

# Project Performance International

## Systems Engineering

### Newsletter (SyEN)

**SyEN #023 - August 25, 2010**

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## A Quotation to Open On

*"Engineering is the science of economy, of conserving the energy, kinetic and potential, provided and stored up by nature for*

*the use of man. It is the business of engineering to utilize this energy to the best advantage, so that there may be the least possible waste.*" - William A. Smith, 1908

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## Featured Article

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

Jo Ann Lane  
University of Southern California  
jolane@usc.edu

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.

#### SoS Characteristics and SoSE Challenges

"System of systems" is a term often used to describe a set of related net-centric, software-intensive systems that are used to provide capabilities that cannot be accomplished by any single system in the set. Each system that is part of an SoS is often referred to as a constituent system. In recent times, SoSs have become more complex and difficult to manage, due in part to the fact that SoS capabilities can conflict with single system requirements and plans and, for systems that belong to more than one SoS, present conflicts between the change requests from multiple SoSs. To better guide SoS evolution and performance enhancement, many organizations have established a system of systems engineering (SoSE) team.

To support the United States (US) Department of Defense (DoD) SoS, an initiative was established to analyze 18 SoSs and develop guidance to support SoSE. The results, published in the recent DoD guidebook, *Systems Engineering for Systems of Systems* [3] (hereinafter referred to as the SoSE guidebook), characterized SoSE using seven core elements: translating capability objectives into requirements; understanding SoS constituent systems and their relationships; assessing actual performance to capability objectives; developing, evolving, and maintaining an SoS architecture; monitoring and assessing constituent system changes; addressing new requirements and options; and orchestrating upgrades to SoS. This work along with the current SoSE challenges it identified has encouraged continuing research in the SoSE arena.

Much of the current SoS and SoSE research being conducted with respect to US DoD systems of systems uses Mark Maier's definition of SoSs [8] to characterize SoSs. According to his definition, an SoS is a set of systems that are integrated to perform one or more capabilities (or exhibit emergent behaviors) that are not otherwise achievable by any one of the single constituent systems. In addition, each constituent system is typically capable of operating on its own outside of the SoS (i.e., has its own purpose) as well as participating in multiple SoSs. And finally, these constituent systems are typically owned and managed by a variety of organizations. In the case of US DoD SoS, these organizations might be multiple government agencies or commercial entities providing custom systems or commercial products.

SoS researchers [3, 8] have found that there are several ways that an SoS can be managed and that these management approaches inform and guide the engineering activities that are performed at the SoS level. These management approaches can also be described in terms of increasing levels of authority and responsibility. The virtual SoS lacks a central management authority and a clear SoS purpose—an example of this is the Internet. In the collaborative SoS, constituent system engineering teams work together, but there is no overarching independent SoSE team to guide SoSE activities and resolve SoSE conflicts. The acknowledged SoS has recognized objectives, a designated manager, and resources at the SoS level (SoSE team), but not a lot of authority over the constituent systems. The directed SoS, which is not as common as a collaborative or acknowledged SoS, is centrally managed by a government, corporate, or Lead System Integrator team with relatively strong authority over the core constituent systems and built to fulfill specific purposes—an example of this is the US DoD Future Combat Systems. Most of the SoS/SoSE-related research is with respect to the acknowledged SoS since this is the first type of SoS in the ascending hierarchy of authority and responsibility where there is an identifiable team responsible for engineering activities at the SoS level. The majority of the SoS case studies in [3] are acknowledged SoSs.

#### SoS and SoSE Research Overview

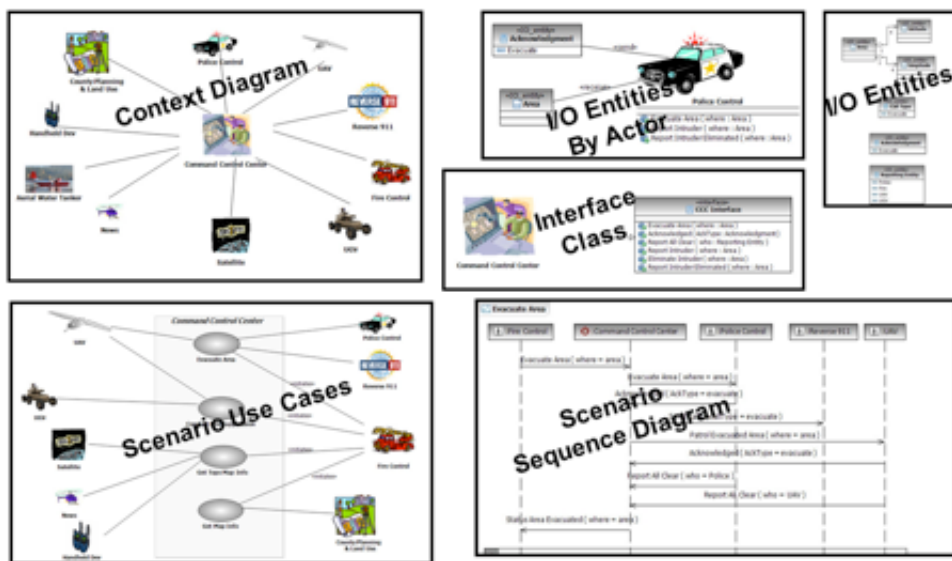
In recent years, considerable research has been done to better understand SoSs in general as well as to understand current SoSE practices and provide guidance to those responsible for SoSs and performing SoSE. The following sections briefly describe several of these research efforts and provide references for additional information.

**Modeling to Support SoSE**

Part of the research for the SoSE guidebook [3] probed the application of modeling and simulation (M&S) to support SoS systems engineering. Those SoSE teams that employed M&S used it to understand complex and emergent behaviors of systems that interact with each other, explore new capability options, identify potential integration issues, evaluate current SoS architecture and potential architecture changes, and support test and evaluation, especially end-to-end performance. However, use was limited mostly to those situations where there were existing models and simulations available and that these existing models and simulations were at an appropriate level of fidelity for the area of interest. Based upon the modeling needs identified by the SoSE guidebook case study teams, additional research identified SysML and UML modeling techniques that were being used to support several of the key SoSE core processes documented in the SoSE guidebook: understanding SoS constituent systems and their relationships; monitoring and assessing constituent system changes; developing, evolving, and maintaining an SoS architecture; and addressing new requirements and solution options. These modeling techniques include:

- Object classes to characterize each SoS constituent system and its capabilities
- Interface classes to describe each constituent system interfaces
- Input/output entity classes to describe the associated data attributes of each data item transferred over a given interface
- Use cases to characterize both constituent system and SoS capabilities from the different user perspectives
- Sequence diagrams to characterize and analyze the operational flow for an SoS capability
- Logical data models to provide details about available information within each constituent system.

