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SYSTEMS ENGINEERING NEWSLETTER

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WHAT'S INSIDE:

A Quotation to Open On

[Read More...](#)

Feature Article: Capers Jones - Software Requirements and the Ethics of Software Engineering

[Read More...](#)

Systems Engineering News

- Systems Engineering Effectiveness Study
- Draft of the Guide to the Systems Engineering Body of Knowledge (SEBoK version 0.5) Released in a Wiki Format

- The Genius of Apple's Long Term Thinking
- Leveraging the INCOSE Systems Engineering Professional (SEP) Program at Jacobs Engineering Group Inc.
- Cognitive Systems Design • Improving Systems and Software Engineering Conference 2011 - Conference Report
- Systems Thinking Workshop in Seattle, Washington, USA, with Colleen Ponto, Nalani Linder, and Steve Byers
- Systems Thinking Conference Highlights Practical Applications in Healthcare, Education, and Product Development
- Sikorsky Aircraft's CH-53K Helicopter Systems Engineering Team Receives the U.S. Department of Defense Systems Engineering Top 5 Programs Award.
- Systems Engineering for Defense Symposium, 15-16 February 2012, Defense Academy of the United Kingdom, Shrivenham
- The Seventh International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering (CISSE 2011)
- Vale Bill Schoening

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[Read More...](#)

INCOSE Technical Operations: Affordability Working Group

[Read More...](#)

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- Cradle® October 2011 Newsletter
- Coast Guard Helped by Computer Modeling System
- Visure Solutions Extends Strategic Partnership with LDRA
- French Model Specialist Modelio Goes Open Source

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- Postdoctoral Position in Model-based Testing at the Computer Research Institute of Montreal
- Assistant Professor Position in Modeling and Analysis of Concurrent Systems at IMT Lucca
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- ISO/IEC/IEEE 42010 Approved

[Read More...](#)

A Definition to Close on – Leadership and Management

[Read More...](#)

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- Robert Halligan to Speak for INCOSE NL
- Certification Training International CSEP Preparation Course Success
- Vacancy at PPI

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PPI Events

[Read More...](#)

A Quotation to Open On

“You can observe a lot by watching.” – Yogi Berra

Feature Article

Software Requirements and the Ethics of Software Engineering

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Abstract

Software requirements are a weak link in the chain of software engineering technologies. Requirements are usually incomplete and change at rates in excess of 2% per calendar month. For many years one common definition of quality has been “conformance to requirements.” However this definition ignores the fact that some requirements are hazardous or “toxic” and should not be included in software applications. Since clients themselves may not realize the dangers of toxic requirements, software engineers have a professional and ethical responsibility to point out the hazards of dangerous requirements and ensure that they are safely eliminated. An example of a “toxic requirement” is the famous Y2K problem which did not originate as a coding bug but rather as an explicit but dangerous user requirement.

INTRODUCTION

There are a number of “standard” definitions for software quality which have not been rigorously examined for flaws and problems. One of the oldest of these quality definitions is:

“Quality means conformance to requirements.”

There are several problems with this definition, but the major problem is that requirements errors or bugs are numerous and severe. Errors in requirements constitute about 20% of total software defects.

Defining quality as conformance to a major source of error is circular reasoning and therefore this must be considered to be a flawed and unworkable definition. Obviously a workable definition for quality has to include errors in requirements themselves.

One definition of quality which can be applied to requirements is:

“The absence of defects that would cause an application to either stop completely or produce incorrect results.”

This definition would include requirements defects such as the former Y2K bug. Don't forget that the famous Y2K problem originated as a specific user requirement and not as a coding bug. Many software engineers warned clients and managers that limiting date fields to two digits would cause problems, but their warnings were ignored or rejected outright.

Another chronic problem with requirements is “requirements creep” or continued growth after the requirements phase. This is not unexpected because the business world is never static so changes will certainly occur.

However the software industry often is not prepared for the magnitude of changing requirements. The measured rates of change for requirements run from less than 1% per calendar month to more than 4% per calendar month.

For a large application that starts at a nominal 10,000 function points and might have a 36 month development cycle, it is easily possible for another 3,000 function points to be added in mid development, and these will probably add at least six months to the development schedule.

If software engineering is going to become a true profession rather than an art form, software engineers have a responsibility to help customers define requirements in a thorough and effective manner. They also have a responsibility to alert clients to the fact that changes in requirements will occur and need to be handled in an effective manner.

Far too often the literature on software quality is passive and makes the incorrect assumption that users are going to be 100% effective in identifying requirements. This is a dangerous assumption. User requirements are never complete and they are often wrong. For a software project to succeed, requirements need to be gathered and analyzed in a professional manner, and software engineering is the profession that should know how to do this well.

It should be the responsibility of the software engineers to insist that proper requirements methods be used. These include:

1. Reusable requirements
2. Data mining of legacy applications to extract hidden requirements
3. Joint Application Design (JAD)
4. Quality Function Deployment (QFD)
5. Prototypes – evolutionary
6. Prototypes - disposable
7. Requirements inspections
8. Agile “embedded users”
9. Running readability software tools on requirements such as the FOG index
10. Running text static analysis tools on requirements
11. Requirements standards
12. Requirements change control boards
13. Requirements estimation tools that predict creep and deferred features
14. Requirements estimation tools that predict quality and costs
15. Focus groups
16. Domain specialists for topics such as security, performance, and ease of use
17. Use of graphical techniques such as the unified modeling language (UML)
18. Use of decision tables
19. Use of model or pattern-based requirements
20. Use of test-driven development

The users of software applications are not software engineers and cannot be expected to know optimal ways of expressing and

analyzing requirements. Ensuring that requirements collection and analysis are at state of the art levels devolves to the software engineering team.

Three Chronic Requirements Problems

There are three widespread problems with software requirements that need better solutions than are customary for software projects:

1. Many requirements are dangerous or toxic and should be eliminated.
2. Requirements are never complete and grow at rates > 1% per calendar month.
3. Some clients insist on stuffing extra, superfluous features into software.

Software engineers have an ethical and professional obligation to caution clients about these problems and to assist clients in solving them, if possible. In other words, software engineers need to play a role similar to the role of physicians. We have an obligation to our clients to diagnose known requirements problems and to prescribe effective therapies.

Once user requirements have been collected and analyzed, then conformance to them should of course occur. However before conformance can be safe and effective, dangerous or toxic requirements have to be weeded out, excess and superfluous requirements should be pointed out to the users, and potential gaps that will cause creeping requirements should be identified and also quantified. The users themselves will need professional assistance from the software engineering team, who should not be passive bystanders for requirements gathering and analysis.

Unfortunately requirements bugs cannot be removed by ordinary testing. If requirements bugs are not prevented from occurring, or not removed via formal inspections or other methods, test cases that are constructed from the requirements will confirm the errors and not find them. (This is why years of software testing never found and removed the Y2K problem.)

Another issue is that for some brand new kinds of innovative applications there may not be any users other than the original inventor. Consider the history of successful software innovation such as the APL programming language, the first spreadsheet, and the early web search engine that later became Google.

These innovative applications were all created by inventors to solve problems that they themselves wanted to solve. They were not created based on the normal concept of "user requirements." Until prototypes were developed, other people seldom even realized how valuable the inventions would be. Therefore "user requirements" are not completely relevant to brand new inventions until after they have been revealed to the public.

Given the fact that software requirements grow and change at measured rates of 1% to more than 4% ever calendar month during the subsequent design and coding phases, it is apparent that achieving a full understanding of requirements is a difficult task.

Software requirements are important, but the combination of toxic requirements, missing requirements, and excess requirements makes simplistic definitions such as "quality means conformance to requirements" hazardous to the software industry.

What Goes Into Software Requirements?

Software requirements obviously describe the key features and functions that a software application will contain. But requirements specifications also serve other business purposes. For example the requirements should also discuss any limits or constraints on the software, such as performance criteria, reliability criteria, security criteria and the like.

The costs and schedules of building software applications are strongly influenced by the size of the application in terms of the total requirements set that will be implemented. Therefore requirements are the primary basis of ascertaining software size.

By fortunate coincidence the structure of function point metrics is a good match to the fundamental issues that should be included in software requirements. In chronological order these seven fundamental topics should be explored as part of the requirements gathering process:

1. The *outputs* that should be produced by the application.
2. The *inputs* that will enter the software application.
3. The *logical files* that must be maintained by the application.
4. The *entities and relationships* that will be in the logical files of the application.
5. The *inquiry types* that can be made to the application.
6. The *interfaces* between the application and other systems.
7. Key *algorithms* that must be present in the application.

Five of these seven topics are the basic elements of the International Function Point Users Group (IFPUG) function point metric.

The fourth topic, "entities and relationships" are part of the British Mark II function point metric and the newer COSMIC function point.

The seventh topic, "algorithms" is a standard factor of the feature point metric, which added a count of algorithms to the five basic function point elements used by IFPUG.

