Vol. 13, Issue 3: June – July 2015

NEWSLETTER

2002, 2004-14 2003

2008, 2012 President's Award for Most Outstanding Chapter

INCOSE President Speaks to the Chapter

The April 15, 2015 speaker meeting featured David Long, the President of INCOSE. The topic of his presentation was "Systems Engineering in Turbulent Times."

David is a long-time practitioner of systems engineering. For over twenty years, he has focused on enabling, applying, and advancing model-based systems engineering (MBSE) to help transform the state of the systems engineering practice. David is the founder and president of Vitech Corporation where he developed CORE®, a leading systems engineering software environment. He co-authored the book *A Primer for Model-Based Systems Engineering* and is a frequent presenter at industry events around the world. David spoke to the Chapter at the Aerospace Corporation facility in El Segundo.

His presentation opened with a discussion of new domains and new challenges, citing the growth in the number of sensors and functions in not only airplanes, but automobiles and home appliances, as well.

(See "Speaker Meeting," on page 9)

Heuristics: A History of Column Fillers

Over the past seven years, the *Newsletter* has used column fillers, sometimes referring to them as "heuristics." Some were from noted scholars, some were overheard at International Workshops or International Symposiums, and some were from Speaker Meetings. All were intended to be pithy and, occasionally, humorous, while germane to our profession. Below is a selection from past editions over those seven years.

- All successful projects follow the systems engineering process. Some follow it deliberately. The others follow it eventually.
- One value of the disciplined systems engineering process as opposed to "native" or "intuitive" systems engineering is minimizing the sins of omission, a.k.a. the too-late utterance: "Oh no!"
- One value of the disciplined systems engineering process as opposed to "native" or "intuitive" systems engineering is minimizing the duplication of effort: following the rigor of the disciplined process ensures that the correct disciplines, and only the correct disciplines, develop a product that satisfies a given requirement. Multiple, and possibly conflicting solutions are a variation of requirements creep.
- Systems engineering is not a separate department. Systems engineering is a way of doing business.
- The technical solution to resolve a problem is NOT the lesson-learned to be learned from the problem.

(See "Column Fillers," on page 8)

Inside This Edition

Cal Poly Pomona Systems Engineering Conference

By DeAnna Regalbuto

On April 11, 2015, the kickoff of the INCOSE Student Systems Engineering Conference was held at Cal Poly, Pomona. Fourteen undergraduate students from a variety of disciplines, including systems engineering, Aerospace Engineering, and Industrial and Manufacturing Engineering, dedicated their Saturday to the Systems Engineering Conference sponsored by INCOSE-LA. The conference had two objectives:

1.) Provide an overview of systems engineering.

2.) Connect students with practicing systems engineering professionals to start work on real world projects that had potential for becoming senior projects, planned to be completed later under the tutelage of the sponsors.

The overview was delivered in the morning by Dave Mason, Assistant Director, INCOSE Student Divisions.

The focus of the group began with a hypothetical baggage delivery system for a regional airport provided the vehicle for discussing the basic systems engineering tools. It was structured around the "V" model. Emphasis was placed on tools supporting the portions of the "V" model, starting with product requirements and continuing through system architecture. Dave served as the "customer" as the students broke out into groups, each including one of the systems engineering professionals present, to work on the associated classroom exercise. Everyone seemed to approach the task in a spirit of fun while simultaneously learning from the experience. The most commonly overheard statement during the morning was variations of, "You're rushing to solution. What are the requirements for that?" It was amusing to observe how, as systems engineering professionals, we never seem to outgrow this urge to hurry up and start building something.

The afternoon was dedicated to the four sponsored projects. Each sponsor presented an overview of his or her project. Next the students were assigned to one of the presented projects to work on requirements definition through system architecture. The working session finished with the students presenting their results focusing on the project needs statement, tools used from the tutorial, tools used from the Cal Poly curriculum, requirements, and options. The projects covered a wide range of domains. They included designing a volunteer genealogical library of the future (sponsored by Richard Emerson), helium mining on the moon (Edward Ruth), moving very large objects (Susan Ruth), and standing up and managing a First Robotics team (Tim Wright).

