INCOSE Chesapeake Chapter
International Council on Systems Engineering

E-Newsletter

August 2013
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President's Point of View
Taking Stock of the Chapter

Dr. William Ewald - INCOSE CC President
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This month, I thought I would pause and take stock of the relative health of our Chapter. The bottom line is that we are doing very well indeed - illustrated by our recent 2012 INCOSE Gold Chapter Award which recognizes those chapters that reach the highest goals and standards established by INCOSE. This honor is the latest in a series of such awards over the past several years. We have consistently maintained a strong track record of serving our membership and advancing the cause of systems engineering. This has not gone unnoticed by the hierarchy of INCOSE, best described by the remarks of David Long, President-Elect, in his recent visit with our Board of Directors when he stated we are one of the strongest if not the strongest chapter in the United States – high praise from someone who will be the next President of INCOSE! What have we done to merit these accolades? A representative but not an inclusive list of accomplishments would include:

- First and foremost we have a strong technical program that includes monthly meetings in which well-regarded subject matter experts provide us with a diverse array of issues and topics related to systems engineering. These are frequently backed up by week-end seminars and workshops that allow for a more in-depth analysis and exploration of the monthly meeting topics. We are already scheduling our speakers for next year. Based on the quality of our Program, we have consistent had a strong turnout and attendance at our monthly chapter dinner/networking meetings and our technical presentations. In an effort to better serve all of our members, we are exploring ways to connect electronically with members who reside several hours away from our monthly meeting site at the Johns Hopkins Applied Physics Laboratory.
- In a related area, the Chapter is sponsoring a "Future of Energy" initiative that is in an early discernment phase of considering the best roadmap for going forward. There appears to be a critical mass of interest and support, and we are building on this base to expand our reach and establish a strategy that will be compelling and sustainable. Past accomplishments

In Vol. 4 Issue 8

This is the monthly newsletter for INCOSE Chesapeake, a local chapter of INCOSE International. We are a not-for-profit organization dedicated to providing a forum for professionals practicing the art and science of Systems Engineering in the Northern& Central Maryland & Southern Pennsylvania area.

The Chesapeake Chapter is always looking for volunteers to speak at our upcoming meetings! Please contact our 2013 Programs Director, Dr. Alex Pavlak, if you would like the opportunity to speak or can recommend someone.

include a best paper award at the Rome IS, strategy sessions with a local foundation, a plethora of additional paper submissions, a Web-site refresh, and other such activities.

- Our attendance at the yearly International Symposia (IS) and International Workshops (IW) is very impressive. At the last IS, we had 20 members in attendance, the second largest turnout in absolute numbers (the Washington Metropolitan Chapter was first with 27 members attending). From a percentage of the chapter attending, we topped the list. This occurred despite the impact of sequestration and canceled travel funds by many companies and government organizations.
- In partnership with the INCOSE Foundation, we are into our third year of awarding scholarships to deserving undergraduate engineering students at the University of Maryland and the University of Maryland Baltimore County (UMBC). We are steadily building a dedicated financial corpus with the Foundation to insure that these awards will be in force for decades to come. In this regard, we are serving as a benchmark for other INCOSE Chapters. As an added note, we are in the early stages of considering naming another award in memory of Carol Hutchinson, a Past-President and very active member of our chapter who recently passed away.
- On a yearly basis we now have a Chapter Systems Engineer of the Year Award to honor one of our members for outstanding contributions to the field of systems engineering. We also sponsor an annual gala celebration to honor all (not just INCOSE members) Maryland residents who have recently achieved certification as a systems engineering professional (CSEP). For the latter, we typically invite INCOSE Officers and Board Members as guest speakers.
- We are exploring the viability of supporting an INCOSE student division. Given the transitory nature of student members, it is quite a challenge to build an infrastructure that can accommodate the constant turnover due to graduation. One possible avenue in the exploration process may be through our Memorandum of Understanding (MOU) with the University of Maryland Institute for Systems Research (ISR). This is a cooperative effort that establishes a partnership to fulfill the goals of INCOSE and the educational mission of the ISR.

Not bad. Combine these accomplishments with our strong financial position and a competent, dedicated, and committed Board of Directors, it is no surprise that we won the Gold Chapter Award. But we cannot rest on our laurels. We need to recruit the next generation of Board members - with three positions open this year (President-elect, Membership, and Secretary). We need to continue our very strong technical program, and explore ways we can better connect to and serve our members. We need to be strategic in our thinking so that we can leave exciting legacies for future members. And much more. In closing allow me to express my sincere appreciation to all our members for their support and participation in Chapter activities. You are the glue that holds us together, and we could not be as strong as we are without your help.

