



## November 12 Tutorial on System Engineering for Secure Systems

Mark the date. This is a preview of the Fall tutorial, with more detail to follow in an upcoming announcement.

Natural systems are secure first, and only then deal with sustenance, functionality, and higher order gratification. They are successful with this priority. They innovate and evolve for better fitness in a changing environment. They are resilient.

Adversarial communities are similar natural systems that self organize without central control. If you look at the widening effectiveness gap between security expense and security loss, both on an increasing trend, with security adversaries seemingly on an unstoppable roll. We spend too much time closing insecure doors and not enough time opening new secure pathways.

Machiavelli looked at political reality and wrote a user manual on how to address the system as it really is. Most of it was tactical in nature, countering adversarial reality with ruthless effectiveness. In contrast we will look at security reality and explore strategic implications and strategic principles, in harmony with today's times.

This tutorial looks at next generation security as having self-organizing charac-

teristics that can exhibit innovation and evolution on a par with that exhibited by the adversarial communities. It suggests that Systems Engineering has ultimate responsibility for the security of a system – by fundamental definition of the job. We will explore both cyber security and physical security. We will lay groundwork for system thinking and architectural concepts affecting ConOps, Requirements, and Tradeoffs. Self organizing security concept examples will be explored. Exercises throughout will apply workshop concepts. It is likely that comfort zones will be crossed.

Six one-hour sessions will intermix tutorial with workshop exercises throughout, with guest speaker video during lunch.

**Objectives:** SE responsibility understood as unavoidable; door opened for SysE, SecE, and decision maker collaboration; advantage and methods seen for engineered self-organizing strategy; system thinking that features security first in harmony with reality.

**Audience:** Program managers, systems engineers, and security engineers.

**Take away:** An appreciation for inno-

vation and evolution as systemic mechanisms and the necessary exploitation of harmony; tools for system thinking and architecture development; concepts for leveraging human and agent communities; and systemic responsibilities for sustainable system integrity.

**Presented by** Rick Dove. He built agile enterprise-wide IT systems for a semiconductor foundry in Malaysia, creating strategy for security in an ethically hostile internal and competitive environment. He was PI on a set of DHS projects that developed new technology for security applications. He is now PI on a DHS project to investigate methods for resilient network sensing and sense-making, modeled on a high fidelity version of the immune system and on hierarchical cortical processes. He chairs the INCOSE Working Group on System Security Engineering, and leads its project on a pattern language for self organizing security. He is author of *Response Ability – the Language, Structure and Culture of the Agile Enterprise*, and *Value Propositioning – Perception and Misperception in Decision Making*. He holds a BSEE from Carnegie Mellon University.

### Joint Symposium With PMI Rio Grande

Tana Lucy, Sandia National Labs

The PMI Rio Grande Chapter and the Enchantment INCOSE Chapter are partnering to offer a one-day joint symposium in the Spring 2011. Members from each Chapter's Board have been meeting for the past several months to develop plans and discuss potential topics and organize the logistics for offering such an event.

Chapter membership has indicated an interest in a variety of topics. Examples of feedback on topics of interest include:

- Separate speaker tracks for Project Management and Systems Engineering to include a broad perspective.
- Some focus on Configuration Management would be useful and would appeal to a broader audience.
- Delineate the differences within Project

Management and Systems Engineering for IT vs. non-IT projects.

- Risk Management.
- Discussion on how the Systems Engineering group can better work with the Project Management group when they are separate functions.
- Agile approaches and how Agile can branch out from SW development to other areas.
- The project lifecycle and how Systems Engineering applies at each phase.
- What do PM and SE have in common? What is different?
- Is there an integrated discipline that is applicable to the development of large, complex, high technology systems?
- Implementation strategies and tactics for Project Management and Systems Engineering methods.
- Broad overview and discussion regarding IT project management and software

engineering best practices.

- The role/value of systems engineering on a project implementing a COTS product.
- Tailoring the systems engineering methodology for iterative development.

A call for volunteers to help in the planning and execution of the symposium was issued to both Chapter memberships. Activities that need to be staffed include:

- Marketing Promotions
- Sponsorships
- Facilities and Equipment
- Speakers/material
- Registration
- Symposium Activities

Although several volunteers have expressed interest in supporting the symposium, additional volunteers are needed. Please contact Tana Lucy @ [tblucy@sandia.gov](mailto:tblucy@sandia.gov) if you are interested in volunteering to support this event.