The similarity between the topics that need to be examined when gathering requirements and those used by the functional metrics makes the derivation of function point totals during requirements a fairly straightforward task.

(In 1994 the author's company built a successful function point generation tool that worked on the Bachman Analyst Workbench. Unfortunately Bachman went out of business fairly soon thereafter.)

There are some 24 additional topics that also need to be decided during the requirements phase. Some of these are "non-functional requirements and some are business requirements needed to determine whether funding should be provided. These additional topics include:

1. The *size* of the application in function points and source code.
2. The *schedule* of the application from requirements to delivery.
3. The *cost* of the application by activity and also in terms of cost per function point.
4. The *business value* of the application and *return on investment*.
5. The major *risks* facing the application; i.e. termination, delays, overruns, etc.
6. The *security criteria* for the application and its companion data bases
7. The features of *competitive applications* by business rivals
8. The *supply chain* of the application, or related applications upstream or downstream
9. The *legacy requirements* derived from older applications being replaced.
10. The *laws and regulations* that impact the application (i.e. tax laws; privacy etc.).
11. The *quality levels* in terms of defects, reliability, and ease of use criteria.
12. The *warranty* terms of the application and responses to warranty claims.
13. The *hardware platform(s)* on which the application will operate.
14. The *software platform(s)* such as operating systems and data bases.
15. The *nationalization* criteria, or the number of foreign language versions.
16. The *performance criteria*, if any, for the application.
17. The *training requirements* or form of tutorial materials that may be needed.
18. The *installation requirements* for putting the application onto the host platforms or making it available as a service-oriented application.
19. The *reuse criteria* for the application in terms of both reused materials going into the application and also whether features of the application may be aimed at subsequent reuse by downstream applications.
20. The *use cases or major tasks* users are expected to be able to perform via the application.
21. The *control flow* or sequence of information moving through the application.
22. Possible *future requirements* for follow-on releases.
23. The *hazard levels* of any requirements that might be potentially "toxic."

The seven primary topics and the 23 supplemental topics are not the only items that can be included in requirements, but none of these 30 should be omitted by accident since they can all have a significant effect on software projects.

Note: As this paper was being written the International Function Point Users Group (IFPUG) issued a major change to function point counting. The new rules separate functional requirements from non-functional requirements. However these new rules are likely to change and they are so new that no examples of non-functional size are currently available. The data shown in this article is hypothetical and predicted by the author's Software Risk Master Tool.

Gathering and Analyzing Software Requirements

Today in 2011 almost half of all major applications are replacements for aging legacy applications, some of which have been in use for more than 25 years. Unfortunately legacy applications seldom have current specifications or requirements documents available.

Due to the lack of available information about the features and functions of the prior legacy application, a new form of requirements analysis is coming into being. This new form starts by "data mining" of the legacy application in order to extract hidden business rules and algorithms from the source code. Data mining of legacy applications can also be used to gather data for sizing, in terms of both function points and code statements.

For new applications requirements gathering and requirements analysis methods will vary based on the overall size of the application as measured in function points.

Very small applications < 100 function points: Very small applications below 100 function points in size are very common for smart phones, tablets, and personal assistant devices. Usually the requirements for these small applications are created by the application developer or the inventor, rather than being gathered from potential customers.

For some small applications, such as board games like checkers or chess, the requirements may be hundreds of years old and are based on the rules of the game. All the software is doing is moving the game to a computer, so requirements are mainly those of aesthetics and ease of use rather than actual functionality.

Small applications < 1000 function points: For smaller applications between about 100 function points and 1000 function points the Agile method of having an embedded user is successful. Also successful are prototypes and the use of a variety of tools for both recording requirements, evaluating readability levels, and looking for errors and inconsistencies.

Large applications of 10,000 function points: For larger systems between 1000 and 10,000 function points the Agile approach of embedded users is no longer effective. The reason is that large systems usually have more than 1000 users, and no single user representative can possibly know what the others will use the software for.

For larger applications focus groups, Joint Application Design (JAD), and Quality Function Deployment (QFD) are all useful. Requirements standards are useful for large systems too. Requirements tools, readability tools, and static analysis tools for text are also valuable.

Prototypes are not as successful for very large systems because if a prototype is built that covers 10% of the features, then it becomes a large and difficult program in its own right.

Massive applications of 100,000 function points: For massive applications between 10,000 and 100,000 function points it is necessary to use state of the art requirements methods to have even a hope of delivering the application with acceptable quality levels and anywhere near the planned delivery date.

Requirements creep for these large multi-year applications can approach or even exceed 50% of the planned requirements. Such massive volumes of unanticipated requirements can delay deliveries by more than a year and raise costs by more than 65% compared to the original budgets.

Some of the massive applications in this size range include enterprise resource planning tools such as Oracle and SAP, large operating systems such as Windows 8, national air-traffic control, and a variety of large military systems.

Quantifying Requirements Size, Growth, and Quality for a Small Application

This section will show some typical requirements topics for both a small program of 100 function points and a large system of 10,000 function points in size. The large size was selected because requirements problems go up with size, and 10,000 function points is the range where requirements gaps, requirements creep, requirements defects, and toxic requirements become severe.

Table 1 shows traditional requirements using interviews and text documentation. Other methods such as the unified modeling language (UML) or the agile method of embedding users in the team would create somewhat different results. However for large systems in the 10,000 function point size range, requirements are troublesome using most methods.

The data in table 1 was produced using the author's Software Risk Master Tool which predicts requirements size and defect volumes and supports all requirements practices.

Function Points	100	10,000
<i>Functional requirements</i>	90	8,500
<i>Non-functional requirements</i>	10	1,500
Source code (Java)	5,300	530,000
Specific requirements	65	7,407
<i>Functional requirements</i>	6,295	
<i>Non-functional requirement</i>	5	1,112

Superfluous requirements	375	375
Requirements pages	2,500	2,500
English words	1,125,000	1,125,000
Requirements gathering/analysis days	10	60
Total requirements writing days	10	556
Words per requirement	349	152
Words per function point	180	113
FOG readability index	<10	>15
Diagrams	6	300
Requirements completeness	95%	60%
Requirements team	2	12
Requirements reviewers	10	40
Days to define requirements	10	60
Days to read and understand requirements	2	135
Total reading days (clients + team)	7	5,405
Requirements errors	10	875
Toxic requirements	0	18
Missing requirements	11	1,050
Creep per month in function points	2	150
Total creep function points	4	2,687
Deferred function points	0	1,522
Test cases for requirements	66	4,932
Average removal efficiency	96%	84%
Best removal efficiency	99%	96%
Average requirements defects delivered	2	178
Lowest requirements defects delivered	0	42
Major requirements defects	0	36
Requirements costs	\$29,813	\$2,809, 162

Table 1: Requirements for Applications of 100 and 10,000 Function Points

As can be seen from Table 1, requirements for small applications are relatively easy to gather and relatively free from serious problems.

Requirements for large systems, on the other hand, are very difficult to gather and also have a large number of significant errors, significant gaps, and a tendency to grow continuously throughout the development cycle.

Because users are not trained in expressing requirements or in understanding how many problems might occur due to requirements creep and requirements errors, it is up to the software engineering team to assist the users by ensuring that requirements gathering, requirements analysis, and above all requirements defect removal methods carried out in a professional fashion using proven techniques.

Continuous Requirements Growth after the Initial Release

Once software applications have been delivered to clients or customers, that does not mean that requirements stop growing and changing. For most applications growth is continuous for as long as the applications are in use. They tend to grow at rates of between 4% and 15% per calendar year forever.

Because requirements and applications continue to grow, this means that application size increases too whether measured with function points, logical code statements, or any other metric.

To illustrate the points about continuous growth, table 2 shows both typical development patterns and typical post-release patterns for a large system of 10,000 function points written in the Java language. Table 2 shows 15 intervals as predicted by the author's Software Risk Master Tool. Table 2 uses integer values and makes some simplifying assumptions in order for the patterns to be clear.

Measurement Intervals	Function Points	Logical Code Statements in Java
1 Size at end of requirements	10,000	530,000
2 Size of requirements creep	2,000	106,000
3 Size of planned delivery	12,000	636,000
4 Size of deferred features	- 4,800	- 254,400
5 Size of first delivery to clients	7,200	381,600
6 Size after year 1 usage	12,000	636,000
7 Size after year 2 usage	13,000	689,000
8 Size after year 3 usage	14,000	742,000
		901,000

9 Size after year 4 usage (mid-life kicker)	17,000	
10 Size after year 5 usage	18,000	954,000
11 Size after year 6 usage	19,000	1,007,000
12 Size after year 7 usage	20,000	1,060,000
13 Size after year 8 usage (mid-life kicker)	23,000	1,219,000
14 Size after year 9 usage	24,000	1,272,000
15 Size after year 10 usage	25,000	1,325,000

Table 2: Ten-Year Requirements Growth after Initial Release

Table 2 shows larger than average growth at year 9 and year 13. For commercial software it is necessary to add significant new features in order to stay current with competitive applications. These are called “mid life kickers.”

