The Enchanted View
— Thinking About Systems —

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www.incose.org/enchantment

Way to Go!

Anthony Matta, President— Hello Enchantment members!

I am thrilled to see the amount of impactful presentations and networking opportunities we have already encountered so early in the year. The chapter monthly presentations have been great along with Rick Dove's co-presentation with the Arizona Chapter. We had the INCOSE International Workshop (IW) in January of which 11 Enchantment members attended this wonderful networking and educational event. This seems to be a new record for our chapter and an outstanding name is being made for our membership! Way to go!

In the spirit of encouraging new ideas, Board of Directors member Jason Jarosz led an out brief from the IW to bring back hot topics and new upcoming ideas that could benefit our membership. Thanks Jason! This event plugs us into the greater Systems Engineering community in which we can have impact through the many working groups and change the SE discipline in a large way. I would like for you all to consider participating in one of these groups and/or pursuing your SE certification. If you are interested in either, the IW can be a great place to get started. Make sure to consider it for next year.

Also, keep the new ideas coming! This year we have already changed by adding a collaborative out brief mentioned above, simplified the chapter presentation surveys, have a scheduled lunchtime monthly presentation, and the 2017 Socorro Summit topics are being collected to continue this forward momentum. Your voice has impact so remember to reach out to any board member, myself armatta@sandia.gov, or follow us on our website and social media to get connected to all our upcoming events!

Chapter Members at IW17

Ed Carroll	Jason Jarosz
Rick Dove	Anthony Matta
Anthony Matta	Jessica Weems
Ron Lyells	Regina Griego
Heidi Hahn	Mark Rosenthal
Regina Griego	Laura Salguero

The 11th Chapter member at IW17, not pictured, was Bob Malins, busy with Health Care WG activity at picture time.

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2017 Socorro Systems Summit—October 6-7

As in 2016, we need your help for 2017. The 2017 Summit will again have eight working sessions on topics that can benefit from collaborative thought by people interested in learning more about what others know and think. But what should the 2017 topics be?

The objective is to increase the knowledge base of participants wrestling with issues at work, with benefit from broader exposure to what others with similar issues and interests have experienced, are thinking, and know.

We want to choose 8 workshop topics that are of value to you and your organization. We seek your input on choosing topics that will inspire you and others in your organization to attend and participate.

Page 7 of this newsletter provides some food for thought, and also places the Summit and its topic workshops in context with Vision and Mission . ∞

Chapter Wins 2016 INCOSE Platinum Award

2016 is the second year that INCOSE offered a Platinum Award, and the second year that the Enchantment Chapter has earned it. Excerpted from March 23rd letter sent by the INCOSE Director for Americas Sector:

On behalf of the International Council on Systems Engineering (INCOSE), we are pleased to recognize the Enchantment Chapter as a **Platinum Circle Award Chapter** based upon its contributions and accomplishments in 2016. The Platinum Circle Award recognizes chapters adopting best practices and reaching the highest goals and standards established by our organization.

Chapters organize technical and social programs, communicate key information about our organization and discipline, support technical activities, and enhance the member experience by facilitating an open, inviting environment where members receive valued products and services that enhance their careers. In fulfilling this mission, the Enchantment Chapter leaders and members have committed significant time and energy to further the goals of our organization.

To honor these efforts and achievements, this Platinum Circle Award will be presented during the Wednesday Plenary at the 2017 INCOSE International Symposium in Adelaide, Australia. In doing so, INCOSE recognizes and celebrates the contributions and achievements of the Enchantment Chapter, its leaders, and its sponsors. ∞

Spring Tutorial: Agile Risk Management—Rick Dove
May 19—Registration is Open Now

Mary Compton, Sandia National Labs

To be effective, projects/processes/products (all viewed as systems) have to mate well with their operational environments. Operational environments are not static, they react to disturbances and evolve with opportunity and whimsy. Inserting a system into an environment is a disturbance. Sustaining a system in an environment entails compatible evolution.

The environment is the problem space the system will occupy. Understanding the requirements for a compatible-to-the-space solution is best done before system functional requirements get too far ahead and shape an incompatible path.

But how do we characterize the environment as a dynamic problem space and develop solution-response requirements, sufficient to guide the design of risk-mitigating agility? Characterizing the problem space is an ill-structured problem. It cannot be expressed in numbers and equations, nor solved with algorithms. This tutorial provides heuristic frameworks for developing useful characterizations of the problem space, and for developing risk-mitigating requirements for the solution space; grounded with real examples and in-class application practice.

Given enough understanding about the problem, effective solution requirements and features becomes (almost) obvious. The problem shapes and constrains effective solution, but only to the extent that we understand it.