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### Recent Meetings

Mary Compton, Sandia National Labs

**July 2010**—Sheri Clark presented “It’s not Easy Being Lean.” It has never been more important to “do more with less”, but how does an organization know which processes can be eliminated or changed without damaging the resulting product or service? Sheri discussed methods that can help an organization identify what is creating waste (in terms of time, people, materials) and how to develop effective solutions. This presentation examined Lean definitions and methodologies, why it is applicable to all types and sizes of organizations and the relationship to quality. A Lean activities starter guide and the presentation are available from the Chapter website: [www.incose.org/enchantment/library.aspx](http://www.incose.org/enchantment/library.aspx)

**August 2010**—Pete McQuade’s presentation introduced the basic concepts of Quality Function Deployment (QFD) for aerospace systems, discussed the philosophy and purpose behind QFD, and how QFD can be applied to help derive firm system

requirements from “fuzzy” stakeholder expectations. The audience built a QFD matrix for an intriguing problem, a High-G Entertainment System for Uncle Cliff’s!

**June 2010**—Dr. Ricardo Valerdi spoke about the many challenges that exist in the back end life cycle processes such as verification and validation. The existing paradigm of test planning for single systems is insufficient to handle the complexity involved with testing systems of systems. To address this, his team is developing a decision support system to improve test planning for a special class of SoS: unmanned & autonomous. This class of SoS presents even more complex emergent behaviors which make testing an interesting mixture of art and science. The presentation provided an overview of PATFrame (Prescriptive Adaptive Test Framework) which is being developed to support test planning in the DoD through the application of numerous methods such as cost modeling, real options, value-based testing, architecture modeling, design of experiment, adaptive dynamic programming, and ontology-based modeling. This project is

part of a 3-University effort involving MIT, USC and UTA (<http://mit.edu/patframe>). The presentation is available from the Chapter website: [www.incose.org/enchantment/library.aspx](http://www.incose.org/enchantment/library.aspx)

**September 2010**—Jack Ring spoke about the interest INCOSE, NDIA, and several individual companies have in a common way to assess the systems engineering competency of individuals. The INCOSE Fellows are devising criteria for selecting a competency model and assessment method, essentially the measures of effectiveness for selecting among candidate competency models and assessment methods. This presentation reported on the current status of the perceived need, the development plan, and the effectiveness validation method of the Fellows Action Item effort. Jack has given us permission to distribute the talk to INCOSE MEMBERS ONLY with the understanding that it will not be distributed to anyone outside the Chapter until their work is complete. To request a copy please contact Mary Compton, [mlcompt@sandia.gov](mailto:mlcompt@sandia.gov).

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### Next Meetings

Mary Compton, Sandia National Labs

#### **October 13: Stakeholder Management on an Enterprise-wide Software Engineering Project – What Worked & What Didn’t,**

Dr. Heidi Hahn, Office Director for Engineering Capability Development, Los Alamos National Laboratory.

**Abstract:** The Los Alamos National Laboratory’s (LANL’s) Enterprise Project – the implementation of a commercial off-the-shelf enterprise resource planning (ERP) system to replace the home-grown business computing systems in use since the early 1980’s – provides a case example of the importance of early and rigorous intervention with stakeholders at all levels of the organization. The focus of the talk is on the Project’s implementation of two key elements of the stakeholder requirements definition process – stakeholder identification and requirements elicitation. Some of the stakeholder management approaches used by the project will be described and placed in the systems engineering context. Where applicable, the theoretical underpinnings of the approaches will be discussed. Finally, lessons learned will be provided, along with some insights into why particular results were obtained.

#### **November 10: Microelectromechanical Systems Overview,**

Ernest J. Garcia, Distinguished Member of the Technical Staff, Sandia National Laboratories

**Abstract:** Microelectromechanical Systems or MEMS is a broad multidisciplinary field that utilizes expertise from all areas of science and engineering and has great potential to solve many problems in a number of areas. It is intriguing to consider the opportunities, but one area that is ripe for exploitation is in the area of biomedical engineering. I will review some fundamentals of MEMS such as how are these microstructures fabricated and how can they interface with the macro world. Most of the examples will come from my own work in the field, which by the way, is not related to bioMEMS but more towards sensing and switching. However with a background in MEMS, and we’ll talk some about nano technology, you could yourself become dangerous and begin your own journey (though possibly perilous) into micro and nano technology!