As can be seen from table 2, requirements growth never stops for as long as software applications are being used unless the developer withdraws support due to bringing out a new product of the same type. This is why Windows XP no longer changes except to fix bugs and security flaws.

Some applications continue well past 10 years. Several IBM applications and the U.S. Air Traffic control system have been in use for more than 30 years.

Summary and Conclusions about Requirements

Software requirements have been a very weak link in the chain of software engineering technologies. Because requirements are always incomplete and always contain errors, it is the responsibility of the software engineering team to ensure that state of the art requirements methods are used. Users are not trained in requirements methods and cannot provide requirements that are complete and error-free without assistance from trained requirements experts, plus state of the art requirements tools.

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Systems Engineering News

Systems Engineering Effectiveness Study

A new study is being conducted by the U.S. National Defense Industrial Association (NDIA), the IEEE Aerospace and Electronic Systems Society (IEEE-AESS), and the Software Engineering Institute (SEI) of the Carnegie Mellon University, USA, and with the participation of the International Council on Systems Engineering (INCOSE).

The intent of this study is to build a stronger “Business Case for Systems Engineering” (BCSE), providing quantitative information on the impact of SE activities on project performance. This information will aid organizations and individuals utilizing SE to focus their efforts on activities that produce measurable benefits. The parties to the study would like your organization to participate in this study by completing a *confidential* and *anonymous* survey.

In 2006, the SE Effectiveness Committee of the NDIA Systems Engineering Division conducted the Systems Engineering Effectiveness Study (SEES). Using survey techniques, this study identified statistical relationships between the application of specific SE practices to development projects and the performance of those projects, as measured by satisfaction of budget, schedule, and requirements. The results clearly demonstrated the benefits of SE, showing that projects applying the least SE

performed measurably worse than projects applying the most SE. The study also identified relationships between specific SE practices (e.g., requirements development, trade study performance, architecture development) and project performance. For more information about the SEES, you may download several reports, papers, and presentations from the BCSE web site at www.sei.cmu.edu/go/bcse2/.

Based on the success of the prior study, in 2010 the NDIA embarked on the BCSE project to update and enhance it by gathering data from a larger and more diverse population. The BCSE Project Team is comprised of members of defense, industry, and academia working through the NDIA, the IEEE-AESS, and the SEI. This project has been coordinated with the Office of the Secretary of Defense (USA) through the Deputy Assistant Secretary of Defense, Systems Engineering (DASD(SE)). This study will survey individual product-producing projects to assess 1) the characteristics of the project, 2) the SE activities applied to the project, and 3) the resulting project performance. Completion of the survey will require approximately 30 minutes for each project. Like the prior survey, data security and confidentiality will be paramount. *All data will be collected anonymously.* No information identifying the project, organization, or respondent will be requested. The Software Engineering Institute, a U.S. DoD-sponsored FFRDC, will do the data collection and analysis. Only they will see your responses, and only statistical summaries of the aggregated data, untraceable to any project, organization, or person, will be released.

Similar to the original study, those who participate will be rewarded with early access to more detailed levels of aggregated data and analysis for one year prior to these results being published for everyone. This will allow you to assess your organization/project results relative to the rest on the industry, showing your strengths and areas of weaknesses that should be addressed.

The Study Parties' Request to You

The parties to the study wish to reach out to relevant organizations to invite them to participate in this study. If your organization executes projects that produce delivered products, they ask you to participate in this study. By providing the data requested below, you will enable the study parties to contact the appropriate decision makers within your organization to 1) explain this important study, 2) discuss the value of this study to your organization, and 3) request the participation of your organization in the study.

Please take just a minute to answer the following six questions that will assist them in reaching out to potential respondents for the survey. Based upon the information that you provide, they will contact the designated person to discuss this study. If the contact authorizes your organization to participate, an invitation will be sent to your organization, enabling the submission of *anonymous* and *confidential* responses to the survey.

If you have any questions, please contact:

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Draft of the Guide to the Systems Engineering Body of Knowledge (SEBoK version 0.5) Released in a Wiki Format

A draft of the Guide to the Systems Engineering Body of Knowledge (SEBoK version 0.5) was released in a wiki format on September 19, 2011 at www.sebokwiki.org. SEBoK 0.5 is currently open to worldwide review.

The BKCASE team hosted open information and review instruction sessions November 7, 8, and 9 2011 that provided:

- A brief overview of the SEBoK 0.5 wiki, including basics of navigation;
- A demonstration of the review functionalities of the wiki; and
- A time slot for open questions from the participants.

If you have any questions, please contact the BKCASE team at bkcase@stevens.edu.

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The Genius of Apple's Long Term Thinking

Earlier this summer, tech blogs were briefly abuzz with the rumor that the unification of Apple's iOS and Mac OS X is on its way. This story had Apple joining the two operating systems as early as next year. As crazy as the idea is of "iOS X" running on all Apple devices, even more fascinating is the way that this would be the final step in a grand scheme that few other companies in history would have had the courage to execute.

[More Information](#)

Leveraging the INCOSE Systems Engineering Professional (SEP) Program at Jacobs Engineering Group Inc.

Jacobs Engineering has an agreement with the International Council on Systems Engineering (INCOSE) that allows the Company to leverage the INCOSE Systems Engineering Professional (SEP) program and certify appropriately experienced Jacobs systems engineers in collaboration with INCOSE for value-added performance, thereby boosting client's confidence. In making the announcement, Jacobs Chief Executive Officer Craig Martin stated, "Employee talent is the cornerstone of our success. This agreement provides an excellent framework to collaborate with INCOSE and continue improving our systems engineering capability. Providing our employees with opportunities to hone their expertise contributes to value-added performance and promotes client confidence in our ability to partner with them for success."

"INCOSE's professional certification designations are the worldwide reference for systems engineering professionalism. INCOSE is pleased to enter this agreement with Jacobs to advance the practice of systems engineering," said Samantha Robitaille, President of INCOSE.

[More Information](#)

Cognitive Systems Design

How well do technical systems support the human cognition essential to the performance of those systems? A 30-minute tutorial will leverage from some work on cognitive indicators from the naturalistic decision-making area to develop system evaluation tools based on the abstraction-decomposition space of work domain analysis and the decision ladder of work task analysis. To view this video or to download it, go to the workshops page at www.cognitivesystemsdesign.net and follow the link under webcasts in the right-hand column.

Point of contact: [Dr. Gavin Lintern](#),

Improving Systems and Software Engineering Conference (ISSEC) Conference Report

Clive Tudge CEng MIET, Brisbane, August 2011

The Improving Systems and Software Engineering Conference (ISSEC) took place in Sydney on the 3rd to 5th August 2011 in the Novotel Hotel in Brighton-le-Sands, Sydney. The theme of the conference was 'Architects of the Future' and focused on the importance of flexibility and adaptability in systems and software design and implementation.

I have a part time role with the Systems and Software Quality Institute (SSQI) and they sponsored me to attend and support them at the conference and for that I am very grateful.

The role of the SSQI is to encourage research in systems and software engineering by facilitating industry applied academic research, to advance and improve the domestic systems and software engineering capability and establish international collaborations. It is a not-for-profit organization and any proceeds earned by the SSQI operations are donated to the Professor Geoff Dromey Foundation. This is a scholarship fund to establish industry-focused research higher degree scholarships for the long-term benefit of the Systems and Software Engineering community.

The SSQI hosted the ISSEC conference in technical collaboration with Carnegie Mellon Software Engineering Institute (SEI) and co-located with PMOz. The Major Foundation Sponsor was the Australian Department of Defense, Defense Materiel Organization (DMO) with additional sponsorship from Raytheon Australia and Dedicated Systems. It was a very successful conference with many varied and interesting presentations and workshops and several hundred delegates.

The conference was honored to have Dr. Barry Boehm, an eminent software engineering expert, who has been leading the charge in improving software since software first came on the horizon. He has written many books and developed many strategies for improving the way we write and measure software. His research interests have included software development process modeling, software requirements engineering, software architectures, software metrics and cost models, software engineering environments, and knowledge-based software engineering. His contributions to the field include the Constructive Cost Model (COCOMO), the Spiral Model of the software process, the Theory W (win-win) approach to software management and requirements determination and two advanced software engineering environments: the TRW Software Productivity System and Quantum Leap Environment. Dr. Boehm gave a presentation on 'Skating where the Puck is going' derived from one of Wayne Gretzky's famous sayings. Dr. Boehm finished by pointing out that software is now everywhere and is a key component of everything that we do and by 2025 will be responsible for a major world event on the scale of 9/11 with major loss of life or with a major World Economic Impact!

Also at the conference was Dr. Richard Turner who co-authored with Barry Boehm the book titled "Balancing Agility and Discipline".

Dr Paul D. Nielsen, Director and CEO of the Software Engineering Institute gave a very enlightening and entertaining keynote presentation on "The Importance of Architecture in Complex Systems".