Participants will receive: a) Instruction: a series of heuristic tools will be introduced. b) Examples: how others have characterized their dynamic problem spaces. c) Practice: engagement in application exercises. d) Reference material: soft-copy course notes and case studies on the examples.

Features to be Learned:
- System goal-development framework
- Environment characterization framework
- Reality factors framework
- Solution response-requirements framework

Advantages to be Obtained:
- Context-driven top-level goals
- Problem space illumination
- Risk-response needs established
- Traceable solution design decisions

Benefits to be Realized:
- System environment compatibility
- Projects that mitigate evolving risk
- Processes that deliver on purpose
- Products that are sustainable

The course is aimed at:
- Beginners to experienced SE practitioners
- Engineers of all disciplines
- Project managers
- System requirements developers

Rick Dove is a leading researcher, practitioner, and educator of fundamental principles for agile enterprise, agile systems, and agile development processes.

In 1991 he initiated the global interest in agility as co-PI on the seminal 21st Century Manufacturing Enterprise Strategy project at Lehigh University. Subsequently he organized and led collaborative research at the DARPA-funded Agility Forum, involving 250 organizations and 1000 participants in workshop discovery of fundamental enabling principles for agile systems and processes.

He is CEO of Paradigm Shift International, specializing in agile systems research, engineering, and education; and is an adjunct professor at Stevens Institute of Technology teaching graduate courses in agile and self-organizing systems.

He chairs the INCOSE working groups for Agile Systems and Systems Engineering, and for Systems Security Engineering, and is the leader of the current INCOSE Agile Systems Engineering Life Cycle Model Discovery Project. He is an INCOSE Fellow, and the author of *Response Ability – the Language, Structure, and Culture of the Agile Enterprise*.

Time:
Registration 7:30 – 8:00 a.m.
Tutorial 8:00 a.m. – 5:00 p.m.

Date: Friday, May 19, 2017.

Place: Room 207, Workforce Training Center (WTC), 5600 Eagle Rock Ave. NE Albuquerque, NM 87113,
www.cnm.edu/depts/wtc/index.html.

Registration & Payment: Register via EventBrite: www.eventbrite.com/e/agile-risk-management-tickets-32600226154. INCOSE members: $125; non-members: $175; students: $0. You will receive an email receipt from EventBrite, which will act as your confirmation. If you have trouble registering or paying, or to register and pay by check, contact Mary Compton at mlcompt@sandia.gov.

Directions: From Junction of I-40 and I-25 in Albuquerque take I-25 North to exit 233, Alameda Boulevard. Take a left and cross the freeway.

Package: The tutorial cost includes **soft-copy downloadable** tutorial notes, lunch and snacks.

Contact: Other questions? Contact Ann Hodges at alhodge@sandia.gov. ∞

Open Questions. What is a System? What is Systems Engineering?

Regina Griego, Sandia National Labs

At the request of the INCOSE BoD the INCOSE Fellows Chair coordinated a Task Team composed of nine INCOSE Fellows, with Hillary Sillitto serving as the chair, to develop a white paper that offers the best current definition of System and Systems Engineering, and provides strong rationale for the definitions. The intent is to develop more inclusive definitions that serves INCOSE better in fulfilling their Vision and Mission as well as the INCOSE Vision 2025. A paper on the definition of the word system was accepted for INCOSE IS2017. This project came about after a lengthy Fellows discussion during the first half of 2016, with no clear consensus, but a clear agreement to find one. The June 14 Chapter talk (abstract next page) previews the findings. ∞

Recent Meetings

Ann Hodges, Sandia National Labs

Presentations and recordings are in the Library at www.incose.org/enchantment.

January 2017—Dr. Heidi Hahn, Los Alamos National Laboratory, presented *A Mission Assurance Framework for R&D Organizations.* This talk described the LANL approach to developing and implementing the Mission Assurance Framework and discussed the policies, tools, and training that support the diverse set of projects performed across the Laboratory's mission space. Emphasis was placed on the SE and engineering quality aspects of the Framework.

February 2017—Mark Blackburn, Stevens Institute of Technology, presented *Transforming Systems Engineering through a Holistic Approach to Model-Centric Systems Engineering.* This talk summarized research, with targeted organizational discussions to address the research question, the concept of a "future" state, and a new operational model between Government and Industry.

March 8, 2017—Alan Benson, California Department of Transportation, presented *Integration of Agile Principles into the Systems Engineering Lifecycle Model*. This talk discussed Caltrans's experience with integrating Agile principles into the Systems Engineering Lifecycle Model for software intensive projects. Caltrans found increased stakeholder involvement, immediate validation, faster deliveries of functionality, and reduced rework cycle time by integrating certain Agile principles into the design, development, and integration phases of the project.