Figure 1 provides example model views for an example SoS, the Regional Area Crisis Management SoS (RACRS). Additional details about these SoS modeling techniques can be found in [7].



**Figure 1.** Example SysML models to support SoSE activities.

**SoSE Application of Lean Principles**

By applying a lean enterprise lens to analyze the evolving field of SoSE, Lane and Valerdi [6] observed that many SoSE teams are developing processes that are consistent with many lean enterprise principles. The first lean indicators were identified through the analysis of 13 of the 18 SoS case studies documented in [3]. These indicators showed that the SoSE teams employ a holistic view of the SoS, focusing on long term goals; are guided by prioritized stakeholder capability needs; view themselves as continual learning organizations; establish an upgrade “battle rhythm” by making decisions slowly by consensus, considering all options, establishing a continuous process flow through concurrent engineering, “pulling” constituent system engineering information as needed, implementing rapidly, and leveling the workload by using constituent systems with available resources to implement needed new functionality; minimize waste by avoiding duplication of constituent systems engineering efforts and eliminating non-value adding engineering activities and documentation; and respecting and challenging the SoSE suppliers, i.e., the constituent system engineering teams. These SoSE processes are designed to efficiently evolve the group of systems to meet new needs using limited resources.

Further analysis, summarized in Figure 2, used Murman, et al.’s lean enterprise principles [9] and Nightingale’s lean enterprise

four grand questions [10]. Through this analysis, it became evident that SoSE teams are employing lean concepts whether or not they are aware of it. By making the SoSE teams more aware of the application of lean principles to SoSE, they have more confidence in the ways they have evolved single system engineering processes into SoSE processes as well as a vision to guide further optimization of their processes. This lean focus also guides how the SoSE team engages with the constituent systems engineering teams and works to meet both the needs of the constituent system stakeholders and the SoS stakeholders, one of the key challenges identified in [3].

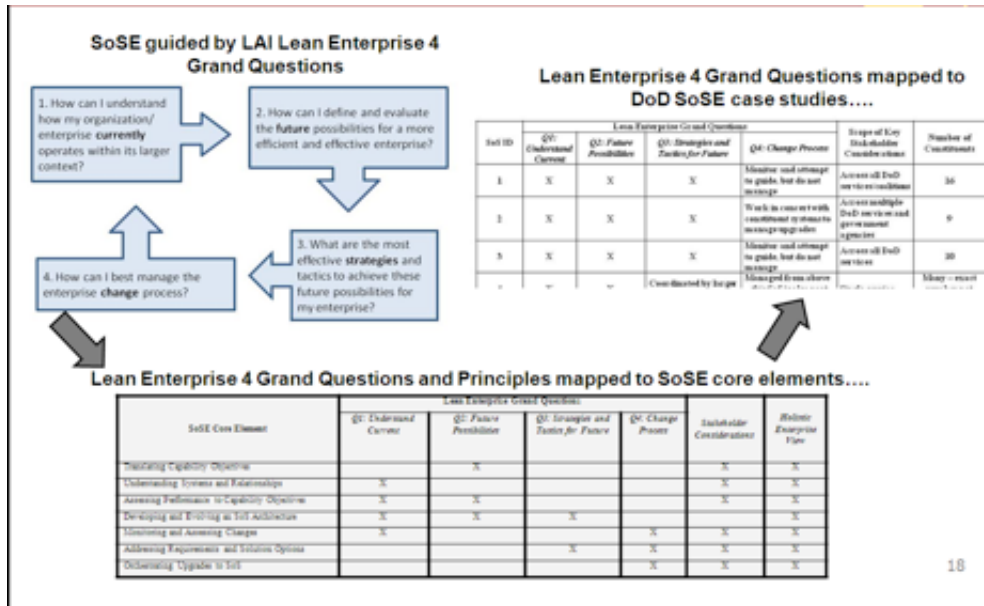


Figure 2. Overview of SoSE lean analysis.

### SoSE Cost Modeling and Estimation

The University of Southern California’s Center for System and Software Engineering has done considerable work in the areas of software development, systems engineering, and Commercial Off-the-Shelf (COTS) integration cost modeling. These parametric cost models focus on the engineering product, the processes used to develop the product, and the skills and experience levels of the technical staff responsible for the development of the product. The parametric cost models require a set (one or more) of size drivers to describe the size of the product to be developed. The size driver(s) are then used to compute a nominal effort (labor hours) for the project. In addition, there are a set of cost drivers to adjust the nominal effort either up or down, depending on the characteristics of the product to be developed, the processes used to develop the product, and the experience and capabilities of the people developing the product. Key to these cost models is determining through weighting factors how much influence each cost driver should have on the estimated effort. The computed adjustment factor, based on the cost drivers and associated weights, is called an Effort Multiplier (EM).

To develop an SoSE cost model, the cost modeling team attempted to build upon one or more of the existing cost models. The Constructive Systems Engineering Cost Model (COSYSMO) [11] was the selected cost model that most closely estimates the SE effort associated with SoS engineering activities. The nature of SoSs (as well as complex systems) is that they are often composed of many subsystems, some relatively simple and others rather complex. However, the initial version of COSYSMO only allowed the user to specify a single set of EMs for the whole system, with no ability to generate EMs for the various constituent systems comprising an SoS. Through analysis of the SoSE guidebook processes and case studies, extensions to COSYSMO were developed that allowed the user to characterize the SoS and its engineering team and processes as well as the constituent systems and their engineering teams and processes. In addition, factors were added to incorporate SoSE and constituent system activities not typically performed for a single system engineering effort. Finally, the various components are combined in a way that captures the diseconomy of scale that results as the engineering size drivers (e.g., number of requirements) grow. Figure 3 provides an overview of this model and additional details can be found in [5].