The day finished up with an informal meet-and-greet between the students and volunteers.

(See "Cal Poly Pomona" on page 5)

New INCOSE Website — Up and Running

The new INCOSE website is up and running. The INCOSE IT Team announced the launch on April 2, 2015 of the new INCOSE web site, incose.org, including the membership system, Store, and Connect. According to a report from INCOSE, when you log in to incose.org you will see our bright new look and easy to use links to upcoming events, Chapter sites and INCOSE Connect. All the public INCOSE resources are available to you on the new site, and as a member of INCOSE you can also use the Store and Connect once you log in. The IT Team believes that you will find the new website and Connect a significant improvement, but it may seem unfamiliar at the start. If you need help, please look at the Help resources on Connect, or if you have difficulty getting connected send a message helpdesk@incose.org and we will get back to you to help.

To get there, go to www.incose.org/, same as in the past. Note: if you have previously accessed the beta.incose.org site and logged in there, that login continues to be your new incose.org login. The first time you go to the website, enter your e-mail address and password or select the "Forgot Password" if you have forgotten your password. You will then get an e-mail that will send you an e-mail link to set your password. While you are resetting your password you can also set your user ID. Subsequent use of the website will require your user ID and password.

You will see your name in green at the top right of the screen, showing you are logged in. You can then click on "INCOSE Connect" to enter Connect, "INCOSE Store" to find downloadable digital products for and hardcopy products, or "Profile Home" to update and review your profile, among others. The Help Portal is on the top page of Connect.

Off to Seattle!

Edwin Ordoukhanian, president of the Student Division at the University of Southern California (USC), will be attending the International Symposium as the guest of the Los Angeles Chapter.

Edwin is a Ph.D. Student in the Astronautical Engineering Department. He is doing his doctoral research under Professor Azad Madni. He was an active participant in the planning and successful execution of the Conference on Systems Engineering Research that is co-sponsored by USC and was hosted by USC in 2014. Edwin received his M.S in Aerospace Engineering from USC. His research interests include Human-Systems Integration, Resilient Systems, and Complex Systems.

Congratulations Edwin!

June Speaker Meeting
Unleashing Big Space: Next Generation Applications with Small Satellite Advances

ABSTRACT

Advances in new spacecraft morphology have allowed high -volume, low-cost manufacturing of small systems to physically "aggregate", that is be assembled as individual elements or cells to create a monolithic space system. This new morphology allows for any size, shape and scale of space platform to be built, potentially transitioning to on-orbit integration. The University of Southern California (USC) is creating student and faculty research areas focused on uncovering the potential of this new approach. Prof Barnhart will discuss the various areas of research, and broader challenges associated with on orbit aggregation related to both international systems construction and assembly issues and implications to this new field to treaties between countries.

BIOBRAPHY

Professor Barnhart is the Director and a Co-founder of the USC Space Engineering Research Center. At USC he specializes in developing innovative technologies and architectures for second generation space morphologies, satellite robotics and inspiration-based engineering techniques through hands-on projects with students, faculty, and staff amongst the various schools at USC, with outreach to industry based on the "engineering teaching hospital" construct. David was most recently a senior space Project Manager at DARPA, pioneering cellular spacecraft morphologies and satbotics on the Phoenix and SeeMe projects, and represented the first DARPA space project presented at the at the United Nations COPUOS in Vienna Austria.

David holds a Bachelor of Science degree in Aerospace Engineering from Boston University and a Masters of Engineering from Virginia Polytechnic Institute, and has authored over 35 research publications and has been a keynote speaker at multiple national and international space conferences on 2nd generation space architectures.

PARTICULARS:

Date: Tuesday, June 9, 2015, 5:30 p.m. to 7:45 p.m.

Location: The Aerospace Corporation, 200 North Aviation Boulevard, El Segundo, California.