March 13, 2017—Rick Dove, Paradigm Shift International, held a joint Chapter meeting at the SOARizon Chapter, broadcast via GlobalMeet for Enchantment Chapter attendance. Titled *Enabling and Facilitating Agility in Systems Engineering and Hardware Development,* this talk reviewed initial findings for generic fundamental agile systems engineering life cycle patterns and principles arising from four analytical investigations at Lockheed Martin, Rockwell Collins, Northrop Grumman, and SpaWar System Center Pacific

March 15, 2017—Jason Jarosz, Sandia National Labs, convened an experimental IW17 out brief meeting at ATA that reviewed observations of various attendees at IW17. This was an interactive event with a handful of slides, and not recorded. Feedback was positive. Present in person were: Ed Carroll, Regina Griego, Jason Jarosz, Ron Lyells, and Bob Pierson. Present via GlobalMeet were: Anthony Matta, Paul McGoey, John Povacz, Jack Ring, and Steve Wall. ∞

Next Meetings *Ann Hodges, Sandia National Labs*

April 12: What the Systems Community Can Learn from ASME Work in Computational Model V&V Standardization.
Bill Schindel, ICTT System Sciences, President.

Abstract: ASME teams are pioneering the generation of guidelines and standards concerning verification and validation of computational models and modeling, helping the related practitioner communities establish a shared view of this important and advancing practice. The INCOSE sister engineering society for general systems illustrates the interest of the systems community in this advance, attracting contributions to the effort, and learning from it. INCOSE has seen explosive growth in generation and use of general system models across many domains, including aerospace, automotive, medical and health care, advanced manufacturing, and infrastructure systems. As these models are consulted for managing risks and opportunities and making decisions that include safety-critical and large financial issues, questions of trust in the models themselves rapidly become critical. In the systems community, those questions are only part of the rapidly evolving context, which also includes the rise of standards-based systems modeling languages, advanced modeling tools, and integrated executable models and simulations as a part of the overall systems model fabric. This talk reflects the perspective of the INCOSE Model-Based Systems Engineering community leadership for V&V of systems models in general, and the opportunity to learn from and contribute to the related ASME standards committee efforts.

May 10: The Art and Science of Systems Engineering – Developing the Next Generation of Systems Engineering Leaders.
Dawn Schaible, NASA, Deputy Chief Engineer.

Abstract. The successful development of complex systems, such as aircraft, spacecraft, power plants, or computer networks, requires both the art and science of systems engineering. Technical Leadership, the art of systems engineering, balances broad technical domain knowledge, engineering instinct, problem solving, creativity, leadership, and communication to develop new missions and systems. Systems Management, the science of systems engineering, focuses on rigorously and efficiently managing the development and operation of complex systems. Developing systems engineering leaders who are highly competent in both technical leadership and systems management can be a challenge for all organizations. This presentation will discuss how NASA is addressing the challenge through its Systems Engineering Leadership Development Program.

June 14: Defining "System" – A Comprehensive Approach.
Regina Griego, Sandia National Laboratories, Distinguished R&D Systems Engineer.

Abstract. Over the past decades, a common definition of the term system has eluded researchers and practitioners alike. We reviewed over 100 current and historical definitions of system in an effort to understand perspectives and to propose the most comprehensive definition of this term. There is much common ground in different families of definition of system, but there are also important and significant differences. Some stem from different belief systems and worldviews, while others are due to a pragmatic desire to establish a clear definition for system within a particular community, disregarding wider considerations. In either case, it limits the effectiveness of various system communities' efforts to communicate, collaborate, and learn from the experience of other communities. We discovered that by considering a wide typology of systems, Bertalanffy's General Systems Theory provides a basis for a general, self-consistent sensible framework, capable of accommodating and showing the relationships amongst the variety of different definitions of and belief systems pertaining to system. Emergence, the appearance of a new phenomenon or capability as a result of relation or interaction between objects, is key in differentiating between objects that are systems and those that are not. Hence we propose a family of definitions, related by the common theme of emergence, which is in line with both the realist and constructivist worldviews and covers real and conceptual systems, which we believe can impact the scope of systems engineering and support the aspirations expressed in INCOSE SE Vision 2025. ∞

Breakthrough Ideas for Gender Parity in Engineering

Regina Griego, Sandia National Labs

At the INCOSE International Workshop the Empowering Women as Leaders in Systems Engineering (EWLSE) group held a brainstorming session on "Breakthrough Ideas for Gender Parity in Engineering." The premise of the brainstorm is that progress has been very slow or stalling for increasing women in engineering, particularly systems engineering. The exercise was to address: What are breakthrough ideas to the goal of achieving gender parity within 20 years. A tall order, but the participants in the EWLSE brainstorming session formed four groups of about 5-6 people in each and were provided ideas on visioning for a future of gender parity. The teams were named Team Amazing, Team Wonderful, Team Diversity, and Team Respect (all self-named).

