## Meet The 2013 Officers

Ricardo Pineda, President—Dr. Ricardo L. Pineda holds Ph.D. and M.Sc. degrees from Lehigh University and a B.Sc. degree from Universidad Nacional de Colombia. He is currently the AT&T Distinguished Professor in the College of Engineering, Chair of the Industrial, Manufacturing and Systems Engineering department and the Director of the Research Institute for Manufacturing and Engineering Systems (RIMES) at the University of Texas at El Paso. His background includes recognition as Distinguished Member of the Technical Staff (DMTS) at Bell Labs, and CTO at AT&T in Mexico. His research interests include service systems engineering, network centric systems, application of Architectural Frameworks to SOS, complex systems development management, renewable energy systems, and energy systems security. He is a member of INCOSE, IEEE, IIE, ASEE, ISACA and an Executive Board member for TMAC.   ∞

Ann Hodges, Vice President, President Elect, Acting Secretary—

Ann has over 25 years of experience in systems engineering, software engineering, tailorable policy/practice definition, risk management and project management. At Sandia National Labs, Ann is the Mission Assurance systems engineering lead in the Strategic Management Unit of Defense Systems and Assessments. Previously she has coordinated software quality engineering training and assessments, and was test and V&V manager for over 10 years for projects/programs including WIPP, Hanford waste management/storage, Advanced Atmospheric Research Equipment, Advanced Simulation and Computing, corporate business applications, FAA inspector system, and Air Force seismic treaty verification system).   ∞
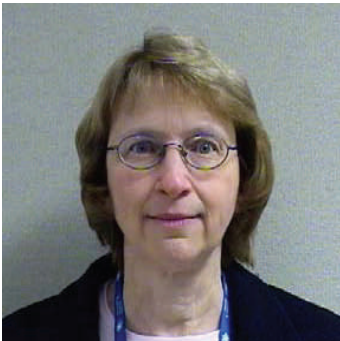
Mary Compton, Treasurer—Mary has worked at Sandia National Laboratories (SNL) since 1990. She has a BS in Biology, a Masters in Library Science, a Masters in Education in Science Education, and an MS in Software Engineering with a specialization in Software Systems Engineering. Mary worked as a librarian for 20 years, half spent working in the Technical Library at SNL. In 2001 she transferred to the Science and Engineering Information Systems group as a systems analyst; she wrote requirements for applications that support nuclear weapons work for the NNSA (the Master Nuclear Schedule and the Weapons Information System) and SNL (the Record of Assembly and the Need-to-Know Engine). In October 2010 Mary became a systems engineer in one of the firing set organizations, and in May 2012 she transferred to a group supporting the ground station for a satellite system . Mary served as Chapter Secretary 2008-2010, and became Treasurer in 2012   ∞

Past President Woody Weed Sums up the 2012 Year
Woody Weed, Sandia National Labs

2012 was a wonderful year for our Chapter. The monthly meetings were lively, several informative tutorials were offered and the Holiday Social presentation was inspiring yet challenging.

Several of our Board members are moving on: Sharissa Young served as a Director, Tana Lucy served as Director and Treasurer, and Heather Kraemer served as Secretary. Their contributions benefited the Chapter immensely. I am sad to see them go and wish them the best in their future endeavors. Sharissa, Tana, and Heather thank you very, very much.

Thank you to all members of the 2012 Board for all of your time and effort. INCOSE depends upon the selfless offerings of volunteers such as you. Several of you contributed many hours of your time and the results are reflected in the products and health of the Chapter.

Our student Chapter at the University of Texas El Paso. Eric Smith and Ricardo Pineda provide guidance and leadership to this important part of our activities.

Thanks to ALL of our meeting presenters this past year. I especially enjoyed MIT's Josef Oehmen discussing lean enablers for managing engineering programs, LANL's John Bernardin giving us a preview of the Mars Rover Curiosity in his talk on the engineering of the ChemCam instrument currently exploring Mars, and Pete Adolph's presentation on the current state of the DoD acquisition, test and evaluation enterprise.