Bill Ewald - INCOSE Chesapeake Chapter President

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The Chesapeake Chapter of INCOSE is proud to recognize the following organizations for sponsoring our endeavors to expanding the understanding and appreciation of Systems Engineering in the local area:

Booz | Allen | Hamilton

The Institute for Systems Research
A. JAMES CLARK SCHOOL OF ENGINEERING

clovis
A Division of Eliassen Group

serco
Bringing service to life

Camber
Customer Focused, Employee Driven

CyberCore TECHNOLOGIES

APL
The Johns Hopkins University

Dinner/Lecture 21 August 2013 (6:00 – 8:00 pm)

Laying a Secure Foundation for Mobile Devices

Mr. Stephen Smalley, National Security Agency

Presentation: Modern mobile devices such as smartphones and tablets have become fully general computing systems with a rich third party application ecosystem and user experience. As such, the same security problems that have long plagued the personal computer (PC) industry are becoming increasingly evident on mobile devices. Addressing these threats effectively requires a secure foundation, including both hardware and software mechanisms. Device OEMs and mobile operating system developers have an opportunity to establish such a foundation by providing the right primitives for constructing secure systems and enabling their use in commodity mobile devices. Many of the same security constructs that have been applied in the space of client and server PCs can and should be brought to the mobile arena. In this talk, we lay out a vision for secure mobile computing, including a discussion of the roles that virtualization, trusted computing, and secure operating systems play in an overall security architecture and how these mechanisms can be realized in mobile devices today.

Bio: Stephen Smalley is a computer security researcher in the Trusted Systems Research organization of the US National Security Agency (NSA). He presently leads the NSA's Security Enhancements (SE) for Android project, which is advancing the state of the art in mobile operating system security. Prior to his work on Android, Mr. Smalley led the development and successful technology transfer of Security-Enhanced Linux (SELinux) to mainline Linux and co-developed Flexible Mandatory Access Controls (FMAC) for the OpenSolaris project. Mr. Smalley received the Meritorious Civilian Service Award in 2009 for his contributions to NSA's Information Assurance (IA) mission by raising the security bar in commodity and open source operating systems. He received a Director of National Intelligence (DNI) Fellows Award in 2005 for his technical achievements within the Intelligence Community.

Location: **Applied Physics Laboratory, Johns Hopkins University**; 11100 Johns Hopkins Rd Laurel MD 20723 (Main Entrance – Lobby 1)

>>Download the Meeting Flyer Here<<

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Don't Miss September's Dinner/Lecture: 18 September

The AP1000, A Third Generation Nuclear Reactor

This Newsletter is to serve our members and is open to all for contributions. Do you have an interesting idea for an article? A review of a new book related to engineering? Let us know. We'd love to hear about. It may wind up in a future issue of our Newsletter.

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Mr. Andrew Drake

Presentation: Since the first nuclear powered submarine (USS Nautilus - 1954) and first commercial nuclear power electrical generation station (Shippingport, PA – 1957) Westinghouse has been the industry leader in the development/evolution of larger and safer commercial nuclear power electrical generation stations. The early commercial nuclear power plants were typically less than 600 Megawatt electric two-loop plants that were "upsized" to 3-loop and then to 4-loop plants. As plants were "upsized" the size and complexity of the structures, components and instrumentation grew. In the late 80s Westinghouse recognized that a different "simplified" design was needed if nuclear power was to remain an economical source of electricity. This presentation will cover major differences between the previous generation of plant designs and the Westinghouse AP1000™ and the status of AP1000™ plants currently under construction.

Bio: Andrew Drake has thirty-two years' experience in nuclear industry. Eight years of experience in commercial Pressurized Water Reactor operations, training and training material development including Senior Reactor Operator (SRO) Certification, SRO Instructor Certification. Fifteen years of experience in project management including resource planning, program/project scheduling, cost management and invoicing. Sixteen years in various management/senior management positions related to major new plant construction/startup projects. Andrew has a BS in Physics and a MS in Nuclear Engineering. He is a certified Project Management Profession (PMP) and currently President of the Plum Borough School Board.

>>Check out the Event Flyer Here<<

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Did you miss last month's lecture?

