Project Performance International

Systems Engineering

Newsletter (SyEN)

SyEN #027 - January 12, 2011

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

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A Quotation to Open On

"Tests are no substitute for requirements specifications" - Bertrand Meyer

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Featured Articles

The Collection of Past SyEN Articles

Since 2008 SyEN has been providing free monthly eNewsletters on all things systems engineering, below is a listing of all past articles featured.

If you would like to submit an article please send by email to SyEN@ppi-int.com.

SyEN #1 - Agile Systems Engineering - Some views of Robert Halligan, FIE Aust

By Robert Halligan, FIE Aust

An interesting paper: **"Toward Agile Systems Engineering Processes"** by Dr. Richard Turner, of the Systems and Software Consortium, appears in the April 2007 edition of Crosstalk, The Journal of Defense Software Engineering (see http://www.crosstalkonline.org/storage/issue-archives/2007/200704/200704-Turner.pdf).

There is much in the paper that I agree with, and some content that I cannot embrace. In the latter respect, most of my disagreements relate to the author's extreme characterisations of systems engineering – nobody in their right mind would do systems engineering the way the author describes. Certainly, none of PPI's clients do systems engineering that way!

Full Article

Note: Scroll down on linked page to view article.

SyEN #2 - Systems Engineering Patterns

By Cecilia Haskins, PhD, CSEP

Have you ever sat down to think about a problem, and felt that there was something familiar about it? Then you wrack your brain to remember what you did the last time this problem posed itself. Drawing on experience, or rules-of-thumb derived from experience, is called "business smarts", and most of us avail ourselves of these shortcuts to finding workable solutions.

Full Article

Note: Scroll down on linked page to view article.

SyEN #3 - The ISO Way

By Alwyn Smit, CSEP

One of the first documents I was exposed to after joining the ISO standards development community via our national standards body, was a document called: "My ISO Job". It provides a unique insight into ISO and into the standards development process. The following sections quoted from this document aims to provide some insight into the standards development process.

Full Article

Note: Scroll down on linked page to view article.

SyEN #4 - What is Cognitive Systems Engineering and Why Should You Care

Dr. Gavan Lintern
glintern@CognitiveSystemsDesign.net

Large-scale socio-technical systems are cognitive systems and function as such through the individual and collaborative cognitive work of the humans in the system. As major systems have become more information intensive and more distributed, the difficulty of addressing cognitive challenges has become a troubling area for Systems Engineering. The discipline of cognitive systems engineering has methods and tools that can be brought to bear on the challenge of designing system functionality that will support human participants as the undertake the essential cognitive work.

Full Article

Note: Scroll down on linked page to view article.

SyEN #5 - The Practice of Cognitive Systems Engineering

Dr. Gavan Lintern
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To make good on what I had intended to promise, I will, in this article, outline some important features of the practice of Cognitive Systems Engineering, discuss the distributed nature of cognitive systems, introduce my personal perspective on design and introduce two popular frameworks for Cognitive Systems Engineering. In the final two articles, I will elaborate on these two frameworks and illustrate how each can complement existing Systems Engineering processes used in the design of large-scale socio-technical systems.

Full Article

Note: Scroll down on linked page to view article.

SyEN #6 - Cognitive Task Analysis and Decision-Centered Design

Dr. Gavan Lintern
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Reprise

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

Full Article

Note: Scroll down on linked page to view article.

SyEN #7 - Cognitive Work Analysis and Cognitive Systems Design

Dr. Gavan Lintern
glintern@CognitiveSystemsDesign.net

Reprise

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

SyEN #7 - Handling the Complexity of Large, Technology-based Business Ventures

By Erik W. Aslaksen

It is argued that the systems engineering methodology, now increasingly accepted as the preferred approach to complex projects also outside defense and aerospace, should be extended into the front end of commercial business ventures, in order to assure that the engineered solution fully meets the business objective.

Many business ventures involve the creation of large, technology-based facilities, such as transport and storage facilities, mines, power stations, and process plants, and their success depends, among other factors, on the degree to which these facilities support the business objectives. That can be seen as the result of a two-stage process; first the conversion of the objectives into requirements on the facilities, and then the design of facilities to meet those requirements. Both of these processes are prone to inadequacies and even outright errors, as is the transmission of the information across the interface between them. It is an interface between two different cultures, business and engineering, and it is not helped by the fact that the means of transmission, a contractual document of some sort, is developed by a third group, the legal profession, which has a different perspective again.

Full Articles

SyEN #8 - Cognitive Work Analysis and Cognitive Systems Design

By Dr. Gavan Lintern
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Reprise

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

Full Articles

SyEN #9 - Types of Requirements

By Robert Halligan, FIE Aust
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Why Should We Care About Types of Requirements?

The Types of Requirements, e.g. functional, performance, external interface, etc., are important to three roles in engineering: the Requirements Analyst role, the Specification Writer role, and the Designer role.

For the Requirements Analyst, a close relationship exists between the types of requirements, and specific analytical techniques. Thus, the analyst benefits from an excellent understanding of the Types of Requirements to select the most appropriate combination of analytical techniques to address a particular requirements problem. To even communicate about requirements and their capture and validation, relies upon a good understanding of the distinctions between different types.

For the (requirements) Specification Writer, of all the influences on good requirements specification structure, the Types of Requirements have the greatest influence. That is not to say that there is a 1:1 relationship between Types of Requirements and elements of structure, e.g. sections. There is not. A sound schema and understanding of Types of Requirements enables the Specification Writer to very efficiently place each (singular, not compound) requirement in its single correct place. This transformation of a pile of requirements in a database into a well structured, no logical disconnects, easy to use requirements specification may even be automated.

For the Designer, many of the Types of Requirements have corresponding design process issues. In some cases, e.g. external interface requirements and other qualities requirements, there are also corresponding, specific design management issues.

In this paper, as soundly-based schema of Types of Requirements is presented, and the significance of each type to each of the three roles of Requirements Analyst, Specification Writer, and Designer is described.

Full Article

SyEN #10 - Medical Device Development Process

By David J. Jones and Melissa T. Masters
Medical Device Solutions

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Abstract

Medical devices of increasing complexity are central to mankind's continuously expanding ability to save lives and improve the quality of life. Within our business, we often reflect on how fortunate we are to have the opportunity to work on a variety of these remarkable devices. We believe that such rewarding experiences are made possible through the application of a rigorous system engineering process, ensuring that the resulting devices are safe, effective, and successful.

This article describes a deployed System Engineering process tailored for Medical Device Development within Battelle Medical Device Solutions (MDS). This process (based on ISO 15288:2002, the INCOSE System Engineering Handbook and a Legacy Process), integrates compliance to international regulations, embeds a Safety Risk Management process as defined in ISO 14971:2007, and assures adherence to ISO 13485:2003 Quality Management Systems. Based on the classification and complexity of the device, the process is scalable, may be tailored, and is iterative.

Full Article

SyEN #11 - Lean Enablers for Systems Engineering

By Dr. Bohdan W. Oppenheim
Loyola Marymount University

A new product named Lean Enablers for Systems Engineering (LEfSE) is described. It is a collection of 194 practices and recommendations formulated as “dos” and “don’ts” of SE, and containing collective wisdom on how to prepare for, plan, execute, and practice SE and related enterprise management using Lean Thinking. The enablers are focused on mission assurance and the satisfaction of stakeholders achieved with minimum waste. The product has been developed by experts from the Lean Systems Engineering (LSE)1 Working Group (WG) of the International Council on Systems Engineering (INCOSE). LEfSE are organized into six well-known Lean Principles called Value, Value Stream, Flow, Pull, Perfection, and Respect for People. The LEfSE are not intended to become a mandatory practice. Instead, they should be used as a checklist of good practices.