Several tutorials were offered this year to increase your systems engineering expertise. Tyson Browning taught Design Structure Matrix Methods and Applications. Sarah Sheard taught Complex Systems and Complexity Measurement on Programs, and we finished the year with Regina Griego's The System Concept: Bringing Order to Chaos.

Finally, a special thanks to New Mexico Spaceport Executive Director Christine Anderson. Christine shared stories about, and pictures of, Spaceport America at our Holiday Social last month. Her talk was engaging and inspiring; but a legislative hurdle remains to ensure the future of the Spaceport. I urge you to learn more about this hurdle at www.saveourspaceport.com and to encourage your New Mexico legislatures to pass this needed legislation without further delay.

I wish you and yours a healthy and prosperous 2013 and hope you will do your part to further the discipline of systems engineering in the Land of Enchantment and El Paso.   ∞

IW13 INCOSE International Workshop in Jacksonville—26-29 Jan

You won't find this conference-badge-insert of working group sessions on the INCOSE web site, so you might want to print and cut a copy to take with you if you are going. For updates to this 27 December schedule go to the INCOSE IW13 site.

If you haven't decided yet, here's some things to think about ...

Unlike INCOSE's annual International Symposium and other conferences, there are no paper, panel or tutorial presentations. Instead, attendees spend 4 days working alongside fellow systems engineers. Systems Engineers at all levels and from all backgrounds are encouraged to engage in working sessions, and contribute their knowledge and experience to take the discipline forward.

Working group meetings at IW represent about half of the meetings that occur. The other half called "core" are associated with INCOSE committee, administration, forward planning, and networking activities. These include plenary sessions, technical operations planning, International Symposium planning with paper/panel/tutorial selections, regional meetings offering collaborating with neighboring chapters, and of course social networking events. Some of these core sessions are closed for designated committee members only, but most are open.

If you haven't attended any working group (WG) meetings at one of the INCOSE International Workshops, you should feel comfortable in doing so. They are generally informal gatherings of people interested in talking and hearing about the WG area of interest. Working group activity varies, with mixtures of round-the-room discussion, presentations, break-out workshop sessions, activity and project planning, project work, project updates, symposia on scheduled topics, and more.

Open WG & Workshops	Sat 26Jan	Sun 27Jan	Mon 28Jan	Tue 29Jan
Affordability		1300-1600	0900-1200	
Agile Systems & SE			0800-1700	0800-1200
Anti-terrorism Int			0800-1200	
Architecture			1000-1500	
Competency		0900-1200	0800-1200	
Complex Systems	1200-1600	1300-1700	0900-1200	
Infrastructure		1300-1700	1300-1700	0830-1130
Lean Systems Eng		0900-1700	0900-1700	
MBSE Workshop	1000-1700			
Motor Sports				0800-1200
Model Based Concept Eng			0900-1200	
Process Improvement			1630-1700	1330-1400
Product Lines			0800-1700	
Requirements	1030-1730	0900-1700	0800-1700	0800-1430
Space Systems			1300-1500	
Student Division				0800-1130
Systems Eng				
Systems of Systems		1300-1500	1300-1700	0900-1200
Systems Science	1000-1800	0900-1700	0800-1700	0800-1430
Systems Security Eng		1900-1700		
Training			1600-1630	1300-1330
Transportation		1530-1700	1300-1500	
Very Small & Med Ent	1300-1730	1300-1700	0800-1700	0800-1700

Open sessions are the norm, and everyone is welcome to come and participate or simply lurk, whether officially a member of the working group or not. An excellent opportunity to learn what the WG does and decide if you want to join the group. Some WG's, like Biomedical, have closed sessions as well, so if you are a member of a WG you might find additional sessions in the full listing.

All Working Groups at: www.incose.org/about/organization/ti.aspx

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Lean Systems Engineering

This WG will meet 27Jan, 9:00-5:00 EDT, and is supporting the joint INCOSE-PMI-MIT initiative that published the *Guide to Lean Enablers for Managing Engineering Programs* in May 2012. Download the guide from http://dspace.mit.edu/handle/1721.1/70495.

The WG is elaborating the detailed descriptions of each enabler and related supporting elements. In this working session we will review the recent progress of the Lean SE WG and work on the Lean Enablers, but will focus on the refinement of metrics for Lean program execution. .