MBSE Current State and Directions

Mr. Sanford Friedenthal

Sanford Friedenthal is an INCOSE Fellow, and industry leader in model-based systems engineering (MBSE) and an independent consultant. At Lockheed Martin, he led the effort to enable Model-Based Systems Development (MBSD) and other advanced practices across the company. His experience includes the application of systems engineering throughout the system life-cycle – from conceptual design, through development and production on a broad range of systems in aerospace and defense. While a systems engineering department manager, Friedenthal was responsible for providing systems engineering people, process, and tools to the programs. Friedenthal has been a

leader of the Industry Standards effort through the Object Management Group (OMG) and INCOSE to develop the Systems Modeling Language (OMG SysML™) that was adopted by the OMG in 2006. He is co-author of A Practical Guide to SysML™.

>>View the After Action Report Here<<

Upcoming Tutorial, 21 September, by Mr. Sanford Friedenthal

Description: Model-based systems engineering (MBSE) formalizes the practice of systems engineering through the use of models. This tutorial describes what MBSE is and the motivation for transitioning to MBSE from a document centric approach. The tutorial introduces the OMG Systems Modeling Language (OMG SysML™) and some of the key language concepts needed to represent the system requirements, behavior, structure and parametrics. The tutorial also includes a short introduction to an MBSE method called OOSEM that leverages SysML™ to support the specification, architecture design, and analysis of systems. The tutorial format is a slide presentation. A SysML tool is demonstrated by the instructor but is not the focus of the tutorial. The book entitled "A Practical Guide to SysML' provides a detailed reference for people who choose to learn more about MBSE using SysML.

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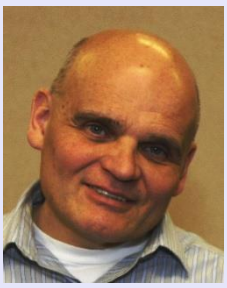
COVERAGE FROM IS2013

Wicked Problems in Systems Engineering



Dr. Donald York, CSEP

Professor Brian Collins, Professor of Engineering Policy at University College London, provided Tuesday's keynote address to the INCOSE 2013 IS attendees. One of the topics addressed by Professor Collins was the notion of "wicked problems" in Systems Engineering. Professor Collins noted that we attempt to make wicked problems into and call them projects so that we can use project management to manage them. He related this incorrect approach to the old adage that when you have a hammer, everything looks like a nail. Wicked problems are such that they are not usually understood until after the formulation of a solution. You learn by doing. Also, unlike a project, wicked problems have no stopping rule, no beginning and no end. Every wicked problem is fundamentally unique and new. Every solution to a wicked problem is a one shot solution and solutions to wicked problems are not definitively right or wrong. In his discussion of wicked problems, Professor Collins referenced the book *Complexity Demystified: A Guide for Practitioners* authored by Patrick Beautement and Christine Broenner. As part of his plenary address, Professor Collins cited three real-life case studies to frame for the audience not only a picture of wicked problems but also of system complexity and system synthesis. One of these case studies or a particularly "wicked" systems engineering problem was the April 2010 eruption of the Eyjafjallajökull volcano in Iceland which caused enormous disruption to air

travel across western and northern Europe. Approximately 20 countries closed their airspace to commercial jet traffic affecting more than 100,000 travelers and costing Europe 2.5 billion pounds per day. In conclusion, Professor Collins asserted that identifying critical interdependencies between COIs, enabling co-evolution of solutions to joint problems that also deliver mutual value-based benefits, and enabling embedded learning to help all COIs to mature should all be part of any approach to systems complexity, synthesis and wicked problems.

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Power & Energy at IS2013

Dr. Alex Pavlak, CSEP

The P&E working group held a workshop on Tuesday afternoon. One of the questions was: "What can the P&E group do to impact the world around us?" Next May, the IEEE EnergyTech2014 will be co-hosted by INCOSE and the AIAA. My suggestion is that we organize two sessions: a technical session on modeling the power grid followed by a panel discussion. The popular approach is to simulate the grid as it exists and add renewables. A more traditional concept development approach advocated by the Chesapeake Chapter Future of Energy Initiative (FoE) is to start with simple concept models and add complexity in stages. Assessing transmission constraints with a mesh network has its own difficulties as it is an NP-hard problem. IS2013 had a roundtable session that was directed at the question: "What information is necessary to begin clean energy concept definition phase?" The FoE perspective is current knowledge and a goal. There was a heated discussion as most folks felt the goal needed stakeholder buy in. The FoE perspective is stakeholder buy in and value choices comes at milestone B, at the conclusion of concept definition. I presented a paper titled System Implications of Intermittent Generators. Slides are available here. The basic conclusion is that we need thorough concept modeling. It appears that 99% renewable systems are technically feasible, but they will be expensive and have substantial environmental impact.