Systems engineering is regarded as an established sound practice but not always delivered effectively. Sixty-two recent successful space launches indicate that mission assurance can be practiced well. At the same time, recent U.S. Government Accountability Office (GAO) and NASA studies of space systems [1, 2, 3, 4] document notorious major budget and schedule overruns, some exceeding 100 percent. Most programs are burdened with waste, poor coordination, unstable requirements, quality problems, and management frustrations. Recent studies by the MIT-based Lean Advancement Initiative (LAI) researchers [5, 6, 7, 8] have identified a mind-boggling amount of waste in government programs, reaching 70 percent of charged time. This waste represents a vast productivity reserve in programs and major opportunities to improve program efficiency.

The new field of LSE is the application of Lean Thinking to SE and to the related aspects of enterprise management. SE is focused on the flawless performance of complex technical systems. Lean Thinking is the holistic management paradigm credited for the extraordinary rise of Toyota to the most profitable and the largest auto company in the world [9]. Toyota is well known for practicing excellent Product Development and SE (what Toyota refers to as simultaneous engineering). For example, the Prius car design was completed in nine months from the end of styling, a performance level unmatched by any competitor [10]. Lean Thinking has been successfully applied in defense industry and in the U.S. military itself, (e.g., [5], and the Air Force Lean initiative named AFSO-21). It has become an established paradigm in manufacturing, aircraft depots, administration, supply chain management, health, and Product Development, including engineering.

LSE is the area of synergy of Lean and SE with the goal to deliver the best life-cycle value for technically complex systems with minimal waste. LSE does not mean less SE. It means more and better SE with higher responsibility, authority, and accountability (RAA), leading to better and waste-free workflow and mission assurance. Under the LSE philosophy, mission assurance is non-negotiable, and any task which is legitimately required for success must be included, but it should be well-planned and executed with minimal waste.

Full Article

SyEN #12 - Systems Thinking and Dynamic Modeling Within K-12 Schools: Effects on Student Learning

Anne LaVigne
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Introduction:

In 1988, Massachusetts Institute of Technology (MIT) Professor Emeritus, Gordon Brown, found his way into the classroom of one middle school science teacher in Tucson, Arizona US and shared system dynamics modeling software with him. The teacher saw potential applications for embedding dynamic models into the learning process as a way to enhance and deepen student understanding of science content. He began creating instructional materials that allowed students to learn curriculum from a problem-based, learner-centered approach. For example, as part of an ecological study, students explored interdependent, dynamic relationships while making decisions about where to locate various amenities in a new national park. Students had to consider the impacts their decisions would have on the system as a whole, while operating within a limited financial budget. Young people often don't forget these experiences, since they exemplified meaningful work, and they carry the essence of that learning with them into their adult lives[1].

Over time, Professor Brown and that one middle school teacher directly and indirectly impacted use of systems thinking and dynamic modeling beyond this one classroom - to other teachers in the same school, to other schools in the same district, to other districts in the same city, and to other schools across the nation and in other nations. The increasing trend of use could, of course, not have occurred without a network of educators who saw the benefits for their students and who worked and continue to work on developing capacity to apply systems thinking and dynamic modeling within classroom instruction and organizational learning. Perhaps some important questions to consider are "How and why has it spread thus far?" and "What keeps it from spreading more quickly?" One partial answer begins with yet another question: "After twenty years, what evidence exists that using systems thinking/dynamic modeling[2] (ST/DM) methodologies has a positive, desirable effect on student learning?"

Four areas of evidence are available, each in different quantities and with different measurement criteria. The largest body of evidence is found within the anecdotes of teachers who describe thinking and learning results for their students. Although smaller in quantity, action research (a methodology used to investigate a particular question about learning) and student survey results allow for observation of some general trends relating to student learning/thinking[3]. Finally, empirical research studies are less prevalent, but have occurred within K-12 classrooms.

[1]A longitudinal video study, …that School in Tucson, shows adults reflecting on their learning experiences in middle school. Available from the Creative Learning Exchange at www.clexchange.org/thatschoolintucson

[2] The term dynamic modeling is used in this context to include computer modeling using system dynamics software, such as STELLA or Vensim, as well as other types of models, such as dynamic physical or kinesthetic modeling/simulation.

[3] The stories and research are a result of contributions from many individuals over time. Many thanks to Tracy Benson, Barbara Casanova, Caryl Crowell, Frank Draper, Sheri Marlin, Dave Mason, James Ranney, Joan Scurran, Shea Van Rhoads, and Heng Wenyu whose specific experiences are shared here.

Full Article

SyEN #13 - Requirements Quality Metrics: The Basis of Informed Requirements Engineering Management

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Abstract

Available data demonstrates that defective requirements are a dominant cause of cost and schedule overrun in technical programs. This paper presents a structured methodology for measuring the quality of requirements, individually and collectively. It is shown that requirements may be characterized by ten quality factors, each with an associated metric, and by two overall requirements quality metrics. In addition, the requirements engineering process itself can be instrumented by means of five process-related metrics. The paper describes the author's experience with application of both types of metric to engineering decision making.

Full Article

SyEN #14 - Common Sense on Reliability Engineering (Part 1 of 3)

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"Unfortunately, the development of quality and reliability engineering has been afflicted with more nonsense than any other branch of engineering."- Patrick O'Connor

Many people believe that reliability engineering is a specialised discipline of engineering. The INCOSE Systems Engineering Handbook, for example, refers to it as a specialty area of systems engineering, and describes it under the heading *"Design for Acquisition Logistics - Integrated Logistic Support"* [1]. Many companies therefore believe that reliability engineering should be part of logistics or maintenance, resulting in a reactive approach to handling equipment failures. Other people believe that reliability engineering relies heavily on mathematics and statistics, and is in practice nothing but "applied statistics". However, many of these beliefs are questionable when we apply common sense to this issue.

Reliability can simply be defined as the absence of failures in products and systems. When a product or system does not fail, it is reliable, and when it fails, it is not reliable! When a failure occurs, and the failure mode is analysed to determine its root cause, it is nearly always the result of human error. This implies that failures are primarily caused by errors made by people such as systems engineers, design engineers, production personnel, users and maintenance personnel. *"The achievement of reliability is essentially a management task, to ensure that the right people, skills, teams, and other resources are applied to prevent the creation of failures"* [2].

An example to illustrate this statement is the failure of an electronic component, such as a power transistor in a typical power supply unit. Is it really failure of a specific component, or is it merely the predictable end result of inadequate quality of design or production by people?

Full article

SyEN #15 - Common Sense on Reliability Engineering (Part 2 of 3)

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"Unfortunately, the development of quality and reliability engineering has been afflicted with more nonsense than any other branch of engineering." - Patrick O'Connor

In the first part of this series, it was argued that Reliability is the absence of failures in products and systems. Furthermore, Reliability Engineering can be defined as the management function that prevents the creation of failures by people (such as systems engineers, design engineers, production personnel, users and maintenance personnel).

The ideal state of "absence of failures" can only be achieved in practice by preventing failures from occurring in the first place. However, the prevention of failure is only possible if we (preferably during design and development) develop a thorough understanding of potential failure modes, **and then take appropriate steps to prevent them from occurring**. This understanding of potential failure modes is obtained by using "Analysis" and "Test" as design and production verification methods as indicated in Figure 1.

