engineering Lean Enablers and Leading Indicators

23 March, 2010. Laguna Cliffs Resort, Marriott Hotel - Dana Point
More information

Systems Research Showcase, INCOSE UK, Bristol Local Group NEW

24th March 2010, University of Bristol, exact location MVB/KES
More Information

2010 IEEE International Systems Conference

April 5-8, 2010, Hyatt Regency Mission Bay Spa and Marina, San Diego, CA
More information

10th Annual Cornell University Systems Engineering Forum 2010 NEW

April 7-8, 2010, Statler Hotel Amphitheater
More information

Introduction to Dynamic Modeling with STELLA and iThink NEW

April 7-9, 2010, Buena Vista Palace Hotel & Spa, Orlando, FL
More information

Quality of Model-Based Testing (QuoMBaT 2010)

April 10, 2010. Paris, France
More information

CHI 2010 Workshop: Context-Adaptive Interaction for Collaborative Work 

April 10, 2010, Atlanta, GA, USA
More information

CHI 2010 (ACM Conference on Human Factors in Computing Systems)

10 – 15 April 2010, Atlanta, GA, USA
More information

5th International Workshop on Model-Driven Development of Advanced User Experience and UI Engineering

Organised at CHI 2010

10 – 15 April 2010, Atlanta, GA, USA
More information

2010 Spring Simulation Multiconference (SpringSim'10) 

April 11 - 15, 2010, Florida Hotel and Conference Center; Orlando, FL, USA
More information

Symposium On Theory of Modeling and Simulation - DEVS Integrative M&S Symposium (DEVS'10)

April 11 - 15, as part of the 2010 Spring Simulation Multiconference at the Florida Mall Hotel and Conference Center in Orlando, FL, USA

First Workshop on Green and Smart Embedded System Technology: Infrastructures, Methods and Tools - GREEMBED 2010 

In conjunction with CPSWEEK 2010
April 12th, 2010, Stockholm, Sweden
More information

WER'10: 13th Workshop on Requirements Engineering

April 12-13, 2010 - Cuenca, Ecuador
More Information

Agent-Directed Simulation Symposium (ADS 2010)

12 - 15 April, 2010, Orlando, Florida, USA.
More information

Second NASA Formal Methods Symposium (NFM 2010)

April 13 - 15, 2010, USA
More information

COFES: Congress on the Future of Engineering Software (COFES) 2010

15 - 18 April, 2010, Scottsdale, Arizona, USA.
More information

Lean Software & Systems Conference 2010 NEW

April 21-23, 2010, Atlanta
More information

2010 The 2nd IEEE International Conference on Systems Engineering and Modeling (ICSEM 2010)

23 to 25 April 2010, Bangkok, Thailand
More information

22nd Annual Systems & Software Technology Conference (SSTC 2010)

26-29 April 2010, Salt Palace Convention Center, Salt Lake City, Utah
More information

The Second International Conference on Complexity, Systems Thinking, and Social Entrepreneurship NEW

April 30 – May 2, 2010, Adelphi University, Garden City, New York
More information

Systems Engineering and Test Evaluation (SETE) 2010

3 - 6 May, 2010, Stamford Grand, Adelaide.
More information

Model-Based Engineering of Real-time and Embedded Systems (MoBE-RTES 2010) NEW

(organized in conjunction with ISORC 2010)
May 4th, 2010, Carmona (close to Sevilla), Spain
More information

ISORC 2010 Symposium - 13th IEEE Computer Society symposium dealing with the rapidly expanding field of object/component/service-oriented real-time distributed computing (ORC) technology. NEW

May 5-6, 2010, Carmona (close to Sevilla), Spain
More information

International Workshop on Advances and Applications of Problem Orientation (IWAAPO-2010) at ICSE NEW

May 8th, 2010, Cape Town, South Africa
More information

The 2010 International Symposium on Collaborative Technologies and Systems (CTS 2010)

May 17-21, 2010, The Westin Lombard Yorktown Center, Chicago, Illinois, USA
More information

Software Process Improvement and Capability Determination (SPICE) 2010

18-20 May 2010 - Pisa, Italy
More information

EuSEC 2010: Systems Engineering and Innovation

23 - 26 May, 2010, Stockholm, Sweden.
More information

Siemens PLM Connection Americas 2010

Gaylord Opryland, Nashville, TN
May 24 – Thursday May 27, 2010
More information

3rd International Conference - From Research to Teaching Formal Methods: The B Method (TFM-B'10)