The themes that came forward included: changing culture within and outside engineering companies, creating advocacy and self-accountability throughout organizations, and impacting the future through the education system.

Changing culture by far was discussed greatest by all the teams. Internal culture ideas included respect for work/life integration choices, creation of explicit local culture on teams to level the playing field, and consciously create opportunities for women leaders (make promotion path explicit, not implicit to the in-crowd). External culture included changing pop-culture's portrayal of "women's work or roles" and funded research on the value of gender diversity specifically in engineering.

On the theme of creating advocacy and self accountability for gender parity, ideas like creating explicit champions in the engineering line management for gender parity, training all managers to be advocates for diversity (in particular gender parity), providing mentoring groups and nurturing a mentoring environment, and encouraging everyone to self-monitor to make the culture gender-friendly.

For the last theme on impacting the future through the education system, ideas included creating more gender parity among faculty, pairing women students (in particular graduate students) with industry mentors, training engineering faculty on implicit bias and diversity awareness (particularly aimed as gender issues), hosting women engineers as visiting lectures for engineering classes, and sponsoring "take a girl to work" days regularly (not just daughters).

There was lively discussion during each group's brainstorm. More people joined as the teams reported out and discussions were even more animated. We intend to further the conversation at the Conference on Systems Engineering Research (CSER) at Redondo Beach in Los Angeles with an EWLSE panel to be held 10:30-noon Saturday, March 25th, and again at the INCOSE IS 2017 with an EWLSE panel "Systems Engineering Leadership: Navigational Instruments and Guides." ∞

Not For Women Only

Heidi Hahn, Los Alamos National Lab

A few links to articles and videos.

Amy Cuddy: Your Body Language Shapes Who You Are. Watch » Body language affects how others see us, but it may also change how we see ourselves. Social psychologist Amy Cuddy shows how "power posing" — standing in a posture of confidence, even when we don't feel confident — can affect testosterone and cortisol levels in the brain, and might even have an impact on our chances for success.

I show this to my Future Female Leaders in Engineering students, and thought chapter members might enjoy it too!

The NASA Rocket Scientist Leaving Mars For Politics—From The Atlantic Monthly. After 13 years at her dream job at the Jet Propulsion Laboratory, Tracy Van Houten (who is a systems engineer, by the way!) feels newly called to run for office. Article at www.theatlantic.com/science/archive/2017/02/nasa-tracy-van-houten/517335.

Female Tech and Entrepreneur Experts Wanted: How to Get Yourself on Stage and in the Press, by Patricia Fletcher. How one woman stopped complaining that there were no women on stage at tech events and decided to do something about it.

Read about it here: www.inc.com/patricia-fletcher/female-tech-and-entrepreneur-experts-wanted-how-to-get-yourself-on-stage-and-in-.html.

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A Survey Request

Heidi Hahn, Los Alamos National Lab

Empowering Women as Leaders in Systems Engineering (EWLSE) is a relatively new INCOSE initiative in which men and women work together as advocates for women as leaders in systems engineering. One of the interests that EWLSE has is in collaborating at the INCOSE Chapter, Regional, and Sector Levels. EWLSE is interested in knowing the level of interest in establishing such collaborations with chapters and in what form they would be most helpful. Results will be aggregated and shared with Enchantment Chapter leaders as input into their strategic plans.

Please give us your opinions on this short (5 minutes or less) survey. You will find the survey here: www.surveymonkey.com/r/EWLSE ∞

UTEP Student Division News

Eric Smith, University of Texas El Paso
Pepe Martinez, VP UTEP Student Division

SE Handbook v4.0 Technical Processes Simulated at UTEP

Active learning was investigated at the University of Texas at El Paso as Systems Engineering students learned the SE Handbook v4.0 Technical Processes by walking Outputs-Inputs from one technical process to the next on posters.

Student feedback was that they picked up the essence of the technical processes quickly.

Further improvements for the simulation could include expansion to supporting processes, as well as gamification of the learning exercises. The posters were produced and created by UTEP graduates Edgar Lozano and Ricardo Villa.

SE Boot Camp on UTEP Campus taught by Lockheed

25 University of Texas at El Paso students, including 20 undergraduates and 5 graduate students, benefitted from the opportunity to learn Systems Engineering as taught and as needed by the nation's largest defense contractor. Lockheed senior engineers Mike Yokell and Gary Mitchell taught a longer form of the Lockheed Martin Aeronautics internal Systems Engineering Boot Camp on the UTEP campus on Jan. 2-14. Lockheed engineer and UTEP alum Octavio Castellanos also taught part of the course, as did UTEP professor Oscar Mondragon. Student feedback from the course was excellent, as active participation is emphasized. Students will receive Lockheed-internal credit upon hire to Lockheed. The course will be taught again May 15-27, and is planned to be taught twice per year.