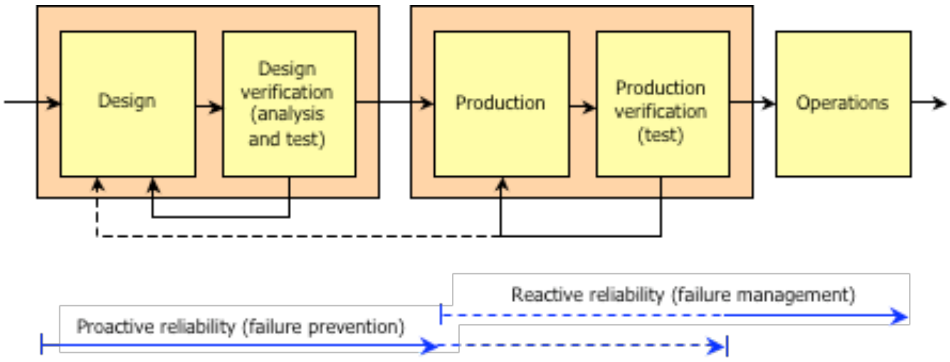

Figure 1: Verification of design and production

[Full Article](#)

SyEN #16 - Common Sense on Reliability Engineering (Part 3 of 3)

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"Unfortunately, the development of quality and reliability engineering has been afflicted with more nonsense than any other branch of engineering." - Patrick O'Connor

In previous parts of this series, Reliability was defined as the absence of failures in products and systems, and Reliability Engineering as the management function that prevents the creation of failures by people (such as systems engineers, design engineers, production personnel, users and maintenance personnel).

It was also argued that "absence of failures" can only be achieved in practice by preventing failures from occurring in the first place. The prevention of failure is only possible if we develop a thorough understanding of potential failure modes, and then take appropriate steps to prevent them from occurring. This understanding of potential failure modes is obtained by using "Analysis" and "Test" as design and production verification methods as indicated in Figure 1.

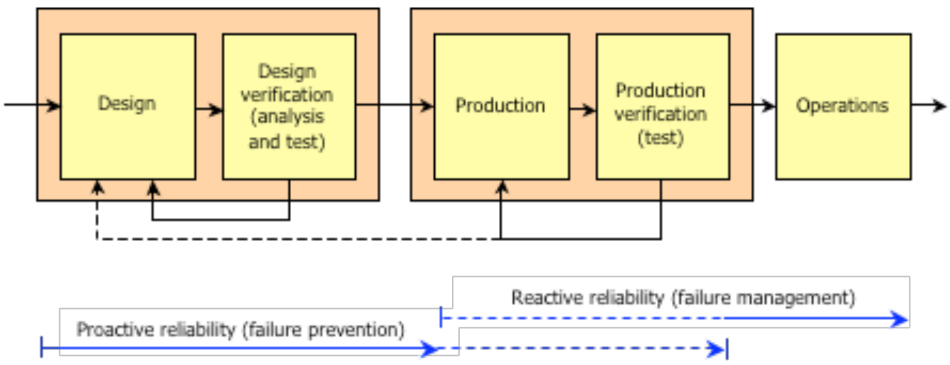

Figure 1: Verification of design and production

The second part of the series discussed "Analysis" in more detail, and referred to both design analysis (eg electronic component derating analysis) and failure analysis (eg Failure Mode and Effects Analysis). These theoretical analyses are all based on some model of the product or system, and not on the actual item. "Test", on the other hand, is always practical, and involves both the design and the manufacturing processes. "Analysis" and "Test" are therefore complementary verification methods which are both essential in achieving high reliability.

Full Article

SyEN #17 - The Use of English Language in Requirements Specifications

by Robert J. Halligan, FIE Aust
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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!

Full Article

SyEN #18 - The Role of Values in Identifying Systems Engineering Competencies

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Internationally, there appears to be a shortage of Systems Engineering (SE) skills as predicted by Professor Peter Lindsay of the University of Queensland (Australia)[1]: “The existing international shortage of systems engineers is likely to double in the next few years”. This is a problem, specifically in South Africa, where organizations such as the Council for Scientific and Industrial Research[2] (CSIR), have a great demand for these skills. The Defence, Peace, Safety and Security (DPSS) unit of the CSIR provides defence science and technology support to the South African National Defence Force and various international customers. This unit has experienced growth of 30% in some business areas for a number of years leading to significant demand for SE skills.

The business value of screening to identify systems engineering potential lies in the cost currently incurred because of the shortage of SE’s and the lead-time in developing SE’s. These costs include opportunity costs resulting from not being able to access new projects, and project risks, a consequence of not having the adequate skills on current projects.

SyEN #18 - The Use of Morphological Analysis and Bayesian Networks as Decision Support Methods for Strategic Problem Spaces

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1. Wicked Problems

Strategic decision support often involves the development of scenarios and complex strategy models. Many of the critical factors in the model may be non-quantifiable, since they contain strong socio-political dimensions. Furthermore, the uncertainties inheret in such problem complexes are in principle irreducible and often cannot be described fully. Associating quantitative measures to these uncertainties then becomes a superficial task.

Full Articles

SyEN #19 - A Method for the Determination of an Optimum Set of Verification Requirements

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1. Definitions:

System or software requirement: a characteristic that any correct implementation of the system or software is required to possess, usually to a defined degree under defined conditions.

System or software verification requirement: the required quality of the evidence that a system or software requirement has been satisfied in the system or software

Specified requirement: a requirement in a recorded form (specific record)

Requirements Specification: a specific record of a set of requirements

System or software requirements specification: a specific record of a set of system or software requirements

Verification requirements specification: a specific record of a set of verification requirements (sometimes referred to as a "test requirements specification", although this terminology is accurate only if the verification requirements explicitly direct and limit verification method to "test").

Where "system requirement" is referred to below, reference to "software requirement" is also intended.

Full Article

SyEN #20 - Managing Time in Time Management: Failure by Belief

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What better to occupy one's mind late on a sleepless night than Time Management. This is not the first time my thoughts have been captivated by Time Management. Time Management seems to be something I have pondered at length, usually when I have less than enough time to get something done.

It seems that when faced with recurring time pressure we turn to the concepts of Time Management believing that it holds the answer for an escape from our dilemma. This in fact constitutes a two part fallacy.

Lets get serious, there is no management of time in Time Management. Time is not manageable! Time simply is. As Zig Ziggler is so fond of saying, "We all have the same amount of time, 24 hours in every day." It's really a question of what one does within that time that makes the difference.

The second part of the Time Management fallacy is based on the belief that if one simply becomes more effective, a better time manager, then they will be able to accomplish what needs to be done - NOT!

What is to follow is a anasynthis, i.e. analysis and synthesis, of one's activity within time in an organizational context. The intent is to provide a foundation for a deeper level of understanding regarding the dilemma faced, and provide some more meaningful approaches that can be taken to resolve the Time Management dilemma.

Full Article

SyEN #21 - Modelling as a Tool in the Engineering of Systems of Systems

By Jan Roodt
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Introduction

Golden Gate Bridge[1]

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.

[1]Image 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

Full Article

SyEN #22 - Thinking in Systems – Aha!

By Alwyn Smit
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Having been trained as an engineer and practising systems engineering for a long time, the concept of reductionism is not unfamiliar. This is after all how we deal with complex systems – by breaking it down into individual elements that we can understand and comprehend. Systems thinking has always been the understanding that systems exist within a context that influences their dynamic behaviour and that their behaviour is not only determined by the behaviour of their elements – right? - That was until I read “Thinking in Systems” by Donella Meadows. For me this was what Gene Bellinger calls an Aha! moment on the Systems Thinking World LinkedIn group.