Bring your experience and insights. Queries to erebenti@MIT.EDU.   ∞

System Security Engineering

This WG will meet 27Jan, 0900-17:00 EDT, with full Live Meeting coverage. Email rick.dove@incose.org for general announcements. Share Point site is at https://connect.incose.org/tb/specialty/systemsecurity.

First drafts for putting security into the SE Handbook have been submitted – these will be reviewed. Major time will review 10 INSIGHT Q2 Theme (The Security-Responsibility Buck Stops Here) essays – with author presentations seeking, constructive comments. SEBoK, CSEP exam, and Standards projects will be discussed.

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Agile Systems & SE

This WG will meet 28Jan 0800-1700 and 29Jan 0800-1200 EDT with full Live meeting coverage. Share Point site is at: https://connect.incose.org/tb/ASSE. Email rick,dove@incode.org for general announcements.

This kickoff meeting will focus on:
1. the scope of the charter (perimeter on the types of projects we will consider),
2. fundamentals that provide a consistent underpinning to the work of the WG,
3. suggested projects and selection of initial project starts.
4. a Team Wikispeed-like process for project work, (*Did You Know* column).

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Recent Meetings

Heather Kraemer, Sandia National Labs

October 2012—Regina Griego, INCOSE Fellow at Sandia National Laboratories, took us on a guided tour of what caught her ear at the INCOSE International Symposium held in Rome Of special interest in the usual suite of outstanding tutorials, was the one that covered the development and evolution of the Systems Engineering Body of Knowledge (SEBoK), reference material whose currency will be maintained by INCOSE and IEEE. Three remarkable Key Notes included two on European transportation initiatives that will make you proud to be a Systems Engineer.

Two themes of special note unfolded this year: the relationships forming with the PMI community and the expanding number of papers on Systems Science. Finally, a couple of the initiatives the Fellows are engaged in were discussed, and two remarkable young people from New Mexico that are a part of these initiatives were introduced. A copy of the presentation slides are posted on the Enchantment Chapter website.

November 2012—Charles Adolph, an independent consultant who was the prior director of Test and Evaluation for OSD Acquisition, and Technology, provided a revealing presentation of the "Current State of the DoD Acquisition, Test and Evaluation Enterprise." He suggested that most people would agree that there are serious problems with today's DOD acquisition process.

He showed shortcomings addressed in numerous studies; and suggested that they all boil down to a lack of discipline in implementing and enforcing existing guidance throughout the product definition, technology development , system development and test process. He discussed the management of developmental programs, showing marked deterioration in the last two decades; with indicators including significant increases in developmental timelines; cost overruns unprecedented in magnitude and frequency, often leading to Nunn-McCurdy breaches; and dramatic increases in suitability failures rates. He went on to identify the primary causal factors for today's problems and suggested required corrective actions. The presentation was verbal, so slides do not exist.

December 2012—Eric Hales from the Institute of Configuration Management provided a half-day tutorial on Configuration Management and CMII Principles.

Attendees learned that it is possible to escape the "corrective action" operational mode through accommodating change and keeping requirements clear, concise and valid. CMII expands the scope of CM beyond traditional product definition—to *any* information that could impact safety, security, quality, schedule, cost/profit or the environment. CMII shifts the emphasis to integrated business processes.

The tutorial was free for INCOSE members and $100 for non-members.

December 2012—This year's social dinner event featured guest speaker Christine Anderson, the Executive Director of the New Mexico Spaceport Authority. During dessert Christine gave an inspiring talk with lots of pictures of the spaceport construction and its anchor tenant, Virgin Galactic. The event was held at the Embassy Suites in Albuquerque, and a good time was had by all 30 party goers. A copy of the presentation slides are posted on the Enchantment Chapter website.