Dr. David Hillson (the Risk Doctor) from the UK gave a very absorbing presentation on Managing Risks in Innovative Projects where he emphasized that it is as important to see opportunities as well as realizing that risks need to be effectively managed. All in all an excellent conference with great opportunity to meet like colleagues and share a vision for the future with improved systems and software.

**Systems Thinking Workshop in Seattle, WA, USA
with Colleen Ponto, Nalani Linder, and Steve Byers
A Series of Three Workshops**

Mon, Jan 23, 2012	For Alumni, Prospective students, Current students, General public
6:00– 9:00 pm	Admission \$25
Location Chardin Hall, Room 1451020 E Jefferson StSeattle, WA 98122	Reserve today

This is a first workshop in a series of three; participants may register for all or some of these workshops. Please register separately for each.

Mon, Feb 6, 2012	For Alumni, Prospective students, Current students, General public
6:00– 9:00 pm	Admission \$25
Location Chardin Hall, Room 145 1020 E Jefferson StSeattle, WA 98122	Reserve today

This is a second workshop in a series of 3; participants may register for all or some of these workshops. Please register separately for each.

Mon, Feb 27, 2012	For Alumni, Prospective students, Current students, General public
6:00– 9:00 pm	Admission \$25
Location Chardin Hall, Room 145 1020 E Jefferson StSeattle, WA 98122	Reserve today

This is a third workshop in a series of 3; participants may register for all or some of these workshops. Please register separately

for each. Deepen and strengthen your understanding of systems thinking tools and language in these continuing education workshops, designed and offered by Steve Byers (OSR 13), Nalani Linder (OSR 12), Colleen Ponto (OSR 7 & Current OSR Faculty).

During each workshop, they will provide a deeper dive into the language and tools of systems thinking, such as causal loop diagrams and leverage points. Emphasis will be on practical applications on actual adaptive challenges from participants' work and life.

Questions? Contact Leslie Chamberlain, email v-chambl@seattleu.edu or call +1 206-296-5898.

Systems Thinking Conference Highlights Practical Applications in Healthcare, Education, and Product Development

Whatever your profession, systems thinking is critical for success in the global economy, according to speakers at the 2011 MIT SDM Conference on Systems Thinking for Contemporary Challenges.

The annual event, sponsored by MIT's System Design and Management (SDM) program, drew almost 300 attendees from across MIT and around the world on Oct. 24 and 25. This year's conference, which highlighted SDM's 15th anniversary and featured several SDM alumni speakers who are now senior executives, focused on addressing complexity and innovation in health care, education and product development.

[More Information](#)

Sikorsky Aerospace Services - CH-53K Helicopter Systems Engineering Team Receives US DoD Top 5 Programs Award

The National Defense Industry Association presented the prestigious award to the CH-53K Helicopter Systems Engineering Team, consisting of both Naval Air Systems Command and Sikorsky Aircraft Corporation engineers, in recognition of excellence in the application of systems engineering practices resulting in highly successful DoD programs, as exemplified by their 2010 performance. 'The evaluation team, made up of senior individuals from across the Department of Defense, felt that the CH-53K program's efforts are clearly in keeping with the award's intent to honor programs who 'demonstrate successful implementation of systems engineering best practices resulting in program success,' ' said Col. Donald W. Robbins, Chairman of the Top 5 Awards Evaluation Team. 'The CH-53K Systems Engineering Team worked hard over the past few years and we are seeing the benefits of a disciplined and systematic approach,' said Col. Robert Pridgen, USMC, H-53 Heavy Lift program manager. 'The Systems Engineering Team set the foundation for us to deliver a marinized, heavy-lifting helicopter that meets the future war fighting requirements of the Marine Corps, sustains the expeditionary capabilities and is supportable, maintainable and reliable throughout its entire lifecycle.' David Zack, Sikorsky's CH-53K Helicopter Program Manager, said the recognition is extremely rewarding and validates the approach taken by the CH-53K Systems Engineering Team, including its government partners as well as its 150 industry partners, to integrate systems engineering process and principles from the program's inception.

[More Information](#)

Systems Engineering for Defense Symposium, 15-16 February 2012, Defense Academy of the United Kingdom, Shrivenham

The Defense Academy of the United Kingdom at Shrivenham is hosting a symposium workshop on Systems Engineering for Defense, sponsored by the Director of Safety and Engineering, who is responsible for MOD's Engineering Strategy. The event, organized by the Department of Informatics and Systems Engineering of Cranfield Defense and Security at the Defense Academy, is one of the series of Symposia at Shrivenham, will run on Wednesday 15th and Thursday 16th February 2012 in the Defense Capability Centre Conference Hall. The theme will be "Systems Approaches for Future Defense Capability", the timing of which could not be more appropriate.

[More Information](#)

The Seventh International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering (CISSE 2011)

The seventh International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering (CISSE 2011), December 3-12, 2011. CISSE 2011 provides a virtual forum for presentation and discussion of the state-of-the-art research on computers, information and systems sciences and engineering. CISSE 2011 is the seventh conference of the CISSE series of e-conferences. CISSE is the World's first Engineering/Computing and Systems Research E-Conference. CISSE 2005 was the first high-caliber Research Conference in the world to be completely conducted online in real-time via the internet. In 2005, CISSE received 255 research paper submissions and the final program included 140 accepted papers, from more than 45 countries. CISSE 2009 received more than 500 submissions and the final program included 210 accepted papers. Last year, CISSE 2010 received a total of 376 paper submissions and the final program included 99 accepted papers, from more than 80 countries.

The virtual conference will be conducted through the Internet using web-conferencing tools, made available by the conference. Authors will be presenting their PowerPoint, audio or video presentations using web-conferencing tools without the need for travel. Conference sessions will be broadcast to all the conference participants, where session participants can interact with the presenter during the presentation and/or during the Q&A slot that follow the presentation. This international conference will be held entirely on-line. The accepted and presented papers will be made available and sent to the authors after the conference both on a DVD (including all papers, PowerPoint presentations and audio presentations) and as a book publication. Springer, the official publisher for CISSE, published the 2009 proceedings in two books.

[More Information](#)

Point of contact:
Caroline Dawson
Event Organizer
Symposia at Shrivenham
DA-CMT, Cranfield University
Defense Academy of the United Kingdom
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Tel (01793) 785268, Fax (01793) 785325
<http://www.symposiaatshrivenham.com>

Now Available: Agile Extension to the BABOK® Guide

International Institute of Business Analysis (IIBA) has announced the newest release of the Agile Extension to A Guide to the Business Analysis Body of Knowledge® (BABOK® Guide) 2.0. This release was completed in collaboration with Agile Alliance, a non-profit organization dedicated to promoting the concepts of agile software development (www.agilemanifesto.org). This new release of the Agile Extension offers:

- information on business analysis in agile lifecycles
- the mapping of information back to the BABOK® Guide 2.0
- descriptions of over 20 new business analysis techniques useful in an agile environment
- key principles regarding agile business analysis

The latest Agile Extension can be downloaded free at <http://iiba.info/AgileExtension>. If you would like to provide feedback on this latest edition, the IIBA welcomes your comments. You may visit the Agile Extension Feedback Form by January 31, 2012 to post comments. Now Available: Agile Extension to the BABOK® Guide

Vale Bill Schoening

It is with sadness that we report the death of William W. (Bill) Schoening, a well known and highly respected member of the systems engineering community, on November 5, 2011.

Featured Society

The Australian Safety Critical Systems Association (aSCSa)

The Australian Safety Critical Systems Association (aSCSa) is a nonprofit organization established to promote the co-operation of academic, industrial, commercial and governmental organizations in relation to the practice and advancement of safety-related systems, in particular those systems containing software in Australia. The activities of the Association are directed towards providing national leadership, facilitation and the co-ordination of professional Association activities, and encouraging member contribution relating to safety-related systems, particularly those containing software.

The Mission of the aSCSa is to raise the awareness of the engineering and wider community of the safety issues specific to software-intensive systems and to provide leadership and guidance. Specifically, the aSCSa's purpose is to:

- Provide a national focus and forum for its members who have an interest in safety related systems, particularly those systems containing software.
- Provide professional services for all categories of its membership.
- Stimulate the active contribution and participation of its members in the development and dissemination of safety-related systems knowledge and to support the activities of the Society.
- Foster and support education and training associated with all aspects of safety related systems.
- To provide learned society functions for individuals and industry groups and to provide practice based opinion and advice for the Society.

Membership of the Australian Safety Critical Systems Association is open to anyone involved in design and development of safety critical systems, or people with an interest in safety issues. The aSCSa organizes an annual conference in association with the Systems Safety Society (SSS) Australian Chapter.

The Chairman of the aSCSa is Mr. Clive Boughton of the Australian National University.

[More information](#)

INCOSE Technical Operations

Affordability Working Group

<https://connect.incose.org/tb/SEsupport/affordability/default.aspx>

Charter / Purpose

The INCOSE Affordability Working Group (AFFWG) is an association of INCOSE members who are focused on Systems Engineering for Design for Affordability. The AFFWG will examine and provide both Methods and Analysis Techniques to incorporate Affordability as an Architectural Objective in the Systems Engineering Enterprise and Discipline. The Charter also includes innovation techniques to accomplish the overarching objective.