Meadows defines a system as “a set of things interconnected in such a way that they produce their own pattern of behaviour over time”. Another central insight explained right at the beginning of the book is the relationship between structure and behaviour of a system. A system also has a distinct purpose that is deduced from its behaviour. It is however the interconnections between the elements of the system and between the system and other systems in its context that greatly define its behaviour over time.

In modelling the behaviour of systems, Causal Loops Diagram (CLD) and Stock & Flow Diagrams are quite often used. The existence and impact of feedback loops, either balancing or reinforcing, is the last essential concept in understanding and modelling system behaviour. These concepts are all very well explained on www.systemswiki.org where all four of the above links will redirect the reader.

Full Article

SyEN #23 - What Are Systems of Systems and How to Engineer Them: An Overview of Current System of Systems Research

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To quickly respond to changing business and mission needs, many organizations are integrating new and existing systems with commercial-off-the-shelf (COTS) products into network-centric, knowledge-based, interoperable, software-intensive systems of systems (SoS). With this approach, system development processes to provide new SoS capabilities and improve the performance of existing capabilities are evolving and being referred to as SoS Engineering (SoSE). This article describes the results of recent SoS and SoSE investigations and research that explore the characteristics of SoSs, SoSE challenges, and how SoSE is evolving to address these challenges.

Full Article

SyEN #24 - Requirements Analysis that Works – the New Wave?

Robert Halligan, FIE Aust
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Introduction:

Innumerable studies have concluded that requirements problems are the single biggest contributor to cost overruns, schedule slippages and loss of capability in systems and software projects. Cost impacts alone of 10%, 20%, 50%, 80% and more are regularly reported by researchers and practitioners.

And yet, the cost of making substantial improvements in requirements quality is considerably lower than these cost impacts, typically 0.1 – 2% of total development cost - if appropriate skills and methods are applied.

Requirements analysis (the capture and validation of requirements through analysis of the problem domain) provides the tools for transforming the inadequate to the adequate, requirements-wise.

Full Article

SyEN #25 - The Great Divides in Systems Engineering

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Step outside systems engineering for a moment and look back into it. Range around the perspectives perimeter (Kasser, et al., 2009)and observe what you see from the different perspectives (Kasser and Mackley, 2008). I’ve been doing this for 15 years and have come up with and researched the following hard questions that nobody else seems to be tackling.

Full Article

SyEN #26 - How to Wrestle a Crocodile

By Alwyn Smit
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A recent Requirements Engineering conference left me pondering the niggling question: Why are so many projects still struggling or failing when so much research has been done on the causes of project failure, and whole conferences are devoted to what has been identified as one of the prime causes of project failure? Like all other engineering problems, this one does not exist in isolation either, and looking at the larger context quickly confirms that the typical project environment is quite complex with many variables and lots of human involvement. Fixing requirements engineering problems will help, but only if it is done in balance with the rest of the Systems Engineering and Project Management activities forming part of this complex interaction called a project. That prompted me to reach for a book on my top shelf, one that I bought a while back at an INCOSE conference: Visualizing Project Management by Forsberg, Mooz and Cotterman. Paging through the Introduction, my eye caught these quotes that I diligently underlined the first time I read it and it reminded me of the lesson I learnt reading it the first time:

- "Widely varying project results would lead one to conclude – quite correctly – that project success is too often dependant on the specific team." I have seen this happening in my own environment where some teams are apparently more successful at project execution than others – perhaps they are the ones that learned from their mistakes.
- "Project reality is such a complex organism that personal experience alone can result in biased and flawed views" This supported my own perception that projects have become increasing complex to the point that no one person can control them, bringing with it the communication challenges within large project teams.
- "A major factor critical to project success is the availability of an effective and intuitive management process – one the group will quickly buy into and build their team upon". One thing I am convinced of despite the tongue-in-cheek tearoom discussions on which is more important: Systems Engineering or Project Management, the answer to this "effective and intuitive management process" the authors refer to lies in the symbiotic relationship between SE and PM where the result is much bigger than the sum of the parts.

The authors then go on to provide a visual depiction of a process model that is an intimate integration of Project Management and Systems Engineering based on these five essentials:

1. Organizational Commitment
2. Communication
3. Teamwork
4. Project Cycle
5. Management Elements.

Chapter three introduces these five essentials in a "Wheel and Axle" model that left me with a healthy respect for the complexity of the typical project environment, yet the apparent simplicity of dealing with this complexity.

Full Article

Featured Article

Systems Engineering and Romance

by Suja Joseph-Malherbe
Edited by Daniel Malherbe

One can only take a look at the title and raise an eyebrow. I met my future husband at a PPI systems engineering course in South Africa during the first half of 2007. For myself, I experienced a strong sense of familiarity when I saw him for the first time in the foyer outside the venue. I still recall the stranger in the far corner with a cup of coffee on the table next to him; wearing a prune coloured shirt and black trousers with crossed arms looking at me. It was disarming.

Several glances were exchanged during the first two days of the course when nervousness was finally triumphed by bravery on the third day with an introduction. We met for drinks that evening at News Café; we were the last to leave. Thursday evening found us at Villa Paolo, a fantastic restaurant in Pretoria, Saturday afternoon coffee and then at the science fair on Sunday in

Newtown followed with lunch at Sophiatown Bar Lounge. What a great atmosphere and place! A romance ensued between Gauteng and the Western Cape. A deep love developed and both of us approved of one another. Fifteen months later we got married. It has been a brilliant adventure ever since.

Relationship to systems engineering? I had certain expectations (requirements) of a prospective partner. Throughout our relationship Daniel, the proposed solution, was tested against my expectations. Validation success! The solution was fit for purpose – having a friend and husband sharing the sandpit of life, having an adventure. With confidence I went ahead to arrange implementation. Our wedding day was beautiful with friends and family being witness to the event. We bring the best out of each other with just the right amount of maintenance and operational support. I am happy with the result.

On a more relevant note, both my husband and I are active in South Africa's systems engineering community, sitting on the committee looking after the Western Cape branch of INCOSE SA and actively participating in the development of systems engineering.

Robert's Reflections

User Versus Operator

Uncertainty sometimes exists regarding the distinction between user and operator of a system. Let me explain by illustration.

A manager wants to get to a meeting. The manager decides to drive him(her)self using a personal company car. The manager is the user of the car – the manager derives benefit in accordance with the manager's values from the manager's relationship to the car. The manager is also the operator of the car, a person who makes inputs to the car to cause the car to exhibit behavior.

Now by contrast, the manager decides to have a chauffeur drive the car. The manager is still a user of the car, but the chauffeur is the operator. The chauffeur is also a user of the car in a minor way – the chauffeur uses the car to derive income by means of driving (operating) the car.

The manager is a primary user of the car. The car is acquired to serve the manager, and maybe similar managers. The chauffeur is a secondary user – the chauffeur's use of the car supports the interests of the manager user. But the car is not acquired by the company to provide employment to the chauffeur!

In developing a description of intended use, such as an Operational Concept Description, it is important to clearly describe the difference between the "user" and the "operator" of the system, where such a distinction exists. Both points of view, while potentially very different, are needed to ensure a system fit for intended use. To illustrate the importance of the distinction between operator and user, if we asked the manager what he(she) needed, the answer might be a cocktail cabinet in the back of the car. If we asked the chauffeur, the answer might be a cocktail cabinet in the front!

The role of the operator is to execute correctly the operating instructions – these instructions are a part of the system design. That leads to the discipline of cognitive systems engineering, which deals with optimizing the relationship between the technology and the decision making of the operator. By contrast, the discipline of cognitive systems engineering has no such relationship to the user in the role of user.