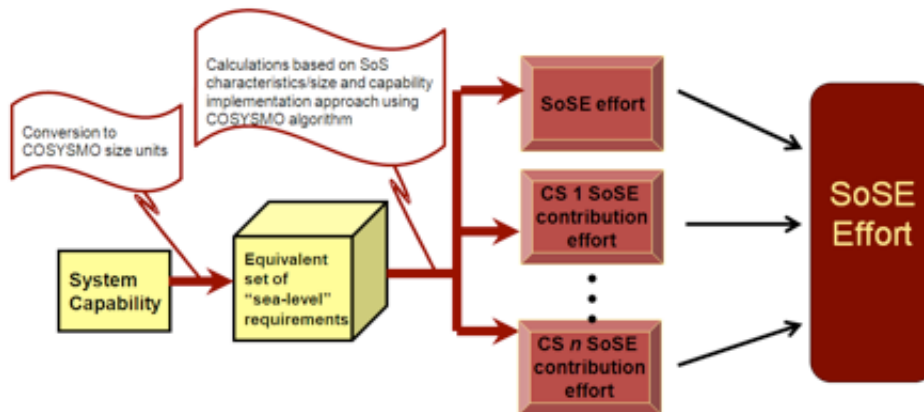


Figure 3. Overview of SoSE cost model.

### SoS Test and Evaluation (T&E) Approaches

Most system testing activities are performed at the single system level, evaluating single system functions and external interfaces. And upon successful test, the system is deployed, often leaving many of the SoS capabilities untested. Recent efforts [1,2] have focused on challenges associated with testing at the SoS level and have tried to capture SoS T&E heuristics from those organizations that are conducting testing at the SoS level.

DoD SoS testing experiences documented to date indicate that SoS-level testing typically builds upon constituent system level testing and is conducted either at a test range using actual systems/platforms or in an operational environment. In both cases, the constituent systems are often instrumented in order to capture performance information for test evaluation. SoS-level testing is typically a risk-based approach that prioritizes testing activities based on perceived risks with respect to the desired capabilities and potential emergent behaviors (both desired and undesirable). For software-intensive SoSs integrated via networks, testing also focuses on network performance and interoperability of the systems.

Because there are typically multiple constituent systems contributing to a new capability and constituent systems are fielded on their own upgrade cycles, new SoS capabilities are often deployed in a piecemeal manner over time. Therefore, SoS testing is viewed as a performance assessment of deployed capabilities over time that provides feedback to the constituent systems about detected problems to be addressed in a future upgrade cycle. The result is that the constituent systems must implement new SoS capability elements in a way that does not adversely affect current SoS operations yet can contribute to the new capability as soon as all of the necessary elements have been deployed. Likewise, the SoS must operate over this transition period, waiting for all of the capability elements to be delivered and if a problem is detected, must be able to disable the new capability (if necessary) until fixes can be provided on the next upgrade cycle.

Once all of the capability elements are in place, full capability testing can begin. While SoSE teams would prefer to test more rigorously at the SoS level before new capabilities are deployed, this continuous assessment approach allows the SoS to function while not holding up the deployment of single system upgrades required by the single-system stakeholders. Research continues in this area to find more effective ways to test at the SoS level.

### Conclusions

Current research is providing good insights into SoSE challenges and ways that various SoSE organizations are working to meet these challenges. This starts with capturing the essence of current SoSE processes, practices, and engineering artifacts, evaluating them with respect to lean principles, and showing how current processes are incorporating these lean principles. It also includes the evolution of single system tools and techniques (e.g., engineering modeling tools such as SysML and UML, cost estimation models, and test tools and techniques) to support SoSE needs.

Finally, the research activities to date have only scratched the surface. Projections [4] with respect to systems of the future show that SoS are going to continue to have a significant role and are a cost effective way to extend the life of existing systems while providing more complex capabilities to users and stakeholders. Research activities and workshops in collaboration with SoSE team members and SE organizations such as INCOSE continue to look for better ways to manage and evolve SoSs.

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### About Jo Ann Lane

Jo Ann Lane is a research assistant professor at the DoD-Stevens-USC Systems Engineering Research Center, conducting research in the area of systems engineering and system of systems engineering (SoSE). She was a co-author of the 2008 Department of Defense Systems Engineering Guide for Systems of Systems. Current areas of research include SoSE processes, SoSE cost modeling, SoSE test and evaluation, system development feasibility assessments, and innovation in systems engineering. Prior to her current work in academia, she was a key technical member of Science Applications International Corporation's Software and Systems Integration Group for over 20 years, responsible for the development and integration of software-intensive systems and systems of systems. She received her PhD in systems engineering from the University of Southern California and her Master's in computer science from San Diego State University.

## 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

Issue	Submission Date for General Articles	Theme	Theme Editor
4th Qtr 2010	15 Oct 2010	Systems Development from Deep Sea to Deep Space: Lessons from the Johns Hopkins Applied Physics Lab	Mike O'Driscoll and Sam Seymour
1st Qtr 2011	15 Feb 2011	Knowledge Management for Systems Engineering	Regina Griego
2nd Qtr 2011	15 May 2011	Systems of Systems and Self-Organizing Security**	Rick Dove, Ken Kepchar, Jennifer Bayuk
3rd Qtr 2011	17 Jul 2011**	2011 International Symposium Coverage: Denver, Co, USA	TBD
4th Qtr 2011	15 Oct 2011	AFIS 2010	Hervé Panetto
1st Qtr	15 Feb 2012	INCOSE Authors	Cecilia Haskins

2012	10 FEB 2012	INCOSE AWARDS	2009 AWARDS
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\*\*Submission deadline moves according to International Symposium date

[More information](#)

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## The 7 Deadly Sins of Lean Integration

Lean is a hot topic in IT circles these days. The primary trigger for increased attention was the global recession, but a more fundamental force at work is that IT as a practice area has matured to the point where it can truly leverage manufacturing techniques, which is where the lean management system was perfected. Furthermore, the increased complexity of IT systems and fragmentation of data is driving the need for effective integration techniques to new heights.

Lean is not rocket science. In fact, it is largely common sense -- which is the secret to its effectiveness. If you are trying to integrate systems across disparate functions and across organizations, you will have a hard time establishing and sustaining integrated solutions unless the underlying principles and methods are ones that everyone can easily understand and adopt.

While Lean is not difficult, it does require a paradigm shift; a different way of thinking and acting. To change behavior, you need to stop doing some things and start doing other things. Let's take a look at some of the practices which are in common use across organizations that are distinctly not lean. In other words, these are things you need to stop doing.....

[More information](#)

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## Darpa Wants To Break the System Design Mold

Believing programs are becoming too complex for available system-engineering tools, causing delays and cost overruns, the Pentagon's advanced research arm wants to follow the lead of the microchip industry and develop a new way to design and test systems. The Defense Advanced Research Projects Agency's (Darpa) Meta program goes even further by seeking to decouple development from production, to enable a "foundry-style" manufacturing model for complex defense systems similar to that in the integrated-circuit industry, where chips are no longer fabricated by their designers.