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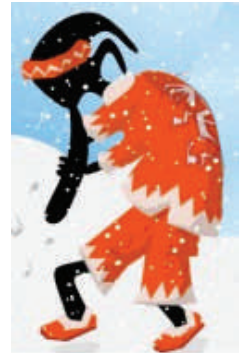
Next Meetings

Ann Hodges, Sandia National Labs

January 9: Identifying Architectural Modularity in the Smart Grid,
Brad Rogers, Navigant's Boulder, Colorado office, Managing Consultant in the Energy Practice.
Abstract: One significant challenge facing a broader deployment of modern grid technologies is integrating with legacy systems while driving toward elegant, interoperable solutions in future grid integration efforts. This challenge is compounded by the de facto approach of customizing point-to-point integration solutions, resulting in an "accidental architecture" of the existing grid. The Design Structure Matrix methodology is applied to two publically available architecture models to demonstrate how this approach can help define smart grid architectures and to help identify architectural groupings that can lead to better modularization of smart grid systems and standardization efforts. The analysis concludes that initial smart grid architectural efforts can be improved upon by identifying areas of modularity and organizing around them. The supporting paper can be downloaded from: http://sdm.mit.edu/news/news_articles/webinar_082012/rogers.pdf.

February 13: INCOSE International Workshop (IW) 2013 Report by IW Attendees,
Ricardo Pineda, and other IW13 participants (TBD).
Abstract: Reports from the Working Group workshops, special activities, events, and other significant happenings at IW13 held January 26-29 in Jacksonville, Florida.

March 13: Managing the Project Team as a Special Class of Stakeholder for Enterprise Transformation Projects,
Heidi Hahn, Los Alamos National Lab, Executive Advisor, Associate Director for Engineering Sciences.
Abstract: The Los Alamos Nation al 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 provocative case study regarding the management of project teams in which team members are, themselves, stakeholders. This paper describes the project's approach to stakeholder management for the project team, which had mixed success, discusses the theoretical underpinnings of the approaches used, and provides lessons learned for handling this class of stakeholders.

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Did You Know…

Team Wikispeed?

Rick Dove, Paradigm Shift International

Joe Justice and Team Wikispeed hand build a new deliverable street-legal, 100+ MPG car every 3 months, with new subsystem iterations every 7 days: 0-60 mph in 5 seconds, 149 mph top speed, with a sexy you-want-it carbon fiber sports car body. All done by a remote collaboration agile development process with volunteers working nights and weekends from many countries around the world.

You don't want the sports car body? They'll make you one with a truck body, or a family-car body, whatever, under $20k. You want a different engine? They can swap out whatever is there for another one in the time it takes to change a tire. Everything mechanical and electrical in the car is modularized for very-rapid swap out and life-cycle upgrade. And a lot of what they have is better innovative technology than you can get from traditional automakers.

Agile, Lean, and Scrum is what Joe Justice calls his development process. Team WikiSpeed videos show how they develop and produce this vehicle – with people from all around the world working on different subsystems simultaneously.

- 21 minute vid: www.infoq.com/ interviews/agile2012-team-wikispeed

- 50 minute vid: www.infoq.com/ presentations/SDEC12-Keynote

A little from the 50 minute keynote:

"We continually check Team Wikispeed against the 4 agile values, 12 agile principles to see 'did we move forward on any of these in the last seven days or did we move backwards in the last seven days on any of these.' …we found Scrum to be the fastest, leanest way to run a collaborative group of people to solve a problem together. … Sticky notes, on a white board, framed off with blue painter's tape. All of our work is on the backlog, from marketing, to engineering, to tasks that will delight the team. … We do all work in pairs. We take this practice from extreme programming, or XP. Extreme programming we find to be the set of technical principles that allow us to iterate very quickly with a high quality bar, in a regulated and mission-critical industry like automotive applications. … By using things like test-driven development, we quickly know if we're passing the road-legal safety tests even when we're innovating something new every seven days. … We're using swarms…promiscuous pairing, the funny sounding practice of regularly changing who your pair is, we're able to scale knowledge out through the team, while reducing the amount of documentation we have, because there's a maintenance cost for documentation, especially when your

product changes every seven days. And also to avoid time spent training that's nor productive,… not building a training engine, … building an engine we're going to use. … What we found by working on seven-day iterations, is it was easy to see over the last seven days what increased our rate of productivity, or our velocity, or what made a detriment in our rate of velocity. We were able to make small changes every seven days and see if we delivered more working product or less. … And we observed that when the team said we were having a high morale week … we would deliver ten times or more as much working product as the team would when they said they were having an average week. And when the team reported they were having a low moral week, we typically delivered no new working product. … the sticky-note board includes tasks for … 'team member delight'. We treat our team members as if they are our customers, because that gives us the highest benefit of anything we found so far on the rate of work-product creation.