The system supplied by Ford or GM or Saab incorporates the operating instructions but not the operator. The system used by the manager in the second case includes both the car and chauffeur (operator).

Systems Engineering News

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

INCOSE Event Calendar

International Workshop 2011 (IW 2011)	Jan 29 - Feb 01, 2011
Sixth International Conference on Systems Engineering sponsored by INCOSE-IL/ILTAM	Mar 08 - 09, 2011
CSER2011 - Ninth Annual Conference on Systems Engineering Research	Apr 14 - 16, 2011
SETE2011 The Systems Engineering Test and Evaluation Conference	May 02 - 04, 2011
21st Annual International Symposium	Jun 20 - 23, 2011

More information

INCOSE eNote: News and Notes from the INCOSE Network

2010 Nov - Vol 7 Issue 10

- INCOSE Elections
- Fellows Nominations - Closes 1 Dec
- IS 2011
- INCOSE Foundation
- CSER-Call for Papers
- CSEP Acq News
- INSIGHT Deadlines
- Upcoming Events
- Webinars
- Survey
- Did You Know.....
- Article Headline

More information

BPMDS Becomes a Working Conference Attached to CAISE

The international series of workshops on Business Process Modeling, Development and Support (BPMDS) has been around since 1998. From 2011 it becomes a (two days) working conference attached to CAiSE (Conference on Advanced Information Systems Engineering).

More information

Peter Coughlan - IDEO: When Systems Thinking Met Design Thinking

Friday, December 10, 6:30 - 7:30 pm

Peter, a visiting faculty member for the Seattle University Graduate program in Organization Systems Renewal (OSR), will explore the overlap between systems thinking and design thinking as well as some of the fundamental differences between these two worlds. Peter will also be sharing recent thoughts about the application of design thinking to organizational change.

More information

Stevens and International Space University Expand International Partnership

To respond to the demand for an in-depth technical degree offering with a global perspective, Stevens Institute of Technology and the International Space University (ISU) have joined forces to offer a Graduate Certificate in Space Systems Engineering that can lead to either a Master's Degree in Space Systems Engineering or a Master's Degree in Systems Engineering. The program will begin in January 2011.

More information

INCOSE New Dues Information for 2011

Effective 1 January 2011, dues will increase in all membership categories as shown below so that we may maintain the quality of our programs, initiatives, investments, working groups, and seminars.

Membership Category	Annual Dues (in USD)
Individual	135.00
Senior	75.00
Student	35.00
Corporate Advisory Board	3,750.00

For individual members, discounts will be applied for advance payment of dues such that annual dues will be USD 125/year for a 3-year advance payment and USD 115/year for a 5-year advance payment. Concurrently, to provide additional capital for chapter activities, we will be increasing by 50% the amount that is forwarded to chapters from individual members' dues.

Featured Society

Society of Concurrent Product Development

Mission

To further the development of and to promote the application of Concurrent Engineering (CE) and Integrated Product Development (IPD) in companies and organizations worldwide.

Vision

To be recognized by industry, academia, and by other professional societies as the best value source to attain the knowledge necessary to achieve advanced product development capabilities and practices.

Values

Leadership: To embrace rapid product realization techniques and to advance our nation’s economy, driven by ourselves, our companies and our Sponsors.

Member Recognition: To individuals in our organizations as facilitators of improvement, to our companies and to Sponsors for foresight in fostering environments that lead to the adoption of improved design practices.

Learning: To satisfy our thirst for continuing personal development and renewal and to provide an accessible resource for industry as a whole, bringing new knowledge and skills to the workplace.

Networking: To stay abreast of industry trends, to interact with like- minded professionals and to identify opportunities for business relationships

Friendship: To make professional acquaintances and to solidify old relationships; taking the SCPD meeting as a professionally rewarding yet enjoyable ?time out? from the pace of daily work.

Objectives

1. Disseminate knowledge to promote understanding of Concurrent Engineering (CE) and Integrated Product Development (IPD) concepts and processes.

2. Provide a continuous forum for networking and sharing of ideas among professionals in all disciplines involved in product

development.

3. Improve enterprise effectiveness by expanding the CE/IPD Body of Knowledge by emphasizing the implementation of practical approaches in industry.

4. Participate in the origination and/or refinement of the Concurrent Engineering knowledge using both internal capabilities and collaborative relationships.

5. Foster a continuous learning organization by maintaining an SCPD Body of Knowledge that remains comprehensive while focusing resources and activities on emerging and leading edge techniques.

6. Operate to achieve multi-national and multi-lingual communications and text capabilities.

More information: http://www.scpdnet.org/index.htm

INCOSE Technical Operations

Systems Engineering for Very Small and Micro Entities Working Group

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

Charter

The Charter of the Systems Engineering for Very Small and Micro Entities (SE for VSMEs), is to assist in the application of systems engineering for product development in very small/micro enterprises or small projects.

Leadership

Chair: Gauthier Fanmuy
Co-Chair: Ken Ptack
Co-Chair: Claude Y. LaPorte
Co-Chair: Sven-Olaf Schulze

Contact Very Small and Micro Entities Working Group for additional information or to join this group.

Accomplishments/Products

- The Charter has been developed and approved. The goals of this working group are:
  - To improve and make product development within VSEs more efficient by using Systems Engineering concepts
  - Elaborate tailored guidance for VSMEs to apply, in the context of either a prime or subcontractor role
  - Elaborate tailored guidance to apply to small projects
  - To contribute to standardization in the context of systems engineering.
- The Survey has been developed in five languages (English, French, Italian, German and Spanish), has been piloted and is being conducted .(http://isosurvey.logti.etsmtl.ca/). The goals of the survey are:
  - 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
- There have been several WG meetings and Telecons
  - International symposia
  - International workshops

Projects

- The Survey is currently open for all participants.

Survey Announcement

Systems Engineering Software Tools News

No Magic Draws Standing Room Only Crowds during the First Day of its Inaugural User Conference

No Magic, Inc., claiming to be the leading global provider of integrated modeling, simulation and analysis software, announced that it has drawn standing room only crowds during the first day of its No Magic World Conference 2010 that took place at the American Airlines Conference Center in Fort Worth, Texas.

More information

Multiple Product Releases from No Magic

No Magic announced the following product releases:

December 1, 2010:

- Cameo Enterprise Architecture 17.0
- Cameo Business Modeler 17.0

November 29, 2010:

- MagicDraw 17.0
- UPDM Plugin 17.0
- Cameo Business Modeler Plugin 17.0
- SysML Plugin 17.0
- Cameo DataHub 4.1 SP1

More information

No Magic Announces Free Online UML 2 Training

No Magic, Inc., claiming to be the leading global provider of integrated modeling, simulation, & analysis solutions and services, announced that it is offering its UML 2 online training course “Free-of-Charge”. The No Magic online UML 2 course is designed to teach those interested in Unified Modeling Language (UML®) the basic tenets of UML 2.

More information

Systems Engineering Books, Reports, Articles and Papers

Systems Thinking for an Economically Literate Society

Michael F. Reber

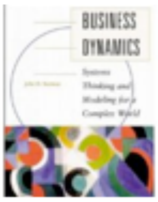
“IN THE US A DISMAL TRUTH EXISTS about the citizenry’s lack of understanding of economic fundamentals.”