The program's mold-breaking goals are viewed skeptically by aerospace-industry veterans, who argue the problems lie not with the system-engineering tools, but how they are used. And even Darpa acknowledges its foundry model is anathema to an industry that develops products through multiple design-build-test-redesign iterations.

[More Information](#)

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## Julian M. Goldman, MD Is Awarded INCOSE's Pioneer Award for Using Systems Engineering Practices to Improve Patient Safety and Clinical Care

(Chicago 15July2010) – The International Council of Systems Engineering has awarded Julian M. Goldman, M.D. its prestigious Pioneer award for his role in practicing systems engineering in the field of medicine.

INCOSE honored Dr. Goldman for his total contribution to the field of medicine, where he is perhaps best known for founding the interdisciplinary MD PnP Interoperability Program, sometimes known as Medical Device Plug and Play, which involves medical device integration to improve patient safety and clinical care. The MD PnP development team was honored in 2007 with the CIMIT Edward M Kennedy award for Healthcare Innovation.

[More information](#)

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## INCOSE Webinars

The International Council on Systems Engineering offers this free monthly web-based service to the greater Systems Engineering community.

Once a month, recognized experts in the field will present the "State of the Art" in Systems Engineering. These presentations will be conducted live, via the internet. Each will last for one hour, including opportunity for discussion and questions.

[More information](#)

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## AIAA SPACE 2010 Conference Set for August 30 – September 2 in Anaheim

The American Institute of Aeronautics and Astronautics (AIAA) will hold the AIAA SPACE 2010 Conference & Exposition August 30 – September 2 at the Anaheim Convention Center and Hilton Anaheim, Anaheim, Calif., focusing on the theme: “Space: Imagine, Innovate, Collaborate.”

[More information](#)

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## The INCOSE International Symposium 2012 will take place in Rome

During the closing plenary of the European Systems Engineering Conference in 2010 (EUSEC 2010), the official announcement was made of the site chosen for the 2012 INCOSE International Symposium: Rome.

EUSEC 2012 will also coincide with INCOSE IS 2012. The organization of the event will largely be done by INCOSE International, but the members of the Region III chapters, in particular the Italian Chapter, will play an important supporting role.

[More information](#)

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## Inaugural Meeting for the SoSA (System of Systems Approach) Community Forum

Steve Hitchins, Niteworks

The U.K. MOD is pleased to announce the inaugural meeting for the SoSA (System of Systems Approach) Community Forum at the Defence Capability Centre, Defence Academy, Shrivenham on 7th September.

The SoSA Community Forum is being led by the Systems Engineering & Integration Group (SEIG) at Defence Equipment & Support (DE&S). Niteworks will facilitate Community Forum meetings and provide secretarial support.

The meeting will be chaired by Mr Steve Hyde, Head of SEIG, and addressed by Mr Howard Mathers, Head of Engineering & Safety at DE&S. This will be the first of a series of quarterly meetings where the U.K. MOD will engage with industry to brief on the development of the System of Systems Approach and solicit industry feedback and involvement.

The aim of SoSA is to deliver enhanced capability through achieving commonality, re-use and interoperability of independently procured systems.

For further information and a registration form please email [steve.hitchins@niteworks.net](mailto:steve.hitchins@niteworks.net). Please note spaces are limited and attendees must register in advance. This event is open to organisations that are not members of Niteworks so you are advised to book your place early.

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## INCOSE Members Take Note of New Wiley Library

Wiley Online Library was launched over the weekend of 7-8 August 2010. Wiley InterScience will no longer be available after Saturday 7 August at 4 am Eastern Daylight Time (9 am British Summer Time, 4 pm Singapore Standard Time).

There are revised General Registration letters posted on the [Connect homepage](#) that all new INCOSE members must use in order to gain full text access to their society journal subscription.

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## Systems Thinking Schools of Thought and Research

### Background:

This introductory list of Systems Thinking Schools of Thought and Research has been assembled to commence with the launch of the Global Association for Systems Thinking website. The first six schools of thought (below) were those used as foundational research at the 2010 International Society for the Systems Sciences (ISSS) Conference, held in Waterloo, Canada.

### Schools of Thought:

1. Cybernetics

2. General Systems Theory
3. Complexity and Complex Adaptive Systems
4. Systems Dynamics
5. Viable Systems Model
6. Soft/Hard Systems Thinking

[More information](#)

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## Featured Societies

### Global Association for Systems Thinking

The Global Association for Systems Thinking claims to be the only premier Alliance and Clearinghouse in the world for Systems Thinking.

The Association wants you to join:

- If you want to make a difference in your life, team, organization, community, society or world.
- If your belief is that Systems Thinking is a better way for individuals and society to Think—Plan—Act and achieves better and more sustainable results.
- If you think that “Living Systems Thinking” is about the nature of human beings on this planet.
- If your belief is that Systems Thinking is not well understood or utilized to solve chronic societal and organizational problems.
- If you believe in “abundance” and the spirit of collaboration as a better way to live.
- If you believe that there is no central, powerful and leverageable Alliance and Clearinghouse for all the various Systems Thinkers in this world to truly make a significant difference today.

The Association claims to be the collective Leaders of the only Premier Alliance and Clearinghouse in the world, who spread the concepts, understanding, and applications of Living Systems Thinking.

Making a difference in the world is not a win-lose analytical, mechanistic approach but a holistic, integrated, synergistic approach. The Association wants to be “Your Tour Guide to the Universe of Living Systems Thinking.”

[More information](#)

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## INCOSE Technical Operations

### Tool Integration and Interoperability Working Group

<http://www.incose.org/practice/techactivities/wg/tii/>

#### Charter

The TIIWG Charter is to:

- Foster improved productivity and quality of systems engineering through integrated tools and environments;
- Provide best practices and guidelines for developing an integrated systems engineering environment;
- Promote the development, validation and deployment of standards that advance the interoperability of engineering toolsets.

#### Leadership

Chair: John Nallon

Contact [John.Nallon@incose.org](mailto:John.Nallon@incose.org) for additional information or to join this group.