The sticky note Kanban board is used within a single garage multi-task-team operation. They use a free scrumy.com tool for integrating distributed garage teams. Deeper detail on the process is in another longer 91 minute video at **Our Process**, the closing keynote of the 2011 Global Scrum Gathering 16-18 May, 2011.

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Missed Tutorial? The Systems Concept—Bringing Order to Chaos

Ann Hodges, Sandia national Labs

The Chapter offered a full-day tutorial on October 26, 2012 by Dr. Regina Griego, a leader in requirements and systems engineering, an INCOSE Fellow and Industry Fellow for Stevens Institute of Technology. Regina explained simple pragmatic steps, using a model-based approach, to go from stakeholder goals to a behavioral (use case) architecture and a high-level system architecture. The approach is particularly useful in the commercial domain and for internal products in the government domain; but can also be scaled for large government programs.

A summary of the steps in bringing order to chaos follow:

1. Create a crisp problem statement. A problem template was presented: "The

problem of *<describe the problem>* affects *<the stakeholders affected by the problem>* the impact of which is *<problem impact description>*. A successful solution would be *<list some key benefits of the successful solution>*."

2. Identify and analyze stakeholders. A stakeholder is *anyone* or any *system* that has a stake in the solution throughout the product or product life cycle. A context diagram is a simple model that can be used to depict the set of stakeholders.
   a. Prioritize stakeholders – primary and secondary.
   b. Understanding the "win conditions" of each stakeholder is crucial. Knowing the answers to questions like:

What product-related scenario would make them deliriously happy? How will they be evaluated? What do they have to lose (what would make the product "dead on arrival")?

c. A stakeholder profile was presented that helps develop an understanding of the stakeholders.
d. Analyze stakeholders' viewpoints functionally, operationally and by common success criteria to determine classes of stakeholders.
e. Model stakeholder interaction by using an N^2 matrix, which is a structural view of the stakeholders.
f. Determine stakeholder goals. A product won't get used if people don't get benefit from it.

Just Thinking

SE in the R&D World — What is different?

Regina Griego, Sandia National Labs

Systems Engineering in the R&D environment requires negotiating the complexity of designing a system or set of systems in the face of uncertainty. It requires engineering in a way that allows an agile response when the time comes to deploy the system or systems. I will discuss some principals that we are discovering by way of example based on work that I am leading as we develop technology and systems for future arms control treaties.

The first principal is to understand and carry multiple operational concepts at the same time, and working out a way with stakeholders to exercise those concepts as cost effectively as possible. It is envisioned that future treaties will require us to monitor all weapons and share that information with treaty partners. The monitoring concepts vary from invasive approaches as a basis of monitoring, to monitoring from a significant distance. Each carries vastly different operational concepts and technologies, and each will yield a different, and to some degree, uncertain confidence level. Access to the most important stakeholders is limited, and the global environment, as well as the final negotiated treaty, is very uncertain, yet the negotiators need options, and need to understand the consequences of those options. When the treaty is negotiated, we as a nation will have to respond with implementation and deployment within a timeline.

A second principal is to create a wide spectrum of technology options. As we know from systems engineering, an operational concept begins to lock in technologies; but if you need to maintain multiple operational concepts, then your technology base must be wider in order to respond to any operational concept that is eventually deployed. A simple example used by Stevens Institute, when discussing operational concepts, is the idea of crossing a significant ravine. One operational concept is a bridge, another is using some sort of hovercraft, and a third might be a craft that could traverse into and out of the ravine. Each of these would require a completely different technology base. Future treaty negotiations require technology maturation in the face of uncertain outcomes, because we need to respond when a treaty is negotiated with the knowledge of how the options will impact current systems.