UTEP graduate and undergraduate students work on SE Handbook v4.0 Technical Processes as advisor Eric Smith observes.

Students work to design and integrate the sub-systems of their Boot Camp project.

ASEP Certification Sessions

ASEP (Associate Systems Engineering Professional) certifications is UTEP's INCOSE Student Chapter main goal for this semester. As chapter development, members are being asked to volunteer to read and present a section of the INCOSE Handbook. The requirements are to read the section, understand what it is talking about and present it during meetings, while also relating it to the 'real world.' If there are any questions, whether from the presenter or the other members of the organization, the sponsor Dr. Eric Smith is present to help clarify.

UTEP INCOSE & Lockheed Martin Lunch

As part of Engineers Week Celebration this past month, the INCOSE Student chapter was invited by Lockheed Martin to join them for a 'Meet & Greet' session to meet the new Systems Engineering Director, Dawn Halom, and former director, Andre Trotter. Members had the opportunity to engage and interact with LM Aero professionals and discuss potential mentorship opportunities, as well as industry-related problems. Additionally, Lockheed Martin brought F-35 and F-16 cockpit simulators to have a better understanding of their products and their technology development.

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Samuel Terrazas
President

Pepe Martinez
Vice President

Natalla Acosta
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Jose Olivaros
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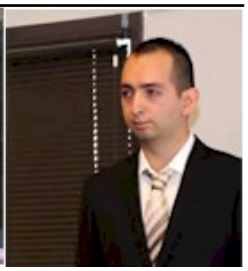
Gustavo Marquez
ASEP Coordinator



Leo Orea
Outreach Coordinator

2017 Executive Board

Object-Oriented Systems Engineering Method Working Group

Howard Lykins, Chair, OOSEM WG

For over 15 years, the INCOSE Object-Oriented Systems Engineering Method (OOSEM) Working Group has worked to improve the practice of Object-Oriented Analysis and Design (OOA/D) applied to Model-Based Systems Engineering (MBSE) by applying concepts, notations, and methods that:

1. Support the capture, analysis, synthesis, and understanding of complex architectures, systems specifications, technologies, and designs.
2. Improve integration between engineering disciplines including but not limited to systems, human(s), software, hardware, test, environment and logistics.
3. Facilitate Family/System of Systems (FoS/SoS), system-, element-, and component-level reuse and design evolution.

The OOSEM WG is sponsored by the INCOSE Chesapeake Chapter (CC) and the Johns Hopkins University Applied Physics Laboratory (JHU/APL).

We are particularly concerned with integrating MBSE and software-level OOA/D. Stakeholders include all practitioners and users of systems engineering, from a wide range of application areas including but not limited to:

- Aerospace and Defense,
- Agriculture,
- Communications,
- Infrastructure Systems (e.g., Power and Energy, Transportation, Communications, etc.), and
- Information Technology (IT)

Around the turn of the millennium the INCOSE OOSEM WG started studying and advocating OOSEM as a top-down, scenario-driven systems engineering method that used the Unified Modeling Language (UML) to support systems engineers in the analysis, specification, design, and verification of systems, especially the growing number of software-intensive systems. OOSEM was (and is) designed to leverage object-oriented and other modeling techniques to help architect more flexible and extensible systems that can accommodate evolving technology and changing requirements. The method was (and is) intended to ease integration with object-oriented software development, hardware development, and test processes.

In 2006, when the Object Management Group (OMG) announced the adoption of a new Systems Modeling Language (SysML; a systems engineering extension of UML), the OOSEM WG went through its first 'evolutionary' phase: moving emphasis from UML to SysML to support systems engineers in their coordinated work with object-oriented software engineers.

In 2015 the OOSEM WG began another evolutionary phase, with the release of the new Object-Process Methodology (OPM) specification (ISO/PAS 19450:2015; Automation Systems and Integration – Object-Process Methodology). OPM was introduced as another MBSE method with its own language (Object-Process Language, OPL). At this point, in addition to its study and advocacy of SysML and UML, the OOSEM WG began investigating OPM and OPL for object-oriented systems engineering.

In 2015 and 2016 the OOSEM WG, together with the Institute of Electrical and Electronics Engineers (IEEE), hosted Educational Workshops on "Agile Planning" and "Scaled Agile Framework (SAFe)" at JHU/APL. The purpose of the workshops was to introduce attendees to the Agile methods, and to begin discussions of how to make the best use of Agile together with OOSEM.