Goal

The AFFWG has a goal of advancing the state of the practice of Design for Affordability. This goal focuses on the value of the system across the Total Life Cycle and includes approaches for: (1) automation technology to reduce staffing, (2) new operational or support concepts; (3) reuse or refurbishment of existing systems, (4) downsizing a system in performance to reduce cost, (5) scalable architectures for variable cost-performance points, (6) Analysis of the Variables that contribute to Systems Engineering Trade Space that effect “cost of function”, Robust Engineering Theory as it contributes to theory and methods for “loss of economic value”, “system robustness”, and the concept of system “ideality”, etc. This goal also includes identifying and providing guidance for the relevant trades across the life cycle, especially during the system definition timeframe, that impact the system affordability.

Definitions

The INCOSE Affordability Working Group’s definition of Affordability is: *Affordability is the balance of system performance, cost and schedule constraints over the system life while satisfying mission needs in concert with strategic investment and organizational needs.*

The INCOSE Affordability Working Group’s definition of SE Design for Affordability is: *Design for Affordability is the systems engineering practice of balancing system performance and risk with cost and schedule constraints over the system life satisfying system operational needs in concert with strategic investment and evolving stakeholder value.*

Leadership

Chair: Joe Bobinis PMP – Sr. Fellow Lockheed Martin USA

Co-Chair: Taki Turner – Boeing USA

Members

The AFFWG has 42 members.

Accomplishments / Products

2011 Society of Cost Estimation and Analysis/International Society of Parametric Analysts (SCEA/ISPA) Conference Whitepaper on; "INCOSE Affordability Working Group – Discussion on Design for Affordability", J. Bobinis, E. Dean

Current Projects

- A set (3) of whitepapers to precede an Affordability Guidebook. Each of the groups is to form a lead and develop an Abstract for submission NLT November 3, 2011 for next year's INCOSE International Symposium in Rome.
- *Affordability as Cost Effective Capability Over time Whitepaper*
- *Compare & Contrast Value Engineering with Design for Affordability & (risk) Whitepaper*
- *INCOSE AFF WORKING Group Mission Presentation* for educational purposes
- *INCOSE Affordability Context Diagram and Meta – V* for INCOSE SE Handbook
- Provide an Abstract for 2012 Symposium Panel Discussion • NDIA Affordability working group has requested that a common website and shared documents be provided.
- Working on Review and updates for:
 - 15288
 - INCOSE SEBOK
 - INCOSE Handbook on Design for Affordability (Long Term Project)

Systems Engineering Tools News

Cradle® October 2011 Newsletter

In this issue:

1. 3SL Newsletters
2. Newsletter Contents
3. 3SL Website
4. Need Help?
5. Cradle Group on LinkedIn
6. New Distributor in Russia
7. EASTRON Requirement Management at the Energetics 2011 Conference
8. 3SL ISP Outage
9. When Cradle Licenses are used
10. Advance Notice of Cradle Release
11. How to Create New Users
12. How to Run Queries
13. How to Exchange Data with MS Project
14. Acrobat Compatibility
15. Mixed Office Installations
16. Old Versions of Cradle

[More Information](#)

Visure Solutions Extends Strategic Partnership with LDRA

Visure Solutions (<http://www.visuresolutions.com>) has extended its joint technology partnership with LDRA (<http://www.ldra.com>), to bundle Visure Solutions' IRQA, the industry's leading requirements engineering platform, with LDRA's Testbed (TB) manager, the test management and traceability component of LDRA's software development suite. The partnership allows LDRA, a leading provider of standards compliance, automated software verification, source code analysis and test tools, to extend its requirements engineering capabilities and offer an end-to-end software development lifecycle solution that increases productivity while reducing errors, and budget and schedule overruns.

French Model Specialist Modeliosoft Goes Open Source

Modeliosoft has announced that Modelio, its core software offering, is being released under an open source license. The company has taken this move to logically increase and maximize community engagement and diversity. More specifically, its intention is to position Modelio as an attractive open source platform for developer modeling and innovation.

Licensed under the GPL v3, the core Modelio offering will deliver support for both the UML and BPMN standards under a modular architecture, with the key APIs licensed under the more permissive Apache 2.0 open source license. This move allows individual developers, communities, and partner companies to develop both open source and proprietary add-on modules, providing new specialist functionality to the core product.

"We wanted to optimize the attractiveness of the Modelio project for both individual developers and corporate partners by providing something more than another GPL licensed, single-vendor 'open core' product. Under this licensing model, typically only the original vendor has the ability to create a paid-for proprietary 'enterprise offering' based on the efforts of the whole community," comments Philippe Desfray, VP of R&D at Modeliosoft. "Our deliberate choice of licensing and our related business model ensures that all contributions to the core Modelio Project remain there for all, whilst allowing our community complete freedom on how they license and distribute add-on modules."

The new licensing model is intended to maximize the potential size and diversity of the community developing both open source and proprietary modules around Modelio. In turn, this should increase the overall level of contribution back into improving the core platform, as well as creating a greater choice of modules and additional functionality available for end-users.

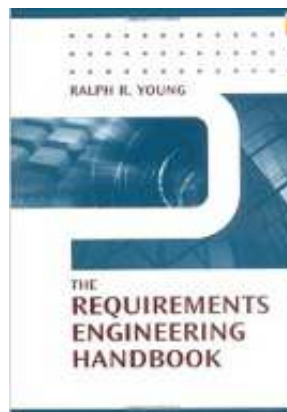
The modelio.org community already provides a set of add-on modules, such as TOGAF Architect, which extends business process modeling into the broader enterprise architecture; SysML Architect for system (hardware, IT, etc.) architects; and Java Designer, which provides Java code generation from UML, including reverse and roundtrip engineering. Modeliosoft will be offering its own commercial support services around Modelio, as well as providing its own guaranteed Modelio distributions packaged with extensions, as solutions dedicated to specific enterprise needs.

[More information](#)

Systems Engineering Books, Reports, Articles and Papers

The Requirements Engineering Handbook

By Ralph Young



Abstract:

This popular, thorough handbook is an excellent desk guide for the requirements engineer, analyst, or manager. It provides a discussion of the roles of the requirements engineer or analyst (RA); identifies the skills and characteristics needed by various levels of an RA; provides definitions, descriptions, and examples of the types of requirements; provides a detailed discussion of the requirements gathering process; describes best practices for requirements development and management; explains an integrated quality approach; and provides a vision for requirements engineering. A chapter is devoted to the "RA's Specialty Skills", a set of questions and answers that address topics often faced by requirements engineers, for example, Why are requirements errors so devastating and how can RAs help address the problem; What if I'm supporting a small project; How can

I be a leader; and What does the RA need to know about the UML? Also addressed are how to strengthen interpersonal relationships and communications, major contributors to project effectiveness. The book includes a comprehensive glossary and list of acronyms; an exhaustive bibliography; and a detailed index.

[More information](#)

Enterprise Release Management: Agile Delivery of a Strategic Change Portfolio

By Louis J. Taborda

Abstract: This new book is said to be an indispensable resource for IT professionals and project managers working to effect positive change in their organizations. It presents a new paradigm for the management of evolving business and IT architectures that comprise the modern, integrated, business. "Enterprise Release Management" takes a holistic view of change that combines traditional management approaches, including project and change management, enterprise architecture, and development practices like configuration and release management. Unlike many books that simply focus on the selection of projects, this practical reference emphasizes the delivery of projects with proper planning and prioritization. This unique book offers a fresh enterprise perspective that addresses strategic change and the release lifecycle, providing executives and managers with the tools they need to chart and track the course their business needs to take to ensure optimal efficiency and future success.

[More information](#)

Call for Papers - Special Issue of the Journal of Simulation: Agent-Based Modeling and Simulation

The Journal of Simulation (JOS), an official journal of The Operational Research Society, aims to publish methodological and technological advances in the application of simulation modeling-related theory and practice. JOS publishes material in a wide range of domains, including manufacturing, service, defense and healthcare, as it seeks to interest and provoke discussion within the wider simulation community.

JOS will publish a special issue on Agent-based Modeling and Simulation. The aim of this special issue is to provide a comprehensive guide on new ideas and results in the integration of Simulation of Multi-Agent Systems (MAS) and Agent-oriented Software Engineering (AOSE) domains. It will capture the state-of-the-art in such domains in terms of techniques and methodologies for agent-based modeling and simulation (ABMS), simulation-driven development processes for multi-agent systems, and simulation-oriented analysis of emergent agent behaviors in complex multi-agent systems. It will also identify potential research directions and technologies that will drive innovations within this domain. We expect the papers of the special issue to serve as a valuable reference for larger audience such as software architects, practitioners, developers, researchers, and students.