Contact: Rick Hefner

Cost: free for members, $10.00 for non-members.

The format at the host site is the INCOSE-LA standard: networking and hors d'oeuvres followed by announcements and then the presentation itself. The host site is just west of the 405 on Aviation Boulevard. The most convenient access is off of Aviation Boulevard coming north from El Segundo Boulevard. Coming from the north (the 405, 105, or Imperial Highway) on Aviation Boulevard works, but involves an unprotected left hand turn into the Aerospace Facility.

(See "Speaker Meeting," continued on page 6)

Systems Thinking Workshop: Learning to Think About Systems in a Holistic Manner

Presented by Dr. James Martin

ABSTRACT:

System thinking has been touted as the "Fifth Discipline" in Peter Senge's famous book by that name. However, this is usually limited to the use of systems coupling diagrams and system archetypes to help understand the nature of feedback and complex system behavior. You will need more than these tools to fully appreciate how to think clearly about systems in a truly holistic manner. This workshop will teach you some essential principles and concepts of systems and how to use these in a "systemic" fashion to improve your ability to think about systems in a holistic manner. You will learn about the PICARD Theory (Parts, Interactions, Context, Actions, Relationships, Destiny) and the Seven Samurai Framework. You will see how the Knowledge Pyramid helps you understand how systems convert data into information that is used for the discovery of knowledge to be used in making better decisions. The workshop will let you spend about half of our time together working exercises in your team to fully understand and appreciate these ideas.

Participants will receive:

- Instruction — a variety of creative and analytic tools will be introduced.
- Course Notes — each student will receive a set of course notes for reference.
- Practice — students will have an opportunity to practice Systems Thinking skills in classroom exercises.

Learning Objectives:

- Use various systems thinking frameworks
- Apply systems thinking principles and concepts
- Better see the "whole" solution to complex problems

The course is aimed at:

- Engineers of all Disciplines
- Managers
- Leaders and decision makers

Topics:

- The Concepts of System and Holism as a Basis for Systems Thinking
- On the Use of Concepts and Principles for Improving SE Practice
- How to Conceptualize Systems... Using the PICARD Theory
- Seven Samurai Framework for Holistic Appreciation of the Whole Solution
- Using the Knowledge Pyramid as a Framework for Modern Systems.

(See "Workshop," continued on page 6)

Second Quarter Strategic Planning Meeting

The Chapter hosted the second quarterly Strategic Planning Meeting on Saturday, May 9, 2015 in the S Café on the Northrop Grumman campus in Redondo Beach. As in the past, the focus of the meeting was providing value to the members: how are we doing, what could we be doing?

President Guine opened with a message of challenge and encouragement and opened the floor to a discussion called an "Issue Table." These discussions (once referred to as "open kimono") gave the attendees the forum to speak directly to issues that are compromising our accomplishing our mission.

One observation is that we bring issues to the Board of Directors, issues which would be better resolved if the directors hosted teams. Those teams will meet independently on a schedule that best meets their needs. The director could simply report on progress and ask the Board to address only those issues which need direction from the Board.

Communications with the membership continues a major concern for the leadership – concern that the Chapter has a lot to offer, and the members have a lot to offer each other, but we need to do One activity to improve communications is the leverage the new INCOSE website as the host for the Chapter website; for example, using the tools available there to provide information on meetings, tutorials, and conferences. The INCOSE Connect site is a powerful tool (perhaps underutilized and under appreciated) for communication. The Chapter will continue to use social media as well.

Individual members can help the communications process. Security considerations obliged many employers to block selected e-mail traffic and to strip off attachments. If your employer has such a policy please go to the INCOSE homepage and change your email address to a private email address which will not block communications from the Chapter and send that information to the Director of Membership, Phyllis Marlbach at phyllis.r.marbach@boeing.com.

The need for volunteers continues – we currently have more good ideas that we have people to act on them. To help minimize potential vagueness, Board members will work to include as many details as possible in the plans, thereby making it easier for volunteers to implement the plan while decreasing the number of variables.