In the summer of 2017 the OOSEM WG, the INCOSE Critical Infrastructure Protection and Recovery (CIPR) WG, and IEEE will host a series of workshops about applying OOSEM processes and notations to develop system solutions for responding to CIPR-related emergency scenarios.

Future OOSEM WG tasks include:

- Continue investigating how other OO methods and processes, such as Agile and OPM, can be used with SysML and UML to improve OOSEM,
- Investigating tool support for OOSEM,
- Developing new case studies from real-world examples to illustrate uses of OOSEM, and
- Working with INCOSE WGs and other organizations for mutual benefit.

Membership and participation in the OOSEM WG is open to all INCOSE Members interested in learning and advocating Object-Oriented Analysis and Design (OOA/D) applied to Systems Engineering.

We meet at least monthly, usually on the second Saturday of the month, with telephone and Internet available for remote, virtual access. At least once per quarter we meet face-to-face at JHU/APL. We have found this a very effective way for people outside the Washington, D.C. area to participate.

For additional information

- About SysML, see *A Practical Guide to SysML,* by Sanford Friedenthal, Alan Moore and Rick Steiner, and the OMG SysML web page at http://www.omgsysml.org/. The *Practical Guide* contains a good example of OOSEM use of SysML.
- About UML, see the OMG UML website at http://www.uml.org/
- About OPM/OPL, see *Object-Process Methodology* by Dov Dori, or the ISO OPM web page, https://www.iso.org/standard/62274.html
- About the OOSEM WG, contact one of the co-chairs:
  Howard Lykins (Howard.Lykins@Verizon.net),
  Mike Pafford (mepafford@verizon.net),or
  Mark Walker (lmw107@bct-llc.com)

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Quad Charts for 36 Working Groups

INCOSE Technical Operations has posted the quad charts for 36 working groups collected at IW17. In about six Power Point pages these quad charts show for each WG the numbers of "members," basic charter, contacts, and what each working group has done, is doing, and plans to do. You can look at individual WGs or download a zip file with all quad charts. There is nothing quad about these charts; but the information is succinct and an excellent way to get a feel for individual WG activity. The term "members" is used loosely, as this is generally a count of people on the WG email list, and doesn't reflect the number of people actively engaged in WG work. These quad charts are located on INCOSE Connect at the Organization/Technical Operations tab, in the documents sub-directory called TO Materials for 2017, sub-sub directory called 2017 Quad Charts. ∞

2017 Socorro Systems Summit

Rick Dove, Paradigm Shift International

The purpose of the Summit is to facilitate a collaborative exchange of perspectives on systems engineering topics of organizational and personal interest. To make the collaboration meaningful, your input is needed.

Should we do some or all of the same topics this year as last year? Many people wanted to attend topics that they couldn't because they had to choose two from the eight.

Should we do something like last year's topics with a different emphasis?

Are there new topics of interest that weren't on our radar last year? Such as:

- Organizational appreciation/respect for systems engineering.
- Alignment of incremental development and test across multi engineering disciplines.
- Agile SE process transformation.
- Quick reaction capability (ie, an infrastructure-supported capability rather than a brute-force accommodation).
- Integrating Project Management with Systems Engineering

2016 Topics

- Systems Engineering Cultural Transformation
- SE as multidiscipline enabler, art, and science
- High Performance Teaming
- Systems of Systems evolutionary integrity
- Fail-fast rapid innovation concepts
- Agile security adaptable to adversary attack
- Agile hardware-development infrastructure
- Organizational teaming for joint project pursuit

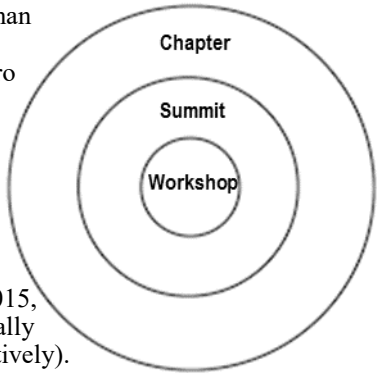
2016 Candidates that didn't make the cut

- Critical infrastructure resilience
- Design concepts of user-embraceable systems
- Meaningful customer involvement
- Integration in large-scale systems for up-grades
- IPT support infrastructure
- T&E for unmanned and autonomous systems
- Sub-contractors as fully engaged team members
- High-value relationships with academic institutions

Send your interests and suggestions to dove@parshift.com. ∞

Context, Vision, and Mission

In the spirit of enterprise as human endeavor, there are three nested enterprises that place the Socorro Systems Summit in context; each with Vision, Mission, Culture, and Learning aspects. The column on the right expresses these aspects in the enterprise framework from *Systems Thinking Made Simple*, by Derek and Laura Cabrera, 2015, Odyssean (a sensible book actually dealing with how to think effectively).