The special issue editors invite contributions in both theoretical development and innovative applications to practical problems in the areas of agent-based modeling and simulation. The review process will be the same as that used by the journal. Topics suitable for this special issue include, but are not limited to, the following:

- Agent-based simulation techniques and methodologies
- Discrete-event simulation of Multi-Agent Systems
- Simulation as validation tool for the development process of MAS
- Agent-oriented methodologies incorporating simulation tools
- MAS simulation driven by formal models
- ABMS simulation toolkits and frameworks
- Testing vs. simulation of MAS
- Industrial case studies based on MAS and simulation/testing
- Agent Computational Economics (ACE) and Agent Computational Finance (ACF)
- Agent-based simulation of networked systems
- Scalability in agent-based simulation

All manuscripts should be submitted via <http://www.palgrave-journals.com/jos/index.html>. More information about the journal and paper submission guidelines is available at the same link. You must select ABMS as the Article Type to make sure that your paper will be considered for the special issue.

The submission deadline is December 15, 2011. The plan is to publish the special issue in 2012.

Inquiries on the special issue can be directed to the guest editors:

Giancarlo Fortino

Michael J. North

g.fortino@unical.it

north@anl.gov Cerchi la casa dei tuoi sogni in città, al mare o in montagna? Trovala su <http://tiscali.casa.it/>

[More information](#)

Conferences and Meetings

K7th Symposium on Perspectives and Technology Planning

November 24 – 25 2011, Berlin, Germany

[More information](#)

ICSSEA 2011 - 23rd International Conference Software & Systems Engineering and Their Applications

November 29 - December 1, 2011, Paris, France

[More information](#)

10th Anniversary & Annual Infrastructure and Regional Resilience 2011 Conference

November 29 - December 1, 2011, Gaylord National Hotel & Convention Center in Washington, DC, USA

[More information](#)

3rd International Conference on Software & Systems Engineering and Their Applications

November 29 – December 1, 2011, Paris, France

[More information](#)

International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering (CISSE 2011)



December 3 - 12, 2011, Bridgeport, CT, USA

[More Information](#)

Australasian Association for Engineering Education 2011 AAEE Conference



December 5 - 7, 2011, Fremantle, WA, Australia

[More information](#)

2011 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)

December 6 - 9, 2011, Singapore

[More information](#)

Haifa Verification Conference 2011 (HVC 2011)

December 6 - 8, 2011, Haifa, Israel

[More information](#)

3rd International Congress on Engineering Education

December 7 - 8, 2011, Kuala Lumpur, Malaysia

[More information](#)

Complex Systems Design & Management 2011

December 7 - 9, 2011, Cité Internationale Universitaire, Paris, France

[More information](#)

Leading and Learning for Sustainability Workshop



December 7 - 9, Drexel University, Philadelphia, PA, USA

[More Information](#)

2nd IEEE International Conference on Networked Embedded Systems for Enterprise Applications - NESEA 2011

December 8 – 9, 2011, Fremantle, Perth, Australia

[More information](#)

The 8th Saudi Engineering Conference

December 10, 2011, Buraydah, Saudi Arabia

[More information](#)

9th International Conference on Integrated Formal Methods (iFM 2012)

December 10, 2011, Buraydah, Saudi Arabia

[More information](#)

6th International Conference on Design Principles & Practices

January 20 - 22, 2012, Los Angeles, CA, USA

[More information](#)

INCOSE International Workshop (IW) 2012

January 21 - 24, 2012, Jacksonville, FL, USA

[More information](#)

Eighth Asia-Pacific Conference on Conceptual Modelling (APCCM 2012)

January 30 - February 2, 2012, RMIT, Melbourne, Australia

[More information](#)

Systems Engineering for Defense Symposium NEW

February 15 - 16, 2012, Defense Academy of the United Kingdom, Shrivenham, UK [More Information](#)

ESSoS12 - International Symposium on Engineering Secure Software and Systems

February 16 - 17, 2012, Eindhoven, The Netherlands

[More information](#)

16th GfSE Workshop 2012

February 17, 2012, Hannover, Germany

[More information](#)

IEEE CogSIMA 2012 – 2nd International Conference on Cognitive Methods in Situation Awareness and Decision Support

March 6 – 8, 2012, New Orleans, LA, USA

[More information](#)

16th International GI/ITG Conference on Measurement, Modelling and Evaluation of Computing Systems and Dependability and Fault-Tolerance (MMB & DFT 2012)

March 19 - 21, 2012, Kaiserslautern, Germany

[More information](#)

CSER 2012 – Conference on Systems Engineering Research

March 19 - 22, 2012, St Louis, Missouri, USA

[More information](#)

The 9th ENTERPRISE ENGINEERING Track at ACM-SAC 2012

The 27th ACM Symposium on Applied Computing

March 25 - 29, 2012, Riva del Garda, Trento, Italy

[More information](#)

Fifth Edition of the Requirements Engineering Track (RE-Track'12)

Part of the 27th ACM Symposium on Applied Computing (SAC 2012)

March 25 - 29, 2012, University of Trento, Trento, Italy

[More information](#)

2nd International Workshop on Model-driven Approaches for Simulation Engineering

Part of the Symposium on Theory of Modeling and Simulation, (SCS SpringSim 2012)

March 26 - 29, 2012, Orlando, FL, USA

[More information](#)

Symposium On Theory of Modeling and Simulation, TMS'12

Part of the 2012 SpringSim - Spring Simulation Multi-Conference

March 26 - 29, 2012, Orlando, FL, USA

[More information](#)

Software for Theory of Modeling & Simulation at TMS/DEVS'12  **NEW**

March 26 - 29, 2012, The Florida Hotel, Orlando, FL, USA.

[More Information](#)

2012 SpringSim - Spring Simulation Multi-Conference

March 26 - 30, 2012, Orlando, FL, USA

[More Information](#)

Applied Ergonomics Conference 2012

March 26 - 29, 2012, Gaylord Opryland Resort and Convention Center, Nashville, TN, USA

[More information](#)

The 31st International Conference on Modelling, Identification and Control

April 2 - 4, 2012, Phuket, Thailand

[More information](#)

Fourth NASA Formal Methods Symposium (NFM 2012)  **NEW**

April 3 - 5, 2012, Norfolk, VA, USA

[More Information](#)

9th IEEE International Conference and Workshop on Engineering of Autonomic and Autonomous Systems (EASe 2011)



April 11 - 13, 2012, Novi Sad, Serbia, Europe

[More Information](#)

Workshop on Requirements Engineering (WER'12)  **NEW**

April 24 - 27, 2012, Buenos Aires

This workshop will be held in parallel with ClbSE'12 and ESELAW'12.

[More information](#)

SETE APCOSE 2012

April 30 – May 2, 2012, Brisbane Convention and Exhibition Centre, Brisbane, QLD, Australia

[More information](#)

Software Engineering Institute Architecture Technology User Network (SATURN) 2012 Conference  **NEW**

May 7 - 11, 2012, St. Petersburg, FL, USA

[More Information](#)

1st Annual Systems Engineering in the Washington Metropolitan Area Conference (SEDC 2012)

May 14 - 16, 2012, George Mason Inn and Conference Center, Washington, USA

[More information](#)

IIE Annual Conference and Expo 2012

May 19 - 23, 2012, Hilton Bonnet Creek, Orlando, FL, USA

[More information](#)

Risk Engineering Society Conference: RISK 2012  **NEW**

May 23 - 24, 2012, Lovedale, NSW, Australia

[More information](#)

12th International Design Conference Design 2012

May 21 - 25, 2012, Dubrovnik, Croatia

[More information](#)

Australian System Safety Conference 2012  **NEW**

May 23 - 25, 2012, Brisbane, Australia

[More information](#)

12th International SPICE Conference on Process Improvement and Capability

dTermination in Software, Systems Engineering and Service Management  **NEW**

May 29 - 31, 2012, Palma de Mallorca, Spain

[More Information](#)

Engineering Leadership Conference (ELC 2012)

May 30 - June 2, 2012, Adelaide, Australia

[More information](#)

International Conference on Software and Systems Process (ICSSP) 2012 NEW

June 2 - 3, 2012, Zurich, Switzerland (co-located with ICSE 2012)

[More Information](#)

iFM2012 ABZ 2012 - Abstract State Machines

June 18 - 22, 2012, CNR Research Area of Pisa, Italy

[More information](#)

PETRI NETS 2012 - 33rd International Conference on the Application and Theory of Petri Nets and Concurrency

June 25 - 29, 2012, Hamburg, Germany

[More information](#)

12th International Conference on Application of Concurrency to System Design (ACSD 2012) NEW

June 27 - 29, 2012, Hamburg, Germany

[More Information](#)

8th European Conference on Modelling Foundations and Applications

July 2 - 5, 2012, Technical University of Denmark, Denmark

[More information](#)

INCOSE International Symposium (IS) 2012

July 9 - 12, 2012, Rome, Italy [IS2012 Call for Papers](#): Deadline for draft papers, and proposals for panels and tutorials for IS2012 is November 8th, 2011.