## Published Products

- ISEE Concepts of Operation (ConOps)
- Integrated System Engineering Environment (ISEE)

## Planned Work

- List of tool bridges, interfaces, environments for Tool DB
- AP233 Plugfest for Vendors
- Update ISEE CONOPS

## Joint Activities & Products

- With MDSD - AP233 compliance for Tools DB
- With MBSE - Model Transformation

## Presentations

 [2008 International Workshop Tool Integration and Interoperability WG Summary Presentation](#) (Size: 200K)

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# Systems Engineering Software Tools News

## MDG Technology for SysML Released by Sparx Systems

Sparx Systems ([www.sparxsystems.com](http://www.sparxsystems.com)), claiming to be a leading developer of UML modeling tools, announced the release of Model-Driven Generation (MDG) Technology for Systems Modeling Language (SysML). This new offering enables users of Sparx Systems' award-winning modeling tool – [Enterprise Architect](#) – to model complex systems using the Systems Modeling Language (SysML) Version 1.0.

[More information](#)

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## Siemens PLM Connection Users Conference and Analyst Day

At the recent Siemens PLM Connection Users Conference and Analyst Day, Siemens presented a look at new markets for PLM, future directions for the company in R&D, innovation, and new technologies, and the realization of the company's end-to-end virtual lifecycle, from concept and design to factory floor operations. Siemens Industrial Automation (IA), Siemens PLM's parent division, is integrating and expanding its product design (CAx), collaborative product data management (cPDM), and digital manufacturing (DM) software offerings with its plant lifecycle engineering (COMOS), and manufacturing operations execution (SIMATIC IT) software. Siemens IA's solution set now ranges from product design through manufacturing, to operations on both the plant and factory floor.

[More information](#)

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# Systems Engineering Books, Reports, Articles and Papers

## The Systems Thinking Playbook: Exercises to Stretch and Build Learning and Systems Thinking Capabilities



By Linda Booth Sweeney and Dennis Meadows  
Publisher: Chelsea Green Publishing; Har/DVD edition (April 30, 2010)  
ISBN-10: 1603582584  
ISBN-13: 978-1603582582

#### **Product Description:**

This book has become a favorite of K-12 teachers, university faculty, and corporate consultants. It provides short gaming exercises that illustrate the subtleties of systems thinking. The companion DVD shows the authors introducing and running each of the thirty games.

The thirty games are classified by these areas of learning: Systems Thinking, Mental Models, Team Learning, Shared Vision, and Personal Mastery. Each description clearly explains when, how, and why the game is useful. There are explicit instructions for debriefing each exercise as well as a list of all required materials. A summary matrix has been added for a quick glance at all thirty games. When you are in a hurry to find just the right initiative for some part of your course, the matrix will help you find it.

Linda Booth Sweeney and Dennis Meadows both have many years of experience in teaching complex concepts. This book reflects their insights. Every game works well and provokes a deep variety of new insights about paradigms, system boundaries, causal-loop diagrams, reference modes, and leverage points. Each of the thirty exercises here was tested and refined many times until it became a reliable source of learning. Some of the games are adapted from classics of the outdoor education field. Others are completely new. But all of them complement readings and lectures to help participants understand intuitively the principles of systems thinking.

[More Information](#)

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## **Challenges in Combining SysML and MARTE for Model-Based Design of Embedded Systems**

#### **Abstract**

Using model-based approaches for designing embedded systems helps abstract away unnecessary details in a manner that increases the potential for easy validation and verification, and facilitates reuse and evolution. A common practice is to use UML as the base language, possibly specialized by the so-called profiles. Despite the ever increasing number of profiles being built in many domains, there is still insufficient focus on discussing the issue of combining multiple profiles. Indeed, a single profile may not be adequate to cover all aspects required in the multidisciplinary domain of embedded systems. In this paper, we assess possible strategies for combining the SysML and MARTE profiles in a common modelling framework, while avoiding specification conflicts. We show that, despite some semantic and syntactical overlapping, the two are highly complementary for specifying embedded systems at different abstraction levels. We conclude, however, that a convergence agenda is highly desirable to align some key language features.

[More information](#)

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## **Satisfying Demand for Systems Engineers**

The infusion of software and embedded technology into manufacturing product systems and systems components has led to an increased demand for professionals in the field of systems engineering. To help satisfy that demand, IBM forged a partnership with the University of Central Florida's Institute for Advanced Systems Engineering to help prepare students for jobs in the systems engineering profession. Manufacturing Business Technology recently sat down with Mark Lefebvre, Director, IBM's Rational Systems Marketing, to discuss the field of systems engineering, what makes it an attractive career option, the driving forces behind its growth and development, and IBM's partnership with UCF.

[More information](#)

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## The Competencies of a Business Analyst

Competencies are described as the ability to do a particular activity to prescribed standard.

The competencies can be classified into three categories

- Behaviour Skill and Personal Qualities
- Business Knowledge
- Techniques

[More information](#)

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## Model-Driven Engineering Allows New Design Methods to Improve an Existing Aircraft System

There are times in the advancement of military technology when progress unexpectedly hits a bump in the tarmac to give new life to the old. Such is the case of a 25-year-old surveillance aircraft that was supposed to be replaced with an advanced design. But the new design was cancelled, and potential enhancements to the old plane are now being demonstrated using a process called model-driven engineering.

[More information](#)

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## Conferences and Meetings

### INCOSE San Francisco Bay Area Chapter Systems Engineering Certification Class

August 28-29, 2010, Santa Clara, CA, USA

[More information](#)

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### Foundations of Interface Technologies (FIT 2010) **NEW**

August 30th 2010, Paris, France

[More information](#)

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

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

[More information](#)

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### IIBA® Webinar Series **NEW**

You are invited to the next presentations in the IIBA Webinar Series:

#### Being a BA Series -- Technical Excellence

Tuesday, August 31, 2010 at 12 p.m. to 1p.m. EDT (UTC/GMT -4 hours)

Presented by Tom Karasmanis

Tom is the Chief Architect of IIBA, and a very experienced BA. Over the last 25 years he has worked at all organizational levels and in various roles including project business analysis, strategic work, managing teams of BAs and more.

This webinar is open to IIBA members. [Register now](#).

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*Please note: The webinars are limited to 1000 participants, and only the first 1000 people who have logged in at the time the presentation begins will have access to the live webinar. If you receive an error message when you log in, that means 1000 people have already logged in and the session is full. If you cannot access the webinar and you are an IIBA member, you can listen to the archived event which will be available on the IIBA website.*

*These and all previous presentations will be archived on our website after the live viewing date. They will also include audio, plus an email address to direct questions to. Please [visit](#) the Public or Members-only Archived Webinars pages.*

*For more information on our Webinar Series including a list of upcoming topics, please visit the IIBA [website](#).*

*Questions? Please contact Tracy Cook at [webinar@theiiba.org](mailto:webinar@theiiba.org)*

[More information](#)

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

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

[More information](#)

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## **European Systems & Software Process Improvement and Innovation**

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

[More information](#)

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

September 05-09, 2011, Lisbon, Portugal.