Mini-conference doing this on the side but felt they were not getting support.

The Chapter continues to reach out to local academic institutions, including the University of Southern California, Loyola Marymount University, Cal Poly Pomona, and, now the University of California, Los Angeles. Members interested in becoming involved in these academic out reach program should contact the volunteer coordinator for the Chapter, Karen Miller atkarmill888@aol.com.

Look for pictures of the Strategic Planning Meeting elsewhere in this edition.

The Chapter will work to broaden its speaker meeting topics by inviting speakers to talk about INCOSE Working Groups. Several members are in a position to do so, covering the Biomedical and Health, Transportation, Systems Thinking, and Very Small Enterprise Working Groups.

The day concluded with a sense of accomplishment but, at the same time, a sense of challenge – challenge to continue improving the value of the Chapter to the membership and to the practice of systems engineering.

INCOSE LMU Student Division Spring Activities

By Karen Grothe, INCOSE LMU Student Division President

The INCOSE LMU Student Division held a "Meet and Greet" at Loyola Marymount University (LMU) on Saturday, March 7, 2015. Students; faculty members Dr. Charles Tang, Dr. Bo Oppenheim, and Dr. Karen Miller; and Systems Engineering and Leadership Program director Dr. Fred Brown had a productive discussion about events the student group could hold to attract students. It was widely agreed that INCOSE LMU should involve faculty in advertising meetings and events in their classes, particularly to the newer students.

As the conversation branched out from attendance issues, we discussed how to help students come up with ideas for their integrative (capstone) projects required for graduation. INCOSE LMU decided to arrange for students who are finishing their capstone projects to dry-run their presentations for other students. In this way, continuing students might be inspired by the finishing students' presentations, and the capstone students can practice both their presentations and fielding questions.

At the end of the meeting, the international students asked if INCOSE LMU could help them find positions to get Optional Practical Training. If they can find employment, they can extend their visas up to eighteen months to get work experience in the United State before returning to their home countries.

In April, INCOSE LMU offered capstone students two opportunities to dry-run their final presentations. On April 18, Meshal Hamdi practiced his presentation about an e-waste recycling system for computers and mobile devices. On April 25, Ignacio Serrano rehearsed his presentation, "Unmanned Aircraft Systems vs. Manned Aircraft Systems – A Military Aircraft Study". A lively discussion ensued after each presentation, and the students got useful feedback to help them improve their presentations.

Is May, June, or July your anniversary month?

DON'T FORGET TO RENEW YOUR MEMBERSHIP!

(Cal Poly Pomona, continued from page 2)

Comments exchanged during this time included: "Ask good questions and listen to what is not said as well as what is said," "Your perspective on systems engineering changes based your role and product," "As a freshman, Wow! I didn't realize there was so much to this." Other comments included "I'm glad my students get to hear what I'm teaching them in class from people who are in the real world," and "As a senior, it was an affirming day. I realized that I'm prepared for what's out there."

This account would be incomplete without acknowledging everyone who made the day a success. Aside from the fourteen students who gave up an entire Saturday to participate, thanks must go out to Dave Mason for his initiative and vision, Susan Ruth (INCOSE-LA), Prof. Saeidah Fallah-Fini (advisor to the INCOSE, Cal Poly Pomona Student Division), and the INCOSE Cal Poly Pomona leadership team (Brandon Johnson, President, Kevin Ruble, Past President, Pantea Mahboubzadeh, Membership Director, and Dane Solomon, IT Director) for organizing the event. In addition, Richard Emerson, Edward Ruth, and Tim Wright are to be recognized for their willingness to identify and sponsor projects, and last but not least, Lupe Chacon and the author, who both kept asking, "What needs to be done now?" and then went and did it.

Pasadena Area Professional Networking Event

By Peter Waswa

The Los Angeles Chapter of INCOSE hosted another it its series of networking events Wednesday evening, April 22, 2015. Held in the Vertical Wine Bisto in Pasadena, this event served to welcome new members and also provided an opportunity for Chapter members and guests to meet in an informal setting. Such a setting lends itself as a valuable opportunity to network.