#### **December 10: Annual Holiday Networking Meeting—A Night at the Atomic Museum—with tour.**

**Abstract:** The Enchantment Chapter of INCOSE would like to invite all members, as well as non-members, to a Night at the Museum: The National Museum of Nuclear Science and History in Albuquerque. The Enchantment Chapter will be holding our annual December Social at the museum on Friday, December 10, from 5:30 to 9:30 pm. The museum will be available to all for viewing before and after the catered dinner. Viewing can be done on your own or with a docent guided tour. This is an excellent opportunity for families to visit and tour this wonderful facility. Mark your calendars and keep watch for further details.

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### Something to Consider...

#### Speaker's Bureau?

*Rick Dove, Paradigm Shift International*

Would your company like a ready list of local speakers that could talk on various topics of System Engineering and related subjects? Maybe for an educational lunch, internal meeting keynote, or project kick-off.

Would you like to register as such a speaker, either for community service and

personal growth and exposure, or for fee?

The chapter is considering a speaker's bureau, and wants to understand the level of interest. We have been asked on occasion to make such recommendations, and see it as a potential community service, as well as a service to our members that would like the opportunity to share their knowledge.

We have questions to answer first. Is your organizations a potential user? Are you a potential speaker? Should a bureau listing be an endorsement by the chapter,

or should that be up to the potential user to determine? Would a readily accessible list on the chapter web site be appropriate? Should the list be restricted to local and/or INCOSE members only?

We will likely put out an email call seeking additional suggestions and answers to these questions, but immediate indication would spur the effort and broaden our thoughts if you care to offer opinions and additional ideas. Send your thoughts now to [dove@parshift.com](mailto:dove@parshift.com).

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#### UTEP Student Chapter First Fall Semester Meeting

*Eric Smith, University of Texas, El Paso*

The First General Meeting of the University of Texas at El Paso (UTEP) division of the Enchantment Chapter of INCOSE occurred on September 2, 2010, in the College of Engineering, at the commencement of the 2010 Fall semester. Student chapter President Jose Falliner welcomed 22 students in attendance, mostly Systems Engineering Program students, as well as faculty members, including Dr. Ricardo Pineda, chair of [Industrial, Manufacturing and Systems Engineering](#)

(IMSE) Department, and Director of the [Research Institute for Manufacturing and Engineering Systems](#) (RIMES). Jose Falliner expressed his desire to move forward a number of initiatives, including an INCOSE membership drive, tours of local companies, preparation course for INCOSE's Associate Systems Engineering Professional certification, and the promotion of a general atmosphere of supportiveness for students in their first semester of graduate studies.

Dr. Pineda then rallied the student body as a coherent whole, stressing the importance of proper performance of Research Assistant duties, the role of IMSE and

RIMES in student support, and the fact that history will ultimate judge the performance of all assembled from the outside, and the conclusion that we are a collective body.

The faculty members present next withdrew for the student-led election of INCOSE UTEP officers, who were elected as follows:

Octavio Castellanos - President Elect  
Nayeth Herrera - Vice-President  
Ana Melendez - Secretary  
Andrew Mcree - Treasurer

Further Information: Jose L. Falliner,  
Mobile Phone: (915) 471-8811,  
[jlfalliner@miners.utep.edu](mailto:jlfalliner@miners.utep.edu).

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### New Chapter members

*Francis Peter, Management Sciences*

Enchantment Chapter now has 95 active members. We would like to welcome the following new INCOSE members to Enchantment Chapter:

Craig A. Anderson	Honeywell Technology Solutions,
Vance Behr	Sandia National Laboratories
Carlos Cantu	Honeywell Technology Solutions
Michael J. Flynn	Honeywell Technology Solutions.
Aaron L. Goodman	Honeywell Technology Solutions
Bryan W. Hunter	Wagner Power Systems
William J. Kowalczyk	Honeywell Technology Solutions
Carole A. Lojek	Sandia National Laboratories
Stephen Othling	Sandia National Laboratories
Gerard Sleefe	Sandia National Laboratories
Jan Williams	Sandia National Laboratories
Timothy H. Wiseley	Sandia National Laboratories

Enchantment Chapter would also like to welcome the following who have transferred:

Edward J. Masterson	US Air Force
Michael Schupbach	US Air Force

The Enchantment sponsored Student Chapter at the University of Texas at El Paso is also doing well in its second year of operation. The Student Chapter now has 16 members. We welcome the following new members to the UTEP Student Chapter:

Jose A. Ayala-Moyeda	Jose A. Gallegos
Stefan Hempel	Ana V. Melendez

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### Haiku Challenge

*Rick Dove, Paradigm Shift International*

Bob Kenley, INSIGHT editor, wanted a synopsis of each IS10 panel session for the October issue. When asked, he said 750 words max, no min, and challenged me to do it in a 21 line sonnet. I thought a 3 line Haiku could do it better. Too much information obscures the core of thought.