June 7, 2010, Nantes, France
More information

Exploring Modelling Methods for Systems Analysis and Design (EMMSAD 2010)

In conjunction with CAiSE 2010
June 7-8, 2010, Hammamet, Tunisia
More information

11th Workshop on Business Process Modeling, Development, and Support (BPMDS'10)

In conjunction with CAiSE 2010
June 7-8, 2010, Hammamet, Tunisia
More information

Fourth International i* Workshop - istar 2010

In conjunction with CAiSE 2010
June 7-8, 2010, Hammamet, Tunisia
More information

6th International Workshop on Enterprise & Organizational Modeling and Simulation (EOMAS 2010)

In conjunction with CAiSE 2010
June 7-8, 2010, Hammamet, Tunisia
More information

The 22nd International Conference on Advanced Information Systems Engineering (CAiSE'10)

07-11 June 2010, Hammamet, Tunisia
More information

21st IEEE International Symposium on Rapid System Prototyping

June 8-11, 2010, George Mason University, Fairfax, Virginia, USA
More information

2nd International Workshop on Future Trends of Model-Driven Development (FTMDD 2010) NEW

In conjunction with the 12th International Conference on Enterprise Information Systems (ICEIS 2010)

8 - 12 June, 2010, Funchal, Madeira - Portugal
More information

2nd International Workshop on Advanced Enterprise Architecture and Repositories (AER 2010)

8 - 12 June, 2010, Funchal, Madeira - Portugal
More information

The Fourth IEEE International Conference on Secure Software Integration and Reliability Improvement (SSIRI 2010)

June 9-11, 2010, Singapore
More information

Model-Based Verification & Validation from Research to Practice

2nd Workshop in conjunction with SSIRI 2010

June 9-11, 2010, Singapore
More information

3rd Workshop on Model-based Testing in Practice NEW

15/16 June 2010, Paris, France, in conjunction with ECMFA 2010
More information

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

June 15-18, 2010, Paris, France
More information

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

a satellite event of Petri Nets 2010
June 21, 2010, Braga, Portugal
More information

PETRI NETS 2010

21-25 June, 2010, Braga, Portugal
More information

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

Collocated with Petri Nets 2010

June 21-25, 2010, Braga, Portugal
More information

IEEE International Conference on Systems of Systems Engineering NEW

22 June 2010 to 24 June 2010, Henry Ford College, Loughborough University, UK
More information

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

June 23-25 2010 Prague, Czech Republic
More information

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

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

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

30 June – 2 July, 2010, Essen, Germany
More information

Transformation Tool Contest 2010 NEW

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

Summer Computer Simulation Conference (SCSC 2010) NEW

July 11–14, 2010, Ottawa, Canada
More information

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

July 12-15, 2010, Cambridge, United Kingdom
More information

20th Annual INCOSE International Symposium (IS10)

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

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

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 NEW

July 21-23, 2010, Southampton, England
http://iscepublishing.com/Forum/default.aspx?g=posts&m=227
More information

System Dynamics Society 2010 Conference NEW

July 25 – 29, 2010, Seoul, Korea
More information

The 2nd International Workshop on Enterprise Architecture Challenges and Responses NEW

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) NEW

August 22-27, 2010 - Nice, 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

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

September 13, 2010, Hoboken, New Jersey – USA
More information

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

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

University Residential Center of Bertinoro, Italy
23-24 September 2010
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

Fifth International Conference on Graph Transformation

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

PDMC 2010
9th International Workshop on Parallel and Distributed Methods in verifiCation NEW

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

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

4 - 6 October, 2010. Keelung, Taiwan.
More information

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

October 16 – 20, Reykjavik Iceland
More information

FMCAD 2010 - Formal Methods in Computer Aided Design NEW

October 20 – 23, 2010, Lugano, Switzerland
More information

Complex Systems Design & Management 2010

October 27-29, 2010, Paris, France
More Information

29th International Conference on Conceptual Modeling

1-4 November 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

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

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

Education & Academia

Significant Investment in New Systems Courses and Programs by the Open University UK

The overall program will comprise three possible awards. The first is a Postgraduate Certificate in Systems Thinking in Practice (C72) of 60 OU credit points. A new course due for first presentation in May 2010, 'Thinking strategically: systems tools for managing change' (TU811) is a compulsory 30 point course for this award together with another 30 point OU option, or where credit transfer has been arranged, a partner option.