“This then leads one to ask, “What can be done to help people become literate in economics?” Perhaps the answer lies in the area of systems thinking, which is a “school of thought that focuses on recognizing the interconnections between the parts of a system and synthesizing them into a unified view of the whole” (Anderson and Johnson 1997, 130)”

“In this paper I first give a cursory review of General Systems Theory (GST) as developed by Ludwig von Bertalanffy and extended by others in the systems thinking field to illustrate the confluences of thought among Mises and systems scientists. From this I argue the need for systems thinking and design in primary, secondary, and tertiary curricula and make reference to non-prescriptive teaching and learning applications for the fostering of economic literacy."

More information

Business Dynamics: Systems Thinking and Modeling for a Complex World



John D. Sterman (Author)
Publisher: McGraw Hill Higher Education (December 1, 2000)
ISBN-10: 0071179895, ISBN-13: 978-0071179898

Product Description:

Today's leading authority on the subject of this text is the author, MIT Standish Professor of Management and Director of the System Dynamics Group, John D. Sterman. Sterman's objective is to explain, in a true textbook format, what system dynamics is, and how it can be successfully applied to solve business and organizational problems. System dynamics is both a currently utilized approach to organizational problem solving at the professional level, and a field of study in business, engineering, and social and physical sciences.

More information

Net-Centric System of Systems Engineering with DEVS Unified Process

Saurabh Mittal, Dunip Technologies, Tempe, Arizona, USA; Jose Luis Risco-Martin
Publisher: CRC Press
Publication Date: November 15, 2011
ISBN: 9781439827062 , ISBN 10: 1439827060

Summary:

Addressing the new challenges that engineers face, this book presents fundamental concepts to help tackle the integration of modeling and simulation with command, and control systems of systems through the use of concepts and standards for interoperability and testing based on the Discrete Event Systems Specification Unified Process. The text presents state-of-the-art modeling and simulation methodologies in system-of-systems engineering, focusing on the development of modeling and simulation based net-centric systems of systems. The author aims to provide a foundation for net-centric systems software engineering. This seminal text is based on the Department of Defense Architecture Framework.

More information

Differences That Make a Difference: An Annotated Glossary of Distinctions Important in Management

by Russell L. Ackoff
Publisher: triarchy press

Publication Date: 9 December 2010
Print ISBN: 978-1-908009-01-2

Product Description:

Thinkers very great and very small - from Voltaire to (most recently) Conservapedia - have underlined the importance of first defining your terms - establishing the exact dimensions of the beast before attempting to argue about it, slay it or revere it.

Towards the end of his life, Russ Ackoff determined to explain how some of the apparently insignificant misinterpretations of language and meaning he observed during his long years of research can, in practice, have far-reaching consequences - especially for our organizational health. His aim was to dissolve (not solve or resolve) some of the many disputes in professional and private life that revolve around such misunderstandings.

In Differences that Make a Difference (the last manuscript that he was to complete before his death) he does exactly that. This book brings together 57 definitions of important terms and concepts, many of which underpin Ackoff's contribution to organizational learning.

More information

Conferences and Meetings

ICISE 2010: International Conference on Intelligent Systems Engineering

December 18, 2010, Bangkok, Thailand
More information

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isee systems - Introduction to Dynamic Modeling with STELLA and iThink NEW

January 19-21, 2011, The Westin Gaslamp Quarter, San Diego, CA
More information

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

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

INCOSE International Workshop 2011 (IW 2011)

January 29 - February 01, 2011, Hyatt Regency Phoenix, Phoenix, AZ, USA
More information

2011 Safety-critical Systems Symposium (SSS'11) NEW

February 8-10, 2011, De Vere Grand Harbour Hotel, Southampton
More information

Second International Conference on Exploring Services Sciences (IESS 1.1)

February 16-17-18, 2011, Geneva, Switzerland
More information

The Sixth International Conference on Systems Engineering in Israel

March 8-9 2011, Herzlia, Israel
More information

2011 International Conference on Systems Engineering and Modeling (ICSEM 2011)

11 to 13 March 2011, Shanghai, Shanghai, China
More information

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

March 14-16, 2011 Karlsruhe, Germany
More information

Design, Automation & Test in Europe

March 14-18, 2011, Grenoble, France
More information

26th Symposium On Applied Computing

March 21 - 25, 2011, Tunghai University, TaiChung, Taiwan
More information

Requirements Engineering Track – 4th Edition

Part of the 26th ACM Symposium on Applied Computing
March 21 - 25, 2011, Tunghai University, TaiChung, Taiwan
More information

ICST Workshop on Requirements and Validation, Verification & Testing (ReVVerT 2011)

Co-located with the 4th International Conference on Software Testing, Verification and Validation (ICST 2011)
March 21-25, 2011 (one day), Berlin, Germany
More information

1st Int'l Workshop on Variability-intensive Systems Testing, Validation & Verification NEW

Co-located with ICST 2011
March 21, 2011, Berlin, Germany
More information

7th Workshop on Advances in Model Based Testing (A-MOST 2011)

Co-located with the 4th International Conference on Software Testing, Verification and Validation (ICST 2011)
March 21, 2011 – Berlin, Germany
More information

IWEI 2011 - The International Working Conference on Enterprise Interoperability

March 22-24, 2011, Stockholm, Sweden
More information

MoBE-RTES 2011 - 2nd IEEE Workshop on Model-based Engineering for Real-Time Embedded Systems

Mar 28, 2011, Newport Beach, CA, USA
More information

REFSQ 2011 - 17th International Working Conference on Requirements Engineering: Foundation for Software Quality

March 28-30, 2011, Essen, Germany
More information

MBT 2011 - Seventh Workshop on Model-Based Testing

April 2-3, 2011, Saarbrüken, Germany
Satellite workshop of ETAPS 2011
More information

IEEE International Systems Conference

April 4-7, 2011, Montreal, Quebec, Canada
More information

Symposium on Theory of Modeling and Simulation (DEVS/TMS'11)

April 4-9 2011, Boston, MA, USA
More information

1st International Workshop on Model-driven Approaches for Simulation Engineering

Held under the aegis of the Symposium on Theory of Modeling and Simulation, part of the SCS SpringSim 2011 conference.
April 4-9, 2011, Boston, MA (USA)
More information

International Symposium on Ambient Intelligence

6-8th April, 2011, University of Salamanca, Salamanca, Spain
More information

Workshop on the Reliability of Intelligent Environments (WORIE ’11)

within the International Symposium on Ambient Intelligence
6th-10th April, 2011, University of Salamanca, Salamanca, Spain
More information

CSER 2011 - Conference on Systems Engineering Research

April 14-16 2011, Redondo Beach Crown Plaza, Redondo Beach, CA, USA
More information

17th International Conference on Information and Software Technologies NEW

April 27th - 29th, 2011, Kaunas, Lithuania
More information

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

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

International Conference on Software and Systems Process (ICSSP 2011) NEW

(co-located with ICSE 2011)
May 21-22, 2011, Waikiki, Honolulu, Hawaii, USA
More information

Sixth Workshop on SHAring and Reusing architectural Knowledge (SHARK 2011) NEW

(co-located with 33rd Int. Conf. on Software Engineering (ICSE 2011))
May 21-28, 2011, Waikiki, Honolulu, Hawaii, USA
More information

RSP 2011 - IEEE International Symposium on Rapid system Prototyping NEW

May 24 – 27, 2011, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany
More information

SPICE 2011 - The 11th International SPICE Conference Process Improvement and Capability dEtermination