A third principal is to understand how stakeholders will measure success in the end. This is often uncertain when engineering in an R&D environment. For instance, you are preparing for a future that can be 5-20 years away, access to stakeholders is limited, and those stakeholders are constrained by the reality of today. As we prepare for future treaties what is "allowed" today will likely be different once a future treaty is negotiated. In thinking about measures of success (or measures of effectiveness) we use our standard engineering approach of calculating evidence and layers of evidence related to trusting information. But there are more intangible things, like what is likely to be accepted by each nation, and perceptions of each other's capabilities to deceive the other.

The last principal I will discuss is remaining agile in ability to respond and deploy a system. Once a treaty is negotiated it will pin down the operational concept for a system. The concept of operations for the system will require work on the part of the policy makers, the system engineers, and the operational stakeholders. For systems deployed as part of a nuclear arms treaty this can be a significant bit of work, and so we have to anticipate the system concept of operations and impacts to the enterprise. Elements of deployment such as certification of systems and facilities, the technology supply chain, and the operations and support of the systems, become important. Clearly these are not trivial, yet need advanced thought even in the face of uncertainty.

What we are applying in this environment of complexity and uncertainty are models of evolutionary development. These models allow us to vector our effort toward an unknown future. We have developed a first version of a representative "test-bed" for maturing technology, systems, and concepts. It is expected that most of the technology we are working on will be obsolete by the time we get to deployment. What will be deployed will be a few generations in the future, but the work we do today will allow the necessary maturation. More importantly, we will have matured our understanding of operational concepts and their impacts. It feels like we are negotiating our way to a new unknown world, explorers for a yet un-conceived world. It is an honor, very exciting, and it takes a certain kind of Systems Engineer to navigate in the face of uncertainty and complexity.

It would be interesting to explore the competencies required for SE in the R&D world!   ∞

Tutorial—(Cont. from page 4)

3. Determine use cases from the stakeholder goals.
4. Perform mission analysis. Define mission-level requirements, measures of effectiveness and operational concepts which will drive system development. Operational concepts describe "how well" and "under what conditions" the product will serve users.
5. Develop as-is and to-be use cases.
6. Model stakeholders (people and systems) and information/objects being passed from the nouns identified in the use cases. A good start is an activity diagram (swim lane diagram) with a swim lane for each stakeholder. A block diagram showing objects and their characteristics, and relationships between objects is also useful at this point. Asking questions like the following can provide insight into other requirements when this model is shared with stakeholders: Are there other views? What's the life cycle of object <name>?
7. The ingredients are now available to create a Concept Document. The Concept Document contains:

a. Product positioning: Motivation and the context diagram of the product
b. Stakeholder analysis results: N^2 interaction matrix, viewpoints
c. Current system description: as-is use case model
d. Planned system description: to-be use case model
e. Justification of changes: to-be
f. Features summary (mission-level requirements)
g. Brief description of critical system requirements.

And there you have it!   ∞

INCOSE Logo
Apparel and Merchandise
INCOSE has partnered with Promotion Select to offer high-quality apparel and other merchandise with INCOSE, ESEP, CSEP, and ASEP logos. Use the following link to access the INCOSE Storefront ∞

New Chapter members

Francis Peter, Management Sciences

Enchantment Chapter now has 102 active members. We would like to welcome the following new INCOSE members to Enchantment Chapter:

Chuck Boehmer	General Dynamics/NMSU
Patricia Briscoe	
Larry Bruskas	Sandia National Labs
Amit Lopez	Univ. of Texas, El Paso
Gina Orozco	Federal Government
Judy Smith	Sandia National Labs

The Enchantment sponsored Student Chapter of the University of Texas at El Paso currently has 4 active members. ∞

Resource

Dave Snowden's Cognitive Edge 70 minute keynote at Agile Cambridge in September 2012 shows his attempts to build a theory for the Agile movement, based on statistical research, weak signal detection methodology, complexity theory, and co-evolution theory. Snowden developed the Cynefin *(Ken-ev-in)* framework, a practical application of complexity theory to management science, most especially to project management. Video & Slides: www.infoq.com/presentations/Agile-Theory ∞

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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