Chapter as INCOSE Enterprise

Vision: a concise future state or goal.

- Organizational encouragement of employee membership.
- Membership utilization for professional development.

Mission: simple repeatable rules that lead to the vision.

- Rule 1: Provide valued services for professional development.
- Rule 2: Engage previously unengaged members.
- Rule 3: Broaden Chapter value awareness in the community.
- Rule 4: Attract new members.

Culture: shared mental models that support the mission

- Everybody has a sense of reward in contributing to the mission.
- Everybody has a voice that is heard and appreciated.
- Everybody comes to learn and improve Chapter effectiveness.

Learning: incremental improvement of the culture and mission.

- Experiment with, evaluate, and evolve Chapter services.
- Experiment with, evaluate, and evolve operating processes.

Summit Concept as Chapter Enterprise

Vision:

- Infrastructure that enables & facilitates collaborative knowledge exchange leading to new actionable understandings.
- Professional development through knowledge exposure, assimilation, and utilization.

Mission:

- Rule 1: Ascertain insufficiently understood topics-of-interest.
- Rule 2: Provide engaging means to participate.
- Rule 3: Provide affordable means to engage (time and cost).
- Rule 4: Create a valued experience for everybody involved.

Culture:

- Vision leadership (centralized initially, acculturated eventually).
- Mission-engaged event development and production team.

Learning:

- Open-ended process-evaluation retrospective.
- Lessons-learned articulated, assimilated, mitigated.

Topic-Workshop as Summit Enterprise

Vision:

- An embraceable problem understanding that illuminates compelling solution-requirements enticing solution investigation.

Mission:

- Rule 1: Articulate a bounded unresolved problem concisely.
- Rule 2: Identify multi-perspective organizational and cultural impediments to recognizing the problem as one in need of attention and solution.
- Rule 3: Converge on broadly acceptable requirements for an embraceable solution.
- Rule 4: Perhaps—Decide on action to work on a solution.

Culture:

- Everybody has a perspective that is heard and appreciated.
- Welcoming to all levels of experience (students to elders).
- Everybody engages as a team on a mission.
- Moderator moderates toward mission (doesn't pontificate).

Learning:

- Real-time evaluation of mission achievement.
- Real-time evaluation of cultural achievement.

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PM-SE Integration Working Group IW17 Report

Heidi Hahn, Los Alamos National Lab

The PM-SE Integration Working Group held its second meeting at IW17. The room was packed! The group is still in formative mode and spent most of the meeting reviewing purpose and goals. The idea is for the group to be the intersection point where systems engineers and program/project managers collaborate and integrate their efforts.

The group also discussed the efforts of the PMI-INCOSE Alliance, a closed working group, which has been working a number of strategic topics. Here is the press release for the most current initiative:

MIT, INCOSE and PMI have formally collaborated for several years on several related strategic initiatives. One major effort has been to develop a book incorporating research our organizations have supported over the past three years focused on the integration of systems engineering and project/program management practices. Thanks to the generous contributions of many INCOSE members, as well as our Alliance colleagues at PMI and MIT, we are pleased to announce that this important new work is now available to the world!

Integrating Program Management and Systems Engineering *is a valuable resource for anyone involved in developmental effort, and particularly those of us who believe that the power of SE is more often limited not by a lack of skills or tools, but instead by a lack of integration into the PM environment in which work takes place.*

Quoting Dr. Art Pyster:

> *"A great contribution to systems engineering and project management, this book lays out the fundamental challenges of integrating these two disciplines and offers well-written practical guidance on how to address those challenges. This is the most comprehensive examination I have seen on the ties between systems engineering and program management."*

This book presents a framework for understanding how these elements combine to improve integration in programs. It uses case studies and acknowledged best practices to show the practical, real world application of the framework. A key contribution of this book is practical guidance on tools, processes, capabilities and structures that enable effective integration between program management and systems engineering.

The book will shortly be offered through the INCOSE Bookstore, and is already available through Wiley, Amazon and other booksellers. Through the INCOSE Store, INCOSE members will receive a 25% discount and CAB associate members qualify for a 12.5% discount off the list price.

INCOSE, PMI, and MIT will be actively promoting this work during 2017, so expect to hear a lot more about this new resource!

To learn more about the book, plan to attend the INCOSE Tech Ops webinar on April 19.