[More information](#)

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## **Summer School 2010: Verification Technology, Systems & Applications**

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

[More information](#)

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## **3rd Workshop on Autonomic and SELF-adaptive Systems**

September 8, 2010, Valencia, Spain

[More information](#)

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

September 13, 2010, Hoboken, New Jersey – USA

[More information](#)

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## **2010 Annual ITEA Symposium**

September 13 - 16, 2010, Renaissance Glendale Hotel & Spa, Glendale, AZ, USA

[More information](#)

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## **Modeling Business Information Systems (MoBIS 2010)**

September 15-17, 2010, Dresden, Germany

[More information](#)

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

September 15 - 18, 2010, Williamsburg, Virginia, USA at the College of William & Mary, Computer Science Department,  
[More information](#)

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

Co-located with the International Scientific Colloquium (IWK2010)  
September 16, 2010, Ilmenau, Germany  
[More information](#)

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

September 20-21, 2010, Antwerp, Belgium  
[More information](#)

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## **3rd International PERADA-ASSYST Summer School on Adaptive Socio-Technical Pervasive Systems**

Sept. 20-27 2010, Europa Conference Center, Budapest, Hungary  
[More information](#)

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

September 21, 2010, Singapore  
[More information](#)

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

21-24 September 2010, Singapore  
[More information](#)

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## **EPEW 2010: 7th European Performance Engineering Workshop**

University Residential Center of Bertinoro, Italy  
23-24 September 2010  
[More information](#)

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## **Challenges of Systems Engineering - International Workshop (RuSEC2010)**

September 23-24, 2010, Moscow, Russia  
[More information](#)

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

September 26-29, 2010, São Carlos - São Paulo - Brazil  
[More information](#)

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## **1st Brazilian Workshop on Model-Driven Development**

September 27, 2010, Salvador, Bahia, Brazil  
[More information](#)

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

September 27-October 1, 2010, Budapest, Hungary

[More information](#)

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

Located at SASO 2010

September 27th, 2010, Budapest, Hungary

[More information](#)

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## **Doctoral Symposium @ RE2010**

September 27, 2010, Sydney, Australia

[More information](#)

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

September 27, 2010, Sydney, Australia

[More information](#)

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## **54th Annual Meeting of the Human Factors and Ergonomics Society**

September 27-October 1, 2010, San Francisco

[More information](#)

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## **The 18th International Requirements Engineering Conference (RE 2010)**

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

[More information](#)

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

September 27-October 1, 2010, Budapest, Hungary

[More information](#)

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

September 27 – October 2, Leipzig, Germany

[More information](#)

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## **Fifth International Conference on Graph Transformation**

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

[More information](#)

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

In conjunction with the 18th IEEE International Requirements Engineering Conference

September 28, 2010, Sydney, Australia

[More information](#)

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## **RELAW'10 Third International Workshop on Requirements Engineering and Law**

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

[More information](#)

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## **REV'10 Fifth International Workshop on Requirements Engineering Visualization**

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

[More information](#)

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

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

[More information](#)

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## **4th International Workshop on Graph Based Tools**

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

[More information](#)

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## **Second Annual Medical Device Connectivity Conference & Exhibition**

September 28-29, 2010, Hyatt Regency Mission Bay, San Diego, CA  
INCOSE is a supporting organization of this conference. Our members will receive a \$100 discount on registrations. Click on this link for additional information:

[More information](#)

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## **PDMC 2010**

### **9th International Workshop on Parallel and Distributed Methods in verifiCation**

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

Co-locating with  
5th International Conference on Graph Transformation (ICGT 2010) , 29 September - 1 October, 2010  
17th Annual workshop on Software Model Checking (SPIN 2010), 27 September - 29 September, 2010

[More information](#)

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## **First Workshop on Model Driven Interoperability (MDI'2010)**

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

[More information](#)

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

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

[More information](#)

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## **5th International Workshop models@run.time**

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

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## **Workshop on OCL and Textual Modelling**

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

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## **4th International Workshop on Multi-Paradigm Modeling - MPM'10**

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

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

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

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

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

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## **2010 isee User Conference**

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

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## **IFM 2010: Integrated Formal Methods 8th International Conference**

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

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## **INCOSE LA Mini-Conference 2010**

October 16, 2010, Loyola Marymount University, Los Angeles, USA  
[More information](#)

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

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

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

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

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**International Conference on Lean Enterprise and Systems (LESS 2010)** 

October 17 – 20, 2010, Helsinki, Finland

[More information](#)

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

October 17-21, 2010, Alexandria, VA, USA

[More information](#)

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**Business Analysis Forum** 

October 17-22, Hilton Alexandria Mark Center, Alexandria, VA, USA

[More information](#)

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**SPLASH 2010 Workshop on Flexible Modeling Tools** 

October 18, 2010, Reno Nevada, USA

[More information](#)

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**Dynamic Languages Symposium 2010**

Co-located with SPLASH 2010

In cooperation with ACM SIGPLAN (PENDING)

October 18, 2010, Reno, Nevada, USA

[More information](#)

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**SEArI Research Summit 2010**

October 19, 2010, MIT Media Lab, Cambridge, MA, United States of America

[More information](#)

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**FMCAD 2010 - Formal Methods in Computer Aided Design**

October 20 – 23, 2010, Lugano, Switzerland

[More information](#)

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**MIT Systems Thinking Conference**

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

[More information](#)

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**NDIA 13th Annual Systems Engineering Conference**

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

[More information](#)

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**Requirements Days 2010**

October 26 – 28, 2010, München, Germany

[More information](#)

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**2010 Huntsville Simulation Conference (HSC2010)** 

October 26-28, 2010, Huntsville Marriott, Huntsville, Alabama, USA

[More information](#)

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

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

[More information](#)

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**Complex Systems Design & Management 2010**

October 27-29, 2010, Paris, France

[More Information](#)

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

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

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

[More information](#)

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**29th International Conference on Conceptual Modeling**

1-4 November 2010, Vancouver, BC, Canada

[More information](#)

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

(Held in conjunction with ER 2010)

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

[More information](#)

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**25th International Forum on COCOMO and Systems/Software Cost Modeling** 

November 2-5, 2010, University of Southern California, Los Angeles, CA, USA

[More information](#)