30 May - 1 June 2011, Dublin, Ireland
More information

Seventh European Conference on Modelling Foundations and Applications

6-9th of June, 2011, University of Birmingham, Birmingham, UK
More information

10th TTCN-3 User Conference

June 7-9, 2011, Bled, Slovenia
More information

4th Symposium on Resilience Engineering

June 8-10, 2011, Sophia Antipolis, France
More information

BPMDS'11 Working Conference NEW

in conjunction with CAISE 2011
June 20-21 in London, United Kingdom
More information

FM 2011: 17th International Symposium on Formal Methods

June 20 - 24, 2011, Lero, Limerick, Ireland
More information

The 32nd International Conference on Application and Theory of Petri Nets and Concurrency (PETRI NETS 2011)

11th International Conference on Application of Concurrency to System Design (ACSD 2011)
June 20-24, 2011 Kanazawa Cultural Hall, Kanazawa, Japan
More information

INES 2011 - 15th IEEE International Conference on Intelligent Engineering Systems 2011

June 23-25, 2011, Poprad, High Tatras, Slovakia
More information

SoSE 2011 - 2011 6th International Conference on System of Systems Engineering (SoSE)

Jun 27 - 30, 2011, Albuquerque, New Mexico, U.S.A
More information

ICMT2011 - International Conference on Model Transformation
Theory and Practice of Model Transformations

Co-located with TOOLS Europe 2011
27 June - 01 July 2011 - Zurich, Switzerland
More information

15th International Conference on System Design Languages NEW

July 5th - 7th, 2011, Toulouse, France
More information

International System Dynamics Conference NEW

July 24 – 28, 2011, Washington, DC, USA
More information

46th Annual International Logistics Conference and Exhibition (SOLE 2011) NEW

August 2011
More information

19th IEEE International Requirements Engineering Conference

August 29 – September 2, 2011, Trento, Italy
More information

International Conference on Industrial Engineering, Systems Engineering and Engineering Management for Sustainable Global Development NEW

September 21-23, 2011, Spier Hotel and Conference Centre, Western Cape, South Africa
More information

Second Annual IIBA Conference

October 2011, More details TBA
More information

SSEE 2011 - Society for Sustainability and Environmental Engineering 2011 International Conference NEW

October 24-26, 2011, Brisbane Convention & Exhibition Centre, Brisbane, Australia
More information

Education & Academia

Sabbatical in Singapore?

The National University of Singapore is looking for some distinguished help in 2011. Would you like to spend a sabbatical in Singapore doing some teaching and developing case studies in systems engineering? The time would be about 3 - 4 months (a semester).

More information

Institute for Systems Research - University of Maryland

The Institute for Systems Research (ISR) is a permanent, interdisciplinary research unit in the Clark School of Engineering at the University of Maryland. It is home to cross disciplinary research and education programs in systems engineering and sciences, and is committed to developing basic solution methodologies and tools for systems problems in a variety of application domains. ISR-based projects are conducted through partnerships with industry and government, bringing together faculty and students from multiple academic departments and colleges across the university.

More information

Some Systems Engineering-Relevant Websites

http://mastersinprojectmanagement.com

This site by Andrea McDougal aims to provide a list of every school in the United States that offers a master's degree in project management. All the schools are listed on the home page and lead directly to each program; additionally they are sorted by state.

http://standards.iso.org/ittf/PubliclyAvailableStandards/index.html

This site lists all the International Standards that, in accordance with ISO/IEC JTC 1 and the ISO and IEC Councils, are publicly available!.

Standards and Guides

ISO/IEC JTC 1 SC 7 WG 7 meeting held in Gaithersburg, USA - 1 - 5 November 2010

By Johann Amsenga

A meeting of ISO/IEC JTC 1 SC 7 WG 7 was held in Gaithersburg, USA, during 1 - 5 November 2010.

The main objective for the meeting was to finalise ISO/IEC TR 24748-2, Systems and software engineering – Life cycle management – Part 2: A guide for the application of ISO/IEC 15288 (System life cycle processes), and ISO/IEC TR 24748-3, Systems and software engineering – Life cycle management – Part 3: Guide for ISO/IEC 12207 (Software life cycle processes). This was achieved and both documents will be submitted for publication. In conjunction with ISO/IEC TR 24748-1, Systems and software engineering – Life cycle management – Part 1: Guide for life cycle management, these documents will provide valuable guidance to ISO/IEC 15288 and ISO/IEC 12207.

ISO/IEC TR 24748-1 was published and is available free of charge. ISO/IEC TR 24748-1 provides information on life cycle concepts and descriptions of the purposes and outcomes of representative life cycle stages. The Technical Report also illustrates the use of a life cycle model for systems in the context of ISO/IEC 15288 and provides a corresponding illustration of the use of a life cycle model for software in the context of ISO/IEC 12207.

Another important objective for the meeting was to contribute to ISO/IEC 29148, Software and systems engineering – Life cycle processes – Requirements engineering. This was also achieved. A number of comments were submitted and accepted. The document will progress to FDIS.

With ISO/IEC TR 24748-3 on which Mr Amsenga was co-editor now completed, it was proposed that he is nominated as editor on ISO/IEC TR 24748-5, Systems and software engineering – Life cycle management – Part 5: Software development plan. The USA was invited at the last meeting to submit a NWIP for this project. Since this was not done, and seems unlikely to happen, it is proposed that INCOSE or South Africa submits a NWIP.

Another project which can be important if it passes the NWIP ballot, is ISO/IEC 16350, Information technology – Application management – Requirements for application management. Also, the study on validation and verification will have to be monitored closely.

As liaison from SC 27, Mr. Amsenga attended a session of WG 1a (IS Governance Frameworks and Systems) to determine the way forward for the project Digital forensics governance, as well as SC 27's involvement with the project. It was decided that a working draft will be prepared by WG 1a, and that SC 27 will be invited to provide a co-editor for the project.

ISO download area

Full INCOSE report

ISO/IEC JTC 1/SC 7 - Software and Systems Engineering – Status of Standards Development (SE-related)

Standard and/or project	**Stage**	**ICS**
ISO/IEC FDIS 15026-2 Systems and software engineering -- Systems and software assurance -- Part 2: Assurance case	50.20	35.080
ISO/IEC CD 15026-3 Information technology -- System and software integrity levels	30.60	35.080
ISO/IEC FCD 15289 Systems and software engineering -- Content of systems and software life cycle process information products (Documentation)	40.60	35.080
ISO/IEC DIS TR 15476-5 Information technology -- CDIF semantic metamodel -- Part 5: Data flow models	40.60	35.080
ISO/IEC FDIS 15909-2.2 Systems and software engineering -- High-level Petri nets -- Part 2: Transfer format	50.20	35.080
ISO/IEC DTR 16337 Systems Engineering -- Systems Engineering Handbook	40.60	35.080
ISO/IEC DIS 19506 Information technology -- Architecture-Driven Modernization -- Knowledge Discovery Meta-model (KDM), v1.1	40.60	35.080