The second award is a Postgraduate Diploma in Systems Thinking in Practice (E28) of 120 OU points. To be awarded the PG Diploma the PG certificate plus another 60 points of study must be completed. 'Managing systemic change: inquiry, action and interaction' (TU812) is a 30 point compulsory course with TU811 (above).

The third award is the MSc in Systems Thinking in Practice which is made up of the PG Diploma plus a further 60 points of study.

More information

Rensselaer Introduces the Department of Industrial and Systems Engineering

Rensselaer Polytechnic Institute, Troy, NY, USA, announced today its Department of Decision Sciences and Engineering Systems (DSES) will be renamed the Department of Industrial and Systems Engineering (ISE). The change, effective immediately, was approved recently by the Board of Trustees upon recommendation of the department and the dean, and with the support of the provost and the president.

More information

Tenured Faculty Position on Model Driven Engineering at École des Mines de Nantes

École des Mines de Nantes (EMN) has opened a new permanent faculty position in the field of Model-Driven Engineering. The selected candidate will become part of the joint INRIA-EMN research team AtlanMod (http://www.emn.fr/x-info/atlanmod).

More information

Postdoc Position on Real-Time Application Models Simulation

POSTDOC POSITION: "Real-time applications models simualtion" within the CEA LIST, Laboratory of Model Driven Engineering for Embedded Systems (LISE), Gif-sur-Yvette (Paris area), France.

More information

Systems Engineering & Management at UT Dallas

Systems Engineering & Management (SEM) at UT Dallas is a new interdisciplinary program that focuses on the engineering and management of complex projects. Unlike any other program in North Texas, we provide a blending of expertise from faculty in engineering, computer science and management. The program features both technical and human-centered disciplines that broadly impact organizations and society.

More information

Some Systems Engineering-Relevant Websites

http://seari.mit.edu/

Systems Engineering Advancement Research Initiative (SEAri) brings together a set of sponsored research projects and a consortium of systems engineering leaders from industry, government, and academia. SEAri is uniquely positioned within theEngineering Systems Division (ESD) at the Massachusetts Institute of Technology (MIT), a new kind of interdisciplinary academic unit that spans most departments within the School of Engineering, as well as the School of Science, the School of Humanities, Arts, and Social Sciences, and the Sloan School of Management.

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http://www.sercuarc.org/research/research-projects/

The Systems Engineering Research Center is the first DoD University Affiliated Research Center focused on Systems Engineering Research in the United States.

What is the mission of the Systems Engineering Research Center?

The mission of the Systems Engineering Research Center is to enhance and enable the Department of Defense's (DoD) capability in Systems Engineering for the successful development, integration, testing and sustainability of complex defense systems, services and enterprises.

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http://www.peerpapers.com/topics/systems-thinking/0

Systems Thinking Essays and Term Papers

Standards and Guides

ISO/IEC JTC1/SC7 Plenary meeting

23–28, May 2010, Niigata, Japan

Host

Information Processing Society of Japan /Information Technology Standards Commission of Japan(IPSJ /ITSCJ)

Organizer

IPSJ /ITSCJ

Organizer contact: Jacky Takahashi at: ing-sc7niigata@itscj.ipsj.or.jp

Meeting location

Toki Messe Niigata Convention Center
Address: 6-1, Bandai-jima, Niigata-city, 950-0078, Japan
Web: http://www.tokimesse.com/english/

More Information

Some Definitions to Close On - Related to Problem Definition

Problem definition is critically important to the achievement of stakeholder satisfaction. This month, we define a number of terms related to problem definition. Some definitions are perfectly general, and therefore applicable to an engineering context, whilst others are specifically framed for an engineering context.