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

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

[More information](#)

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**No Magic World Conference**

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

[More information](#)

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**Annual Systems Engineering Conference 2010 (ASEC10)**

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

[More information](#)

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## **SEPG Latin America 2010**

November 10-12, 2010, Medellín, Colombia

[More information](#)

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

November 11 - 13, 2010, Arlington, VA

[More information](#)

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## **5th Trends in Enterprise Architecture Research (TEAR2010) workshop**

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

[More information](#)

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## **CMMI 10th Annual Technology Conference and User Group**

November 15-18, 2010

Hyatt Regency Tech Center – Denver, Colorado, USA

[More information](#)

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

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

November 16th, 2010, Shanghai, China

[More information](#)

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

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

[More information](#)

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

November 26 - 28, 2010, Kuala Lumpur, Malaysia

[More information](#)

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

December 7-9, 2010, Paris, France

[More information](#)

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## **National Institute of Technology – National Systems Conference 2010**

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

[More information](#)

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## **ICISE 2010: International Conference on Intelligent Systems Engineering**

December 18, 2010, Bangkok, Thailand

[More information](#)

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

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

[More information](#)

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## **Second International Conference on Exploring Services Sciences (IESS 1.1) NEW**

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

[More information](#)

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

March 14-16, 2011 Karlsruhe, Germany

[More information](#)

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## **Design, Automation & Test in Europe**

March 14-18, 2011, Grenoble, France

[More information](#)

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## **26th Symposium On Applied Computing**

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

[More information](#)

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## **Requirements Engineering Track – 4th Edition NEW**

part of the 26th ACM Symposium on Applied Computing

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

[More information](#)

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## **IWEI 2011 - The International Working Conference on Enterprise Interoperability**

March 22-24, 2011, Stockholm, Sweden

[More information](#)

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## **IEEE International Systems Conference NEW**

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

[More information](#)

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

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

[More information](#)

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## **Education & Academia**

### **Ackoff Collaboratory for Advancement of the Systems Approach (ACASA)**

ACASA is dedicated to education, research and service to industry, government and education, using systems sciences and systems thinking and global knowledge and competency resources.

Under the auspices of ACASA faculty from Engineering, Wharton, Medicine and other schools at the University of Pennsylvania, U.S.A. work on multi-disciplinary research topics. "The intention is for ACASA to develop innovative ideas in systems approaches that will enable the Center to evolve into a world class institution with contributions to solving intractable problems, wherever they exist," says Eduardo Glandt, Dean of the School of Engineering and Applied Science. ACASA will extend its offerings beyond the walls of Penn through the application of information technology and the Internet and plans a competency bank of knowledge for all Systems Thinking-related academic activities, research and practices that are scattered around the world.

The corporate membership program will allow for close liaison with leading edge companies for industry-sponsored research and short-term Fellows from industry to work on intellectually challenging projects with standing faculty and students. Further, ACASA will provide opportunities for student internships to further enhance the educational mission of the University.

[More information](#)

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## S&T Ph.D. Student Receives INCOSE Doctoral Award

Jason Dauby, a subject matter expert with the Naval Surface Warfare Center, Crane Division from Crane, Indiana, U.S.A., has received the 2010 INCOSE/Stevens Doctoral Award from the International Council on Systems Engineering. Dauby was honored for his research in systems engineering and integration. The award was presented earlier this month at the annual INCOSE International Symposium in Chicago.

Dauby's research, conducted as part of his Ph.D. program at Missouri University of Science and Technology, focused on the development and use of the Canonical Decomposition Fuzzy Comparative (CDFC) approach as a stable, repeatable and analytically rigorous architecture assessment method. It provides a more realistic and objective assessment of physical system architectures.

[More information](#)

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## Khalifa University Expands Senior Faculty Team

Khalifa University of Science, Technology and Research (KUSTAR), United Arab Emirates (UAE) announced that Prof. Chelsea White has joined its team as the Department Chair, Industrial Systems Engineering and Director of the Logistics Institute.

In his new role, Prof. White will help establish the curriculum for KUSTAR's Systems Engineering program and recruit systems engineering faculty members. He will also be providing leadership for the Logistics Institute, as well as support in the enrollment of personnel. He will be based at the University's Abu Dhabi campus.

[More information](#)

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## U.Va. Master's Program for Systems Engineers Helps Companies Streamline

Students in the University of Virginia's Accelerated Master's Program in Systems Engineering take on challenging "systems" problems – researching, for example, how to more effectively deliver time-critical blood platelets to patients, or analyzing hazardous materials transportation procedures for the U.S. Transportation Security Administration.

These applied research projects are the culmination of the program's curriculum, which is designed to strengthen practicing engineers' analytical and problem-solving skills. The projects also significantly benefit the organizations that engage the students in the projects.

[More information](#)

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## Some Systems Engineering-Relevant Websites

<http://www.globalast.org>

The Global Association for Systems Thinking claims to be the only premier Alliance and Clearinghouse in the world for Systems Thinking.

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## Standards and Guides

### Tutorial: Architectural Rendering with ISO/IEC 42010

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

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

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

[More information](#)

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### New ISO standard will help space projects learn from experience

A new ISO standard will help space systems manufacturers and operators to improve the quality of products and to work more efficiently by distilling principles and guidelines based on experience acquired in previous space projects.

Nick Tongson, secretary of the group that developed ISO 16192:2010, comments: "The increasingly global nature of the aerospace industry has increased the demand for International Standards which facilitate co-production efforts, reduce costs and eliminate trade barriers. ISO 16192:2010 will help the sector to achieve these objectives as well as to improve quality."

An efficient method of processing lessons learned is essential for ongoing efficiency and quality improvement inside any organization, as well as for successful project management.

With these aims, the use of ISO 16192:2010, Space systems – Experience gained in space projects (Lessons learned) – Principles and guidelines, will help to:

- Decrease errors (in terms of both quantity and gravity)
- Improve working methods
- Decrease risk of nonconformity to specified objectives (management, technical, quality, costs and schedules).

[More information](#)

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### OMG Announces New Processes Open for Participation

OMG(TM) members met in Minneapolis, MN the week of June 21-25, 2010. At this meeting members began work on five new standards processes. These processes are now open for comment and participation. The processes include:

- UML® Profile for BPMN(TM) Processes RFP
- Robotics Interaction Service (RoIS) Framework RFP
- Dynamic Deployment and Configuration for Robot Technology Components RFP
- Application Programming Interfaces for Knowledge Base(s) RFP
- SysML(TM)-Modelica RFC

[More information](#)

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## Some Definitions to Close On



## Interface

### Noun:

Interface: A surface forming a common boundary between adjacent regions, bodies, substances, or phases.