This pithy summary of the System Security Engineering WG panel on *Self Organizing vs. Standards-Based System-Security Strategy* was published:

standards in winter  
security is screaming  
self-organized spring

Send in your System Engineering related Haiku to [dove@parshift.com](mailto:dove@parshift.com). But if you don't know the rules for acceptable Haiku, look them up [here](#) first. Editor reserves the right to ignore anything not in the intended spirit of Haiku or devoid of SE related message. Learn to communicate more with less. Engineers have no soul, say some. Show them wrong!

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### News From the Front

## Very Small & Micro Entity (VSME) Working Group

Francis Peter, Management Sciences

Are you an SE for a Small Business or Entity?

INCOSE has established a Very Small and Micro Entity (VSME) Working Group to explore how INCOSE can better serve the needs of small businesses. To help the VSME WG better understand the SE needs of small businesses, and to help you, we are starting with an on-line survey.

If you are a member of an organization with less than 50 people and do not have ready access to SE expertise from a higher corporate support group, then you are eligible to complete the survey, at:

<http://isosurvey.logti.etsmtl.ca/>

The survey is anonymous but you can

enter personal data to receive the results from the survey. Regardless, you can contact me to receive the latest information or to provide additional information to the VSME WG at [francis.peter@incose.org](mailto:francis.peter@incose.org)

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### Conference News & Dates

2010 Q4 (near by or noteworthy)

Oct 10-14, Denver, CO, [LCN 2010: IEEE Conference on Local Computer Networks](#).

Oct 18-21, San Diego, CA, [Unmanned Systems Interoperability Conference](#).

Oct 31-Nov 5, Austin, TX, [ITC 2010: IEEE International Test Conference](#).

2011 (noteworthy)

Jan 29-Feb 02, Phoenix, AZ. INCOSE International Workshop IW11.

Jun 17-23, Denver, CO. INCOSE International Symposium, IS11.

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### Resources

Dr. Len Troncle held a recent INCOSE webinar on a [Brief Intro to a Systems of Systems Processes Theory](#). This webinar discusses the principles of complex systems that have evolved in nature, as determined through sciences of nature (natural systems sciences) and how they can be applied to engineered systems.

Awesome autonomous system control at University of Pennsylvania GRASP Lab. [Watch](#) quadrotor fly through hoops tossed in the air. [Watch](#) quadrotors working as teams. [Watch](#) quadrotor doing a number of tricky maneuvers.

Want some more? The Stanford/Berkeley Testbed of Autonomous Rotorcraft for Multi-Agent Control (STARMAC) is a multi vehicle testbed used to demonstrate new concepts in multi-agent control on a real-world platform. [Watch](#) quadrotor do self-controlled back flips, and more.

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## Connect to Your Community of Practice

Chapter meetings with a focus on systems engineering are held monthly, usually the second Wednesday, except in December. The December meeting is an annual social event, with mingling, dinner, and a speaker chosen for enjoyment by systems engineers and guests alike.

Monthly meetings feature speakers from out-of-town that are visiting the area for other reasons, and local (more or less) subject matter experts on topics of relevance.

On occasion special facility tours are arranged, sometimes as the monthly meeting, and other times on a separate schedule.

Chapter meetings begin at 4:45. After chapter news, announcements and introductions, the presentation and discussion generally lasts until 6:00, all carried live on Live Meeting for those who can't attend. Recordings are not made.

Tutorials with in-depth coverage on topics of interest are arranged approximately twice a year. Delivered by experts in the field, tutorials range from 1/2 day to day+ durations, and generally involve a tuition.

Mix with people who have the same professional interests as you do, but with a diversity of perspective beyond daily

workmates. It comes in handy when you need help or answers to questions outside your accumulated experience, need a connection at another organization, or simply want some mind stretching thought.

Meeting and event notices routinely go to all INCOSE members within the Chapter's geographic territory; but Live Meeting connections, special notices, and collaborative opportunities are generally limited to registered Chapter members. Obtain chapter membership on the INCOSE web site by changing your profile or so selecting as you renew membership.

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### Chapter Board

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