Desire:

1. an unsatisfied longing or craving (Oxford English Dictionary)
2. a conscious unsatisfied wish for something (Robert Halligan)

Expectation:

1. an instance of expecting or looking forward (Oxford English Dictionary)
2. something which is expected or predicted (Robert Halligan)

Goal:

1. the object of a person's ambition or effort; a destination; an aim (Oxford English Dictionary)
2. a desired characteristic of an item (product or service), usually for which a solution will be pursued, subject to trade-offs with other goals (Robert Halligan)
3. something to which one aspires for a program, or a point aimed at for achievement (United States Defense Systems Management College)

Measure of Effectiveness (MOE):

1. a measure, beyond requirements, such that more or less of the characteristic represents a better solution (Robert Halligan)

Measure of Performance (MOP):

1. a measure of how well something is done, or is to be done. Note that a MOP may, or may not, be an MOE. (Robert Halligan)

Need:

1. a condition of lacking or requiring some necessary thing, either physically or psychologically (Oxford English Dictionary)
2. something which is lacking in relation to some purpose (Robert Halligan)
3. a user related capability shortfall (such as those documented in a need statement, field deficiency report, or engineering change order), or an opportunity to satisfy a new market or capability requirement because of a new technology application or breakthrough, or to reduce costs. Needs may also relate to providing a desired service (e.g., system disposal) (EIA/IS-731.1)

Operational Effectiveness:

1. a measure, beyond requirements, which brings together individual measures of effectiveness which are related to end use, into an overall measure (Robert Halligan)

Overall Effectiveness:

1. a measure, beyond requirements, which brings together individual measures of effectiveness into an overall measure (Robert Halligan)

Requirement:

1. an order, a demand, an imperative, a dependence for success or fulfillment (Oxford English Dictionary)
2. some characteristic demanded or deemed an imperative, of something by someone (Robert Halligan)
3. the need or demand for personnel, equipment, facilities, other resources, or services, by specified quantities for specific periods of time or at a specified time (United States Defense Systems Management College)
4. something that governs that a product will have a given characteristic or achieve a given purpose, including what, how well, and under what conditions (EIA/IS-731.1)

Target:

1. see “Goal”

Want:

1. wish for possession of (Oxford English Dictionary)
2. (noun) a wish for satisfaction of (Robert Halligan)
3. (verb) to wish for satisfaction of (Robert Halligan)

Project Performance International News

Free Tutorial by Robert Halligan in La Spezia, Italy

PPI's Managing Director Robert Halligan is presenting a free tutorial to INCOSE - Chapter ITALIA on 17 February, 2010.

Title: "A Systems Approach to Love, Life and Business"
Date: 17 February, 2010
Time: 17:30 - 20:00
Venue:Sala Conegni "Piero Pozzoli", Confindustria La Spezia

Download Brochure

This tutorial has also been presented to INCOSE South Africa and INCOSE Singapore.

Should you be interested in having this tutorial presented to your society, please contact us.

PPI to Present Courses in Stellenbosch, South Africa

PPI has recently made a change in course locations in South Africa. Course originally scheduled to be delivered in Cape Town have now been moved to Stellenbosch. This is due to the high level of engineering releated activity in Stellenbosch.

See PPI's complete course schedule here.

Project Performance International Events

Systems Engineering 5-Day Courses

Upcoming locations include:

- La Spezia, Italy

- Perth, Australia
- São José dos Campos, Brazil
- Las Vegas, USA
- London, UK
- Pretoria, South Africa

View 2010/2011 Systems Engineering Course Schedule

Requirements Analysis and Specification Writing 5-Day Courses

Upcoming locations include:

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

View 2010/2011 RA&SW Course Schedule

OCD/CONOPS 5-Day Courses

Upcoming locations include:

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

View 2010/2011 OCD/CONOPS Course Schedule

Software Engineering 5-Day Courses

Upcoming locations include:

- Melbourne, Australia
- Pretoria, South Africa
- Las Vegas, USA

View 2010/2011 Software Engineering Course Schedule

Cognitive Systems Engineering 5-Day Courses

Upcoming locations include:

- Melbourne, Australia
- London, UK
- Las Vegas, USA
- Adelaide, Australia

View 2010/2011 Cognitive Systems Engineering Course Schedule

PPI Upcoming Participation in Professional Conferences

- April 26 - 29, 2010 - **SSTC 2010** - Slat Lake City, UT, USA (Exhibiting)
- May 3 - 6, 2010 - **SETE 2010** - Adelaide, SA, Australia (Sponsor/Exhibiting)
- May 23 - 26, 2010 - **EuSEC 2010** - Stockholm, Sweden (Sponsor)
- July 12 - 15, 2010 - **INCOSE International Symposium 2010 (IS10)** - Chicago, IL, USA (Sponsor/Exhibiting)

Kind regards from the SyEN team:
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