Source: *The American Heritage® Dictionary of the English Language, Fourth Edition*

Interface: A point at which independent systems or diverse groups interact.

Source: *The American Heritage® Dictionary of the English Language, Fourth Edition*

Interface: A point at which independent systems or diverse groups interact.

Source: *Random House Dictionary, Inc. 2010*

Interface: A boundary across which two independent systems meet and act on or communicate with each other.

Source: <http://www.webopedia.com>

Interface: A hardware or software component that connects two or more other components for the purpose of passing information from one to the other.

Source: *ISO/IEC 24765:2008 Systems and software engineering vocabulary, 2008*

Interface: The functional and physical characteristics required to exist at a common boundary or connection between persons, between systems, or between persons and systems.

Source: *DAU Glossary: Defense Acquisition Acronyms and Terms, 2009*

Ed. note: This would seem to be a definition of interface requirements, not a definition of an interface.

### Verb:

Interface: To join by means of an interface.

Source: *The American Heritage® Dictionary of the English Language, Fourth Edition*

Interface: To serve as an interface for.

Source: *The American Heritage® Dictionary of the English Language, Fourth Edition*

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## Project Performance International News

### PPI at SPOLM

PPI recently sponsored SPOLM 2010 (Symposium of Operational Research and Logistics of the Brazilian Navy) an event organised by CASNAV and held at the base of Sugarloaf Mountain, in one of most beautiful cities of the world - Rio de Janeiro. The event was well supported with over 800 participants in attendance from academia and industry, from many regions within Brazil. Mr Joshua Freeman, General Manager - Corporate, was fortunate enough to be invited into a VIP luncheon which was a fantastic opportunity to discuss Brazilian operations in a formal environment.

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### New Seminars/Courses – New Webpages

PPI has recently released the following new course web pages:

Introduction to Requirements Analysis 1-Day Seminar: <http://www.ppi-int.com/training/ra1d.php>

Preparing Great Requirements Specifications 1-Day Seminar: <http://www.ppi-int.com/training/sw1d.php>

Integrated Product Teams 2-Day Course: <http://www.ppi-int.com/training/ipt-2day.php>

Other seminars and courses coming soon:

- Introduction to Cognitive Systems Engineering 1-Day Seminar
- Managing Technical Projects 2-Day Course

- Engineering & Scientific Presentations in English for Speakers of Asian Languages 2-Day Course
- IT Project Management Principles & Processes 3-Day Course

If any of these are of interest please [contact us](#).

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## iMP Obtains Apple Certifications

iMobile Productivity (iMP) recently became certified as both an Apple Certified Support Professional and an Apple Certified Technical Coordinator. iMobile is a business unit of PPI providing consulting services in mobile technology integration - specifically iPad and iPhone.

<http://www.ppi-int.com/imobile-productivity.php>

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## SEG Defined Terms Tops 4000

PPI's SEG (Systems Engineering Goldmine), a free online resource with a wealth of Systems Engineering related information, now contains over 4,000 defined terms!

Sign up to SEG today, it's FREE!

<http://segoldmine.ppi-int.com/>

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## PPI in South Africa

PPI also recently sponsored the INCOSE South African Annual Conference, in Pretoria, South Africa. The event attracted some great speakers and had in excess of 115 delegates from a range of industries. Worthy of a special mention, was the fantastic networking function, hosted by Roger Young, INCOSE South Africa President and René Oosthuizen, INCOSE South Africa President-Elect, and their team showcasing some particularly some great local South African wines!

For further information in relation to INCOSE South Africa, please visit their recently refurbished website at: <http://www.incose.org.za/>

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## Systems Engineering in Kazakhstan and Kyrgyzstan?

Always looking to the future, PPI founder and Managing Director Robert Halligan visited Almaty in Kazakhstan and Bishkek in Kyrgyzstan during July 2010. Whilst concluding that an Almaty Chapter of the International Council on Systems Engineering or the International Institute of Business Analysis is some way off, Robert was impressed with the industry, large trade surplus and sophistication of Kazakhstan, and the longer term opportunities that he predicts will arise in Kyrgyzstan. Kazakhstan and Kyrgyzstan are former parts of the USSR, now independent countries finding their own way in the world. Both are in central Asia, roughly south of Russia, East of Turkey, north of Afghanistan, and west of China.

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# Project Performance International Events

## Systems Engineering 5-Day Course

Upcoming locations include:

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

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

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## Requirements Analysis and Specification Writing 5-Day Course

Upcoming locations include:

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

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

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## OCD & CONOPS in Capability Development 5-Day Course

Upcoming locations include:

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

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

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## Software Development Principles & Processes 5-Day Course

Upcoming locations include:

- Sydney, Australia

[View 2011 Software Development Principles & Processes Course Schedule](#)

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## Cognitive Systems Engineering 5-Day Course

Upcoming locations include:

- Adelaide, Australia

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

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## Requirements Engineering 4-Day Course

Upcoming locations include:

- São José dos Campos, Brazil

[View 2011 Requirements Engineering Course Schedule](#)

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## IT Project Management Principles & Processes 3-Day Course

Upcoming locations include:

- Melbourne, Australia

[View 2010 IT Project Management Principles & Processes Course Schedule](#)

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## Introduction to Software Development Principles & Processes 2-Day Course

Upcoming locations include:

- Melbourne, Australia
- Sydney, Australia

[View 2011 Introduction to Software Development Principles & Processes Course Schedule](#)

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## Introduction to Requirements Analysis 1-Day Seminar

Upcoming locations include:

- Brisbane, Australia
- Melbourne, Australia
- Sydney, Australia
- 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:

- Brisbane, Australia
- Melbourne, Australia
- Sydney, Australia
- Wellington, New Zealand

[View 2011 Preparing Great Requirements Specifications Seminar Schedule](#)

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## PPI Upcoming Participation in Professional Conferences

- September 23-24, 2010 - **RuSEC 2010** - Moscow, Russia (Exhibiting)
  - September 28 - October 1, 2010 - **XI SIGE** - São José dos Campos, Brazil (Sponsor/Exhibiting)
  - October 4 - 6, 2010 - **APCOSE 2010** - Keelung, Taiwan (Exhibiting)
  - October 25 - 28, 2010 - **NDIA SE Conference** - San Diego, CA, USA (Exhibiting)
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