Most attendees arrived between 5:30 and 6:30 p.m. and were able to find the venue easily. The crowd of about fifteen people consisted of systems engineering professionals from organizations such as NASA-JPL, Northrop-Grumman, the Giant Magellan Telescope Organization, as well as representatives from the INCOSE-LA board and professionals in career transitions.

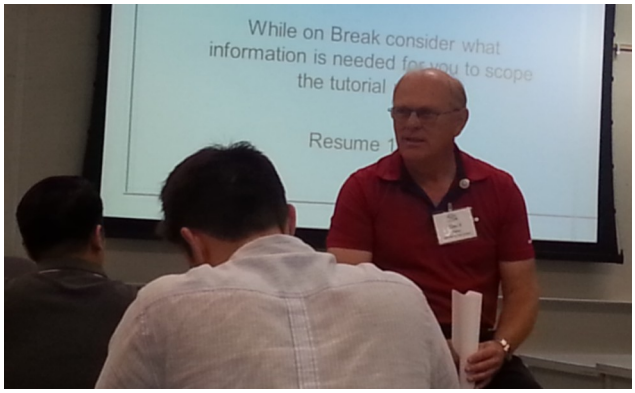
Numerous animated and enthusiastic conversations were observable between diverse groups of attendees who had encircled and enjoyed the mouth-watering appetizers laid on the tables. Circulation was encouraged by the board representatives and nearly everyone attending had the opportunity to interact with everyone else in what proved to be another successful event.

Membership: Why Renew?

By Phyllis Marbach, INCOSE-LA Director of Membership

Why renew your membership in INCOSE? The International Council on Systems Engineering is advancing the awareness of the value systems engineering. Global sharing of best practices will benefit humanity and the planet. If you are not yet aware of the Vision 2025 I encourage you to review the material here: http://www.incose.org/AboutSE/sevision. You can download your own copy at this location. The vision describes the global context, the current state and the future state of systems engineering Vision 2025 goes into details and examples of the various domains where knowledge sharing and the application of model based systems engineering is making a different in tackling the challenges and complexities of today's diverse and rapidly evolving world. Continued involvement in INCOSE will benefit you by enabling you to stay informed about the latest advances in systems engineering techniques and tools thereby to help you in your job. Many of the techniques can be applied to volunteer organizations and personal goal setting as well.

Renewing is easily done by going to the new INCOSE website here: www.incose.org. Click on the Orange "Member Login" oval at the top right. Enter your Username and password. If you don't remember your password click the "Forgot Password?" to create a new password. On the top right there is a blue "Join or Renew" link that will take you to a page where you can select one of several membership types. A regular membership is $145 per year; the regular three-year and regular five-year memberships have some cost savings. A student membership is $38/year and will require some evidence of full-time status. Your membership dues include access to the systems engineering products and services available from the INCOSE web, INCOSE Connect, and the INCOSE Store. Many of the products available from the store are no charge to INCOSE members. Please consider continuing your membership to INCOSE-LA to support your local chapter and to improve your awareness of the best practices of systems engineering.



Dave Mason leading a discussion at the Cal Poly Pomona Systems Engineering Conference. Look for other pictures elsewhere in this edition.

("Workshop," continued from page 3)

BIOGRAPHY:

James Martin is an enterprise architect and systems engineer working for The Aerospace Corporation developing solutions for information systems and space systems. He was a key author on the BKCASE project in development of the SE Body of Knowledge (SEBOK). His main SEBOK contribution was the articles on Enterprise Systems Engineering. Dr. Martin led the working group responsible for developing ANSI/ EIA 632, a US national standard that defines the processes for engineering a system. He previously worked for Raytheon Systems Company as a lead systems engineer and architect on airborne and satellite communications networks. He has also worked at AT&T Bell Labs on wireless telecommunications products and underwater fiber optic transmission products. His book, Systems Engineering Guidebook, was published by CRC Press in 1996. Dr. Martin is an INCOSE Fellow and was leader of the Standards Technical Committee. He received from INCOSE the Founders Award for his long and distinguished achievements in the field. He is founder and current leader of the Systems Science Working Group for INCOSE.