ISO/IEC DTR 24748-2 Systems and software engineering -- Life cycle management -- Part 2: Guide for the application of ISO/IEC 15288 (Systems life cycle processes)	40.60	35.080
ISO/IEC NP 24748-4 Systems engineering -- Application and management of the systems engineering process	10.99	35.080
ISO/IEC/IEEE 24765 Systems and software engineering -- Vocabulary	60.00	01.040.35 35.080
ISO/IEC FDIS 25010 Systems and software engineering -- Systems and software Quality Requirements and Evaluation (SQuaRE) -- System and software quality models	50.20	35.080
ISO/IEC FDIS 25040 Systems and software engineering -- Systems and software Quality Requirements and Evaluation (SQuaRE) -- Evaluation process	50.20	35.080
ISO/IEC CD 25063 Systems and software engineering - System and software product Quality Requirements and Evaluation (SQuaRE) - Common industry Format for Usability: Context of use description	30.60	35.080
ISO/IEC CD 25064 System and software product Quality Requirements and Evaluation (SQuaRE) - Common industry Format for Usability: User needs report	30.60	35.080
ISO/IEC CD 26511 Software and systems engineering -- User documentation requirements for managers	30.60	35.080
ISO/IEC FDIS 26512 Systems and software engineering -- Requirements for acquirers and suppliers of user documentation	50.60	35.080
ISO/IEC CD 26515 Software and systems engineering - IT Performance Benchmarking Framework	30.20	35.080
ISO/IEC CD 26550 Software and Systems Engineering - Reference model for software and systems product lines	30.60	35.080
ISO/IEC CD 26551 Software and Systems Engineering - Tools and methods of requirements engineering and management for product lines	30.60	35.080
ISO/IEC CD 26555 Software and Systems Engineering - Tools and methods of technical management for product lines	30.60	35.080
ISO/IEC FCD 29148 Systems and software engineering -- Life cycle processes -- Requirements engineering	40.60	35.080
ISO/IEC FCD 42010 Systems and software engineering -- Architecture description	40.60	35.080

Legend:

- CD: Committee Draft
- FCD: Final Committee Draft
- DIS: Draft international Standard
- FDIS: Final Draft International Standard
- NP: New Work Item Proposal
- DTR: Draft Technical Report

- TR: Technical Report
- ICS: International Classification for Standards reference
- Stage: Standards Development Process Stage

Report on Ergonomics Standardization Activities at ISO

by Daryle Gardner-Bonneau, Chair, U.S. TAG to ISO TC 159

This article summarizes discussions and activities at the International Standards Organization Technical Committee 159 (ISO TC 159) Plenary meeting and recent working group meetings.

More information

Some Definitions to Close On

Industrial Engineering

Definition: Discipline of utilizing and coordinating humans, machines, and materials to attain a desired output rate with the optimum utilization of energy, knowledge, money, and time. It employs certain techniques (such as floor layouts, personnel organization, time standards, wage rates, incentive payment plans) to control the quantity and quality of goods and services produced.
Source: http://www.businessdictionary.com/definition/industrial-engineering.html

Definition: The branch of engineering that is concerned with the efficient production of industrial goods as affected by elements such as plant and procedural design, the management of materials and energy, and the integration of workers within the overall system.
Source: http://www.thefreedictionary.com/industrial+engineering

Definition: The engineering discipline that is concerned mainly with the design, development, implementation, and evaluation of integrated systems of people, knowledge, equipment, energy, and material. Looking to the applications related to the interactions among the above activities and resources, industrial engineering draws upon the principles and methods of engineering analysis and synthesis, as well as mathematics, physical, and social sciences.
Source: http://www.wordiq.com/definition/Industrial_engineering

Definition: Engineering that deals with the design, improvement, and installation of integrated systems (as of people, materials, and energy) in industry
Source: http://www.merriam-webster.com/dictionary/industrial+engineering

Definition: The branch of engineering that deals with the creation and management of systems that integrate people and materials and energy in productive ways
Source: http://www.hyperdictionary.com/dictionary/industrial+engineering

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Production Engineering

Definition: Design and application of manufacturing techniques to produce a specific product. It includes activities such as (1) planning, specification, and coordination of the use of resources, (2) analysis of producibility, productions processes, and systems, (3) application of methods, equipment, and tooling, (4) controlled introduction of engineering changes, and (5) application of cost control techniques.
Source: http://www.businessdictionary.com/definition/production-engineering.html

Definition: A branch of engineering that involves the design, control, and continuous improvement of integrated systems in order to provide customers with high-quality goods and services in a timely, cost-effective manner. It is an interdisciplinary area requiring the collaboration of individuals trained in industrial engineering, manufacturing engineering, product design, marketing, finance, and corporate planning. In many organizations, production engineering activities are carried out by teams of individuals with different skills rather than by a formal production engineering department.
Source: http://encyclopedia2.thefreedictionary.com/production+engineering

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Process Engineering

A service function of production engineering that involves selection of the processes to be used, determination of the sequence of all operations, and requisition of special tools to make a product.
Source: http://encyclopedia2.thefreedictionary.com/process+engineering

(Engineering / General Engineering) the branch of engineering concerned with industrial processes, esp continuous ones, such as the production of petrochemicals
Source: http://www.thefreedictionary.com/process+engineering

Project Performance International News

Alwyn Asks: Fancy Yourself as a SyEN Subeditor?

Looking to spread the load in producing SyEN to free time for my Master's Degree, I am seeking subeditors as follows:

Academia – systems engineering news and events in the worldwide academic community.

Standards – news and events relating to systems engineering standards and standards in the sub-disciplines of systems engineering.

Software Tools – news and events relating to software tools geared towards systems engineering and its sub-disciplines.

Websites – summary of websites having useful systems engineering content

The pay is terrible - there isn't any! The only return is the satisfaction of contributing to the engineering community and to society worldwide, and, of course, a modicum of public recognition via the credits at the end of the newsletter. If you could be persuaded, please contact me at asmit@ppi-int.com.

Systems Engineering in Transnistria?

Transnistria (also known as Transdniestria and Pridnestrovie), is a self-proclaimed independent Republic north of Moldova in Eastern Europe, and south of Ukraine. The country is recognized by only Abkhazia, Nagorno-Karabakh Republic and South Ossetia. Transnistria, although poor (a PPP of about US$1000), has significant manufacturing industry in the field of electrical goods, footwear and brandy!

PPI Managing Director Robert Halligan visited Transnistria on 8 January, 2011.

Project Performance International Events

Systems Engineering 5-Day Course

Upcoming locations include:

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

View 2010/2011 Systems Engineering Course Schedule

Requirements Analysis and Specification Writing 5-Day Course

Upcoming locations include:

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

View 2011 RA&SW Course Schedule

OCD & CONOPS in Capability Development 5-Day Course

Upcoming locations include:

- Adelaide, Australia
- Pretoria, South Africa
- Canberra, Australia
- Brasilia, Brazil

View 2011 OCD/CONOPS Course Schedule

Software Development Principles & Processes 5-Day Course

Upcoming locations include:

- Pretoria, South Africa
- Sydney, Australia

View 2011 Software Development Principles & Processes Course Schedule

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Cognitive Systems Engineering 5-Day Course

Upcoming locations include:

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

View 2010/2011 Cognitive Systems Engineering Course Schedule

Requirements Engineering 4-Day Course

Upcoming locations include:

- São José dos Campos, Brazil

View 2011 Requirements Engineering Course Schedule

Introduction to Software Development Principles & Processes 2-Day Seminar

Upcoming locations include:

- Melbourne, Australia
- Sydney, Australia

View 2011 Introduction to Software Development Principles & Processes Seminar Schedule

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Introduction to Cognitive Systems Engineering

Upcoming locations include:

- Melbourne, Australia

View 2011 Introduction to Cognitive Systems Engineering Seminar Schedule

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Introduction to Requirements Analysis 1-Day Seminar

Upcoming locations include:

- Wellington, New Zealand

View 2011 Introduction to Requirements Analysis Seminar Schedule

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Preparing Great Requirements Specifications 1-Day Seminar

Upcoming locations include:

- Wellington, New Zealand

View 2011 Preparing Great Requirements Specifications Seminar Schedule

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PPI Upcoming Participation in Professional Conferences

- SETE 2011 (Exhibiting)

Kind regards from the SyEN team:
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