One outcome of the WG meeting was that two Enchantment Chapter Board Members, Ann Hodges and Heidi Hahn, were encouraged to turn work that they have been doing at Sandia and Los Alamos, respectively, into a tutorial for IS18. The topic of the tutorial is developing and tailoring Mission Assurance Frameworks (which, in essence, are structures that integrate Project Management and Systems Engineering, with a dose of Engineering Quality called out for good measure), though the words "Mission Assurance" probably won't appear in the title of the tutorial. We plan to preview the tutorial for chapter members and others who are interested this coming Fall. ∞

Kudos for Merry Mary

From: Jack Ring <jring7@gmail.com>
Sent: Sunday, January 01, 2017
To: Rick Dove <dove@parshift.com>
Subject: Enchantment Newsletter & Mary Compton

The 2017Q1 Newsletter, even better than ever, reminded me to thank Mary Compton for making the Socorro Summit work. A real-life demo of SE and PM synergy all in one, ever-cheerful, person. Thank you Mary. … Jack Ring, Participant. ∞

CSEP Exams Nearby

CSEP Courses by *Certification Training International:*

Course details | Course brochure

2017 Courses Nearby (but many more other places & dates):

April 24-28	| Albuquerque, NM
May 1-5	| Denver, CO
Aug 7-11	| Austin, TX

∞

Fully Printed Product Agile Development For Hardware

3-D printed ammo fired out of a 3-D printed grenade launcher.

http://asc.army.mil/web/news-alt-amj17-rambos-premiere

The first approach printed the projectile body in aluminum, which is less dense than zinc, so the projectile achieves higher speeds than design specifications call for. The printed barrel was hard-coat anodized, allowing for proper rifling engagement with the softer untreated printed aluminum projectile body.

The second approach printed the projectile body in steel, and then molded a urethane obturating ring onto it. The ring ensures proper engagement with rifling in the aluminum barrel.

The third approach utilized a groove and obturating ring, with plastic printed directly onto the steel projectile body.

The fourth approach used a wax printer to 3D-print projectile bodies, then plaster was poured around the wax bodies. Melting the wax away, molten zinc was poured into the plaster mold to cast the zinc projectile bodies. ∞

Resources

From TED, watch: *How to get better at the things you care about*. Working hard but not improving? You're not alone. Eduardo Briceño reveals a simple way to think about getting better at the things you do, whether that's work, parenting or creative hobbies. And he shares some useful techniques so you can keep learning and always feel like you're moving forward, differentiating performance vs. improvement behaviors.

From TED, watch: *How to start a movement*. With help from some surprising footage, Derek Sivers explains leadership, and how movements really get started. So here you can watch a movement happen, start to finish, in under three minutes, and dissect some lessons from it.

From TED, watch: *Smart failure for a fast-changing world*. The world is changing much more rapidly than most people realize, says business educator Eddie Obeng — and creative output cannot keep up. In this spirited talk, he highlights three important changes we should understand for better productivity, and calls for a stronger culture of "smart failure."

From TED, watch: *Your elusive creative genius.* Elizabeth Gilbert muses on the impossible things we expect from geniuses — and shares the radical idea that, instead of the rare person "being" a genius, all of us "have" a genius. It's a funny, personal and surprisingly moving talk.

From PopTech, watch: *On Possibilianism*. Neuroscientist and best-selling author David Eagleman introduces the concept of Possibilianism, a new philosophy that simultaneously embraces a scientific toolbox while exploring new, unconsidered uncertainties about the world around us. http://poptech.org/popcasts/david_eagleman_on_possibilianism

From TED, watch: *Five ways to lead in an era of constant change*. Who says change needs to be hard? Organizational change expert Jim Hemerling thinks adapting your business in today's constantly-evolving world can be invigorating instead of exhausting. He outlines five imperatives, centered around putting people first, for turning company reorganization into an empowering, energizing task for all.

From INCOSE's Complex Systems Working Group, watch: *The systems sciences and systems engineering*. How are (or can or should) the systems sciences and systems engineering (be) related? David Ing presents a perspective on linkages. The ideas are essentially in two parts, with the systems movement as a system of ideas, and ten frames to guide thinking and discussion about changes in society, economics and technology in the 21st century. ∞

Chapter Membership

Jeni Turgeon, Sandia National Labs

No new members joined the Chapter in 2017 Q1.

Enchantment Chapter now has 103 active members and student members.

Regular Members	86
Student members	17

∞

Connect to Your Community of Practice

Chapter meetings with a focus on systems engineering are held monthly on the second Wednesday, except when social events occur, with mingling, dinner, and often a speaker chosen for enjoyment by systems engineers and guests alike.

Monthly meetings feature speakers from out-of-town as well as local 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 pm.

After chapter news, announcements and introductions, the presentation and discussion lasts until 6:00 pm; and are carried and recorded as a web meeting for anybody to access who can't attend in person.

Tutorials with 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 announcements, event notices, and web-meeting links routinely go to all INCOSE members within the Chapter's geographic territory; as well as to names on a special *information* list open to one and all. Sign up for the *information* list with a request to the Chapter secretary listed below. ∞

Chapter Board

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