Particulars:

Date: Saturday, June 20, 2015, 8:00 a.m. to 5:00 p.m.

Address: 1 Space Park Drive

Location: Redondo Beach, California, USA

Venue: Bldg S Cafe, Northrop Grumman Corp.

Contact: Padman Nagenthiram

How to get there:

The most convenient access is off of Marine Avenue just west of Aviation. Marine Avenue intersects Aviation Boulevard south of Rosecrans Avenue and north of Manhattan Beach Boulevard. Turn right at the first stop light east of Aviation Boulevard (second drive way) and proceed to the end of the driveway. Park in the last parking lot on the right.

Registration:

Go to the INCOSE-LA home page at:

http://www.incose.org/ChaptersGroups/Chapters/ChapterSites/los-angeles/chapter-home.

Click on Systems Thinking Workshop. The fee varies. The "early bird" registration fee for members is $200.00. The fee goes up after June 12, 2015. The fee is higher for non-members and lower for senior members, student members and members on active military duty.

For last minute details watch for an INCOSE-LA Reflector Notice or check the INCOSE-LA website.

Going to the International Symposium?

Let us know and look forward to an invitation to the Chapter-hosted soiree!

(Speaker Meeting, continued from page 3)

Registration:

Go to the INCOSE-LA home page at:

http://www.incose.org/ChaptersGroups/Chapters/ChapterSites/los-angeles/chapter-home.

Click on Speaker Meeting.

Remote sites will be available. For information on a remote site near you, go to the INCOSE-LA webpage for details regarding locations, times, points-of-contact, and registration requirements.

For last minute details watch for an INCOSE-LA Reflector Notice or check the INCOSE-LA website.

Action at the Cal Poly Pomona Systems Engineering Conference

Above, Professor Saeidah Gallah-Fini leads a discussion.

Below, Lupe Chacon, Dave Mason, Time Wright meeting with other participants.

("Column Fillers," continued from page 1)