[More information](#)

International Conference of the System Dynamics Society, 2012

July 22 - 26, 2012, St. Gallen, Switzerland

[More Information](#)

Human Factors and Ergonomics Society HFES 2012 Annual Meeting NEW

October 22 - 26, 2012, Boston, MA, USA

[More information](#)

The World Congress on Engineering and Computer Science 2012

October 24 - 26, 2012, San Francisco, USA

Education and Academia

New PhD Degree Program at Arizona State University in Simulation, Modeling, and Applied Cognitive Science

The PhD program is trans-disciplinary and is particularly suited to students with terminal MS degrees in cognitive science, engineering, or computer science.

[More Information](#)

In addition the University is trying to fill an open rank position in Cognitive Science and Engineering in the College of Technology and Innovation.

[More Information](#)

Point of Contact:

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Web: <http://technology.asu.edu/directory/559491>

<http://www.cerici.org>

Postdoctoral Position in Model-based Testing at the Computer Research Institute of Montreal

The position is available for one year with a possibility of extension. Applications are invited for a postdoctoral fellow position in the Distributed Systems Analysis team at Computer Research Institute of Montreal (CRIM) to work on projects in the area of Model-based Testing (MBT).

Job requirements:

- PhD in computer science or software engineering (or in final steps towards it)
- Prior research or work experience in MBT - Knowledge of Model-Driven Development Technologies, Model Checking and UML
- Knowledge of MBT tools - Good Software development skills, Java, C+, Eclipse framework and development.
- Experience in testing embedded real time systems is an asset

Qualifications:

- Interest in applied R&D in MBT
- Skills for writing technical reports in English (French would be an asset)

Please send your application to grh@crim.ca.
http://www.crim.ca/en/crim/emplois/list/emploi_0033.html

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Assistant Professor Position in Modeling and Analysis of Concurrent Systems at IMT Lucca

The IMT Institute for Advanced Studies Lucca invites applications for an Assistant Professor position in the areas of foundations and formal specification of concurrent (distributed, mobile, autonomic) systems; quantitative and qualitative modeling and analysis of concurrent systems and design and development of software tools to support their formal analysis; applications to socio economic systems

.IMT Lucca (<http://www.imtlucca.it>) is a public international Graduate School and Institute of Technology that acts as a research university with the aim of forming human capital in disciplines characterized by their high potential for concrete applications. IMT strives to reach the fusion of theoretical comprehension and practical relevance.

The Assistant Professor will be a part of the Research Unit "System Modeling and Analysis" (SysMA, <http://sysma.lab.imtlucca.it/>) in the Computer Science and Applications area of the Institute, and will perform research activities, tutorship and mentoring of Ph.D. students, limited teaching of graduate courses and participation in the development of the research activities of the Institute.

Senior Lecturer In Sustainable Systems Engineering at RMIT University

- Based in Melbourne
- Full-time continuing (tenured) position
- From \$94, 305 base salary plus 17% Super

RMIT is a global university of technology based in Melbourne, with a commitment to and reputation for high quality professional education and research engaged with industry and community. The School of Aerospace, Mechanical and Manufacturing Engineering is currently recruiting two positions in the field of Systems Engineering, to make a significant contribution to

research and academic development in this field.

The position is supported by a joint research investment by BAE Systems and the School of Aerospace, Mechanical and Manufacturing Engineering, which includes funding for PhD scholarships.

The Senior Lecturer is expected to make a significant contribution to the teaching and research efforts of the School, in the area of Sustainable Systems Engineering focusing in particular on sustainable industrial systems and/or products, and/or sustainable energy systems and processes for clean manufacturing. The successful candidate will have proven ability to develop comprehensive systems models that allow investigation of complex engineering systems and/or products across the entire life-cycle, resulting in high quality publications in international journals.

RMIT is a forward thinking employer and values the contribution of all employees. We offer great employee benefits such as: flexible, family-friendly policies; discounted public transport tickets; subsidized gym membership; onsite childcare facilities (subject to availability); additional holidays; salary packaging initiatives and a generous superannuation scheme.

For further information and to view a position description please refer to our website (below). Confidential enquiries can be made to Professor Aleksandar Subic +61 3 9925 6000 or email aleksandar.subic@rmit.edu.au. RMIT is an equal opportunity employer and encourages applications from all sectors of the community. Please note that applications will be reviewed after the close date.

UC Irvine Extension Offers New Systems Engineering Certificate Program and Informational Webinar

The [University of California, Irvine Extension](#) announced the launch of its new [Systems Engineering Certificate Program](#) that provides professionals skills needed to excel at product development, service delivery fundamentals and project management techniques. The program prepares program managers and those in technical and non-technical disciplines for the Associate and Certified levels of the Systems Engineering Professional exams (ASEP & CSEP) given by the International Council on Systems Engineering (INCOSE). A Systems Engineering education planning session is scheduled on Tuesday, Dec. 13, from 11:30 a.m. to 12:30 p.m. to provide more information about the courses and benefits of the program.

"According to Indeed.com, the national average salary for Systems Engineers is \$95,000 and with the job market recently growing into other industry sectors such as: commercial products and services, transportation, utilities and energy, the possibilities are endless," said Dave Dimas, director of Engineering, Sciences and Information Technology at UC Irvine Extension. "The expanding complexity of providing products and services in a worldwide marketplace with a global workforce has fueled an increase in demand for Systems Engineers, and the Systems Engineering Certificate Program provides analytical, terminological and operational skills for professionals to excel in the industry."

Certificate requirements include four required courses and two elective courses for a minimum of 15 credit units or 150 hours of instruction. Through an articulation agreement, specific coursework from this certificate program also is transferrable to the [Georgia Institute of Technology](#) as credit toward their online Professional Master of Applied Systems Engineering degree program.

Some Systems Engineering-Relevant Websites

http://www.solonline.org/organizational_overview/lexicon/

This webpage of the Society for Organizational Learning, of which Peter Senge is the founder, holds a Learning Lexicon, an etymological dictionary that allows you to gain a deeper sense of common words such as "learning" and "system" by tracing them back to their original roots. Some of the entries of interest: learning; mental models; system; systemic structure; systems thinking; teams; theory, method, tool; vision, values, purpose, goals.

<https://groups.google.com/forum/#!msg/sysml-evaluators/Bye5Y505q3k/kbnjiu8LTeEJ>

This webpage contains for download a historic document summarizes the U.S. Jet Propulsion Laboratory (JPL) evaluation team's position directed to INCOSE MDSD SysML design team with respect to cross-cutting issues regarding the two SysML specification submissions (SysML Partners, v1.0a and SysML Submission Team, v0.98) submitted to the OMG and INCOSE during the turbulent development of SysML.

http://www.defence.gov.au/dmo/dmo/function.cfm?function_id=60

This webpage contains some interesting downloads relating to the performance of Australian defense projects. The standard

DEF(AUST)5679 / Issue2 - Safety Engineering for Defense Systems, is also available for download.

http://www.defence.gov.au/dmo/gc/asdefcon/complex_mat/index.cfm

This webpage contains in downloadable form ASDEFCON (Complex Materiel). ASDEFCON (Complex Materiel) is a template Request for Tender designed for use when undertaking complex acquisitions of equipment and supplies, and consists of two volumes, each volume addressing a different level of complexity and risk.

http://www.defence.gov.au/dmo/gc/asdefcon/asset_lib.cfm

This webpage contains in downloadable form the ASDEFCON Asset Library. The Asset Library contains references made by ASDEFCON templates that must be included as part of a Request for Tender. The ASDEFCON Asset Library is comprised of Data Item Descriptions, Detailed Service Descriptions (For ASDEFCON (Support)) and DMO Checklists. Data Item Descriptions (DIDs) and Detailed Service Descriptions (DSDs) are called out in the Condition of Tender via the Tender Data Requirements List (TDRL), and the Statement of Work via the Contract Data Requirements List (CDRL). DIDs describe the purpose and minimum requirements for data items to be prepared and submitted by the tenderer /contractor. DSDs describe the Services required from the Contractor by grouping together clauses related to the provision of particular Services. There are DIDs and DSDs for the following activities:

- Tendering
- Project Management
- Configuration Management
- Systems Engineering
- Integrated Logistics Support and
- Verification & Validation

The DMO Checklists, which are also called out by the SOW, provides the framework for the conduct of technical reviews. The DMO Checklists define what must be achieved before (entry criteria), during reviews (review criteria) and what is necessary to complete a review (exit criteria). ASDEFCON (Strategic Materiel) V2.3 Assets, ASDEFCON (Complex Materiel) V2.0 Assets, and ASDEFCON (Support) V3.0 Assets are included in the library.

<http://www.modeliosoft.com/features/system-engineering-sysml-support.html>

This webpage describes the system engineering/SysML support features of Modeliosoft, a comprehensive model-driven engineering workbench.

http://mitre.org/work/systems_engineering/

This website contains MITRE's Systems Engineering Guide "for understanding the essentials of the systems engineering discipline and translating this wisdom into practice in your own work environment" plus MITRE's Systems Engineering Competency Model (SECM). The site also contains papers by MITRE staff related to the practice of systems engineering, and resources on risk management, mission partnering, program assessment, and MITRE's Standardized Technology Evaluation Process (STEP). Overall, a very good site.