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MBSE Tutorials at IS2013

Ted Carney, Staff Writer

The 2013 INCOSE International Symposium kicked off a with variety of systems engineering tutorials and workshops offered on the weekend of June 22nd and 23rd. Targeted at both experienced professionals and early-career engineers, the topics included INCOSE Certification, Project Fundamentals, the SEBoK, Systems Science, and Model-Based Systems Engineering (MBSE). On Saturday, I attended "Applied Systems Engineering: Fundamentals for Project Success," taught by none other than the Chesapeake Chapter's own Zane Scott, of Vitech Corporation. The material provided an introduction to applying the principles of MBSE to many types of projects. Zane used his unique perspective – he informed the class that he began his career as a trial lawyer rather than a systems engineer – to show how MBSE can be applied to not only product

and system development, but processes and organizations as well. The tutorial was a quality preface to Sunday's more "down-in-the-weeds" MBSE tutorial. Warren Smith, also of Vitech Corporation, led Sunday's tutorial entitled "Essential Model-Based Systems Engineering: Applied and Practical." The course provided an in-depth survey a MBSE techniques, and also gave participants an opportunity to implement MBSE strategies while working in teams on a simulated design project. The drawing of several structural and behavioral diagrams certainly demonstrated the value of MBSE tools that propagate any changes to the model on throughout the associated diagrams (e.g. CORE or Rhapsody, which interested persons could demo throughout the rest of the week at various vendors' booths). For me, the weekend of tutorials was more than an opportunity to learn about the latest systems engineering methods; the MBSE tutorials that I attended put me in the "SE mindset" as I headed into the rest of IS2013.

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Monday at IS2013
Ted Carney, Staff Writer

With the hustle-and-bustle beginning before 7:00am, Monday morning on June 24th saw symposium goers proceed up the escalators of the Philadelphia Marriott Hotel, stop briefly at the blue and white Symposium Registration booths, and then take their seats in the Franklin Hall auditorium. Everyone was eager to hear Monday's keynote speaker, the US Deputy Assistant Secretary of Defense for Systems Engineering, Mr. Stephen Welby. Quipping that he may be the only federal employee with "Systems Engineering" in his title, Mr. Welby delivered his keynote entitled "21st Century Engineering: Challenges and Opportunities." One of the central challenges Mr. Welby believes is facing the SE community – and indeed the entire scientific community – is the attraction of young, bright minds to the field. He noted that the majority of college graduates in the US are women, and that the percentage of women graduating with engineering degrees remains miniscule, a remark that resonated with the audience. Mr. Welby offered his vision of how to combat this and other issues, and received quite a round of applause from very approving crowd. The rest of the day presented those in attendance with an array of choices, from perusing the dozens of exhibitor booths in the Exhibition Hall, to sitting in on panels and paper presentations on a variety of SE topics. Presentations were categorized according to several technical tracks – Systems of Systems, SE in Automotive, Ontology, Technical Operations, MBSE, Cost Reductions, and Lifecycle Improvement. The wide range of topics gave attendees the unique chance to learn about the latest trends in SE from many different perspectives. Personally, I enjoyed paper presentations on Lifecycle Improvement, a panel on Ontology, and segments of the MBSE plenary. From my point of view, IS2013 was an ideal setting for professional networking, be it at a booth, during Q&A after a presentation, or even at lunch. I found the INCOSE International Symposium to offer great value, and I recommend anyone with the chance to attend one in the future to seize the opportunity.

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Upcoming Events

- August 21: Laying a Secure Foundation for Mobile Devices, *Mr. Stephen Smalley, NSA*
- August 28: Annual SEP Gala
- September 18: The AP1000, A Third Generation Nuclear Reactor, *Andrew Drake, Director, AP1000 Engineering Completion Project*
- September 21: Tutorial: An Introduction to Model-Based Systems Engineering (MBSE) with SysML™, *Mr. Sanford Friedenthal*

Keep up with the latest news and events. Find out about our new Board of Directors. Explore our extensive library of previous lectures from our Monthly Dinner Meetings. Learn of the Benefits of Joining INCOSE. Check out Systems Engineering education in the local area. All this and more awaits you at our INCOSE Chesapeake Chapter Website.

For any comments or suggestions about this newsletter please e-mail our President, William Ewald or our Communications Officer, Oren Eisner. We value your feedback.

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