<http://www.ncsose.org/>

The National Centers for Systems of Systems Engineering (NCSOSE) is an Enterprise Research Center in the Batten College of Engineering and Technology at Old Dominion University, Norfolk, VA, USA, focused on complex systems problems. The Center develops and tests theory, methods, technologies, tools, and provides focused training to more effectively deal with complex system problem domains. NCSOSE's primary goals are to advance the body of knowledge and state-of-the practice relating to engineering complex systems of systems.

Standards and Guides

Six-Sigma Becomes an ISO Standard

Six Sigma (1), a data-driven method for improving business and quality performance, has been published as a two-part ISO standard. Six Sigma was originally developed by Motorola in 1986 to ameliorate manufacturing processes with the goal of 99.99966% (2) of products free of defects (i.e., 3.4 errors per million). Today, the methodology is applied in many sectors of activity by organizations large and small for all types of process and services to:

- Drive process improvement and make statistically based decisions
- Measure business results with a level of reliance
- Prepare for uncertainty
- Combine high returns and benefits in the short, medium and long-term
- Remove waste, defects and errors.

“Six Sigma can be used to effectively address serious chronic business issues,” says Dr. Michèle Boulanger, President of JISC-Statistics and co-chair of the subcommittee that developed the standard, “Organizations can deploy Six Sigma projects to increase customer satisfaction and become more competitive.”

Although Six Sigma has existed for some time, bringing its best practice together under an ISO standard helps solidify and consolidate the methodology. The ISO brand is respected and recognized worldwide, and thus provides an added layer of confidence. Moreover, publication of Six Sigma methodology in an ISO standard will boost international uptake of the methodology in a coherent form, reduce fragmentation, and provide users with harmonized best practice,” concluded Dr. Boulanger.

Six Sigma projects follow a defined sequence of steps with quantified goals and financial targets (cost reduction and/or profit increase), and rely on statistical tools to deal with uncertainty. Implementation involves the establishment of an infrastructure with specific roles and responsibilities. The new standard, ISO 13053:2011, Quantitative methods in process improvement – Six Sigma, deals exclusively with the application of Six Sigma to ameliorate existing processes and is published in the following two parts:

- Part 1: DMAIC methodology, describes the five-phased methodology DMAIC (Define, Measure, Analyze, Improve and Control), and recommends best practice, including on the roles, expertise and training of personnel involved in such projects; and
- Part 2: Tools and techniques, describes tools and techniques, illustrated by factsheets, to be used at each phase of the DMAIC approach.

Both documents can be applied to all sectors and organizations.

ISO 13053 Part 1 and Part 2 were compiled by technical committee ISO/TC 69, Applications of statistical methods, subcommittee SC 7, Application of statistical and related techniques for the implementation of Six Sigma.

ISO 13053-1:2011, Quantitative methods in process improvement – Six Sigma– Part 1: DMAIC methodology, and ISO 13053-2:2011, Quantitative methods in process improvement – Six Sigma – Part 2: Tools and techniques, is available from ISO national member institutes.

(1) Six Sigma is a trademark of Motorola, Inc.

(2) In statistics, this figure corresponds to plus or minus six standard deviations from a shifted target.

ISO/IEC/IEEE 42010 Approved

IEEE P42010 was approved as a revised standard by the IEEE-SA Standards Board on 31 October 2011. The new standard, designated ISO/IEC/IEEE 42010:2011, Systems and software engineering -- Architecture description, is available from IEEE and ISO. This standard replaces IEEE 1471:2000.

The IEEE 1471 website will become the ISO/IEC/IEEE 42010 website. The old website will redirect to the new URL which is: <http://www.iso-architecture.org/42010/> Also, on about 15 November, this users group will change from "IEEE 1471 Users List" to "ISO/IEC/IEEE 42010 Users List".

Existing subscribers need not make any change to continue receiving email. New subscription instructions are on the 42010 website.

A Definition to Close on

Leadership and Management

Leadership: Leadership is the capacity and will to rally men and women to a common purpose and the character which inspires confidence.

Source: Bernard Montgomery, British Field Marshall

Leadership and management: Management uses resources to accomplish results, leadership motivates people to achieve objectives”

Source: Watts S. Humphrey, TSP-Leading a Development Team, 2005

Management: The organization and coordination of the activities of an enterprise in accordance with certain policies and in achievement of defined objectives.

Source: BusinessDictionary.com

Project management: Project management is the process by which projects are defined, planned, monitored, controlled and delivered such that the agreed benefits are realised. Projects are unique, transient endeavours undertaken to achieve a desired outcome” Source: Association for Project Management

Engineering management: Engineering management is management applied to functions, departments, and organizations where engineering is the primary technical skill.

Source: Narayana Rao, 31st January 2010

Engineering management: Engineering management is the discipline where engineers combine management skills with technical expertise to coordinate work in various technical fields such as product design, development, and manufacturing.

Source: <http://www.cramster.com/definitions>

Engineering management: A field that concentrates on the application of engineering principles for the effective planning and efficient operations of managing manufacturing or industrial operations.

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

Engineering management: Engineering management might be defined as the process used in the technically based arena for deciding what is going to be done, how it is going to be done, who is going to do it, when they are going to do it, and how we are doing.

Source: S. G. Walesh, “Engineering your future: the non-technical side of professional practice in engineering and other technical fields”, ASCE Publications, 2000

Engineering management: The art and science of planning, organizing, allocating resources, and directing and controlling activities that have a technological component. Source: American Society for Engineering Management (ASEM)

Engineering management: Engineering management is management - planning, organizing, allocating resources, directing and controlling - performed where engineering is the primary activity which is being managed.

Source: Robert Halligan, 2011

Systems engineering management: Systems engineering management is the set of activities known as planning organising, directing, staffing and controlling systems engineering activities in isolation from the other sets of management activities.

Source: Joseph Kasser, Derek Hitchins and Thomas Huynh, “Reengineering Systems Engineering”, Proceedings of the 3rd Asia-Pacific Conference on Systems Engineering (APCOSE), Singapore, 2009

Systems engineering management: Systems engineering management is the activity of management - planning, organizing, allocating resources, directing and controlling – where engineering using a systems engineering approach is the primary activity which is being managed. Source: Robert Halligan, 2011

PPI News (see www.ppi-int.com)

Robert Halligan to Speak for INCOSE Netherlands

PPI Managing Director Mr. Robert Halligan will speak in Amsterdam, The Netherlands, 1 December 2011, on “A Systems Approach to Love, Life and Business”. The event is conducted by INCOSE-NL, the Netherlands Chapter of INCOSE.

Certification Training International CSEP Preparation Course Success

PPI subsidiary Certification Training International (CTI) recently delivered its second CSEP 4-Day Preparation Course & Workshop in Austin, TX, USA, with a delegate satisfaction rate of 9.7 out of 10.

Overall, CTI's CSEP Preparation Course has had an examination pass rate of 100%, which we are very proud of.

For more information about Certification Training International and CSEP Preparation Courses, please visit the website: <http://www.certificationtraining-int.com/>

Vacancy at PPI

PPI is currently accepting expressions of interest for an additional course presenter for our Software Development and related courses. The ideal candidate must be a highly experienced software engineering professional, preferably a Certified Project Management Professional (PMP) who has extensive experience in this field.

To find out more about the position or to apply, please contact our office: contact@ppi-int.com

PPI Events

Systems Engineering Public 5-Day Courses

Upcoming Locations Include:

- Las Vegas, USA
- São José dos Campos, Brazil
- Singapore

Requirements Analysis and Specification Writing Public Courses

Upcoming Locations Include:

- Melbourne, Australia
- Amsterdam, The Netherlands

Software Engineering Public 5-Day Courses

Upcoming Locations Include:

- Pretoria, South Africa
- Amsterdam, The Netherlands

OCD/CONOPS Public Courses

Upcoming Locations Include:

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

Cognitive Systems Engineering Courses

Upcoming Locations Include:

- Adelaide, Australia
- Las Vegas, USA

PPI Upcoming Participation in Professional Conferences

PPI will be participating in the following upcoming events:

- IITSEC 2011 | Exhibiting as part of the Team Australia booth | Orlando, FL, USA (28 November - 1 December)
 - ICSSEA 2011 | Participating | Prais, France (29 November - 1 December)
 - CSD&M 2011 | Participating | Paris, France (7 - 9 December)
 - Pacific 2012 IMC | Participating | Sydney, Australia (31 January - 2 February, 2012)
 - SETE/APCOSE 2012 | Exhibiting | Brisbane, Australia (30 April - 2 May, 2012)
 - INCOSE IS 2012 | Exhibiting | Rome, Italy (9 - 12 July, 2012)
-

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