- A lesson learned is not a lesson learned until it is a lesson and until it is learned.
- "I would regard it as the greatest treachery on my part if, in embarking on a new domain of knowledge, I accepted any foregone conclusions." Niels Bohr in a letter to Albert Einstein, circa 1920, pp 253, *Einstein, the Life and Times*, by Ronald W. Clark, Thomas Y. Crowell Company.
- "An engineer: someone who can take a problem and turn it into twenty." Ol' Doc Smith, denizen of a Mojave Desert saloon.
- "Bohr emphasized, even demanded that the idea of complementarity – that it is necessary to consider the same situation from two mutually exclusive points of view – should be taught to all eighteen year olds." *The Pursuit of Simplicity,* Dr. Edward Teller.
- "Rivalry, jealousy, and vindictiveness from other scientists and philosophers were Galileo's lot, and they are not infrequently the lot of unorthodox minds in modern times. Anyone who believes that inquisitions went out with the triumph of secularism over religion has not paid attention to the records of foundations, federal research agencies, professional societies, and academic institutions and departments." Robert Nisbet, *Prejudices*, Harvard Press, 1983.
- "It is more fun to talk with someone who doesn't use long, difficult words but rather short, easy words like 'What about lunch?'" — A.A. Milne, Winnie-the-Pooh
- "The whole of science is nothing more than a refinement of everyday thinking." Albert Einstein
- A descriptive heuristic: No problem can be solved from the same level of consciousness that created it.
- A diagram is no substitute for the real model.
- The best engineering solutions are not necessarily the best political solutions.
- If the politics don't fly, the system never will. *The Art of Systems Architecting*, Maier and Rechtin.
- "Successful programs are out there to win. Unsuccessful programs are out there to keep from failing." An astute program manager.
- "Another metric won't help if management won't listen to that one either." INCOSE-LA past President David Boyd.
- "All science is either physics or stamp collecting." Lord Kelvin.
- The question is not if we should let procedure stand in the way of customer satisfaction. The question is if the procedures we have established to ensure customer satisfaction are less important that the panic of the moment. In making this decision one must remember if the procedures in question were established in response to customer dissatisfaction in the past.
- "What makes for effective pedagogy? Well, first you avoid words like 'pedagogy.'" John Vlissides in forward to *Object Design*.
- "If you are out to describe the truth, leave elegance to the tailor." Albert Einstein
- Sir Ken Robinson paraphrased Picasso ("Every child is an artist. The problem is how to remain an artist once he grows up") and elaborated: "We are educating people out of their creative capacities." February 2006 Talent Development Resources conference in Monterrey, California
- Block on a Gantt chart: FHOOMH (from here on out magic happens). First corollary: and then a miracle occurs.
- "Do not accept 'no' from someone who does not have the authority to say 'yes.'" Sign on the desk of the Dispatcher for the Nevada Northern Railroad.
- "My point is that the railway domain has suffered from a lack of application of proper engineering thinking rather than lack of words." Sanjeev Kumar Appicharla.
    - Mr. Appicharla's pithy observation is not limited to the railway domain. [Ed.]
- "Too many pieces of music finish too long after the end." Igor Stravinsky.
    - Might the same thing be said of many meetings? [Ed.]
- "If evolution really works, how come mothers only have two hands?" Milton Berle
- "Scientism, meanwhile, is the act of seeing in science what is not there. It is an act of faith that elevates, nay makes divine, the authority of science to bolster the aims of its acolytes." *The Tyranny of Clichés*, Jonah Goldberg
- A descriptive heuristic: What systems engineers want can be hard to express; what software engineers build can be hard to understand.
- State analysis and functional analysis are complementary techniques.
- A prescriptive heuristic: avoid hidden interactions
- A descriptive heuristic: tools should be driven by the tasks to be accomplished, not the other way 'round.
- Hardware, software, firmware… humans can be thought of as "live-ware."
- Be wary of a software tool becoming "shelfware" and "staleware."
- "Roget's Thesaurus is an example of a very old use of object-oriented classification and organizational techniques." James N. Martin, *Systems Engineering Guidebook*.
- "Correct English is the language of prigs." George Eliot

(See "Column Fillers," continued on page 10)

(Speaker Meeting, continued from page 1)

An airplane might have 5,000 functions, 1,000,000 types of messages, 2,000+ functions — with each individual aircraft (tail number) being different. Meanwhile, the software in automobiles is growing as well: 30,000 functions, 10,000,000 lines of code being the order of magnitude of the challenge.

David discussed "a time of turbulence" and the system engineering domain, noting the impact of divergent system lifetimes, varied scales and domains, combined with the complexity of smart, adaptive, and chaotic systems. At times, rapid change is beyond the control of the systems engineer — rapid change in the problems, in the solution technologies, and in the constraints, particularly budgets and schedule. From these challenges, comes the question: how do we as systems engineers adjust, adapt, and excel? David answered by citing six steps:

1. build on our foundation (the INCOSE guide book)
2. embrace the lessons from LEAN
3. incorporate the insights of agile
4. transform our practice through MBSE
5. begin with the end in mind, and
6. utilize the systems engineer as a leader.

Part of the foundation includes systems theory: the interdisciplinary study of systems in general, with the goal of elucidating principles applicable to all types of systems. In addition, systems thinking, which is holistic, is a part of the foundation. On challenge is to put "the systems thinking and engineering back into systems engineering."

LEAN concepts were noted as eliminating non-value added elements, and ensuring, at the beginning of a project, that capabilities exist to meet program requirements. As a part of this discussion, David noted the importance of using systems engineering to coordinate and integrate engineering activities; that program management is an important part of the systems engineering process.

Agile development was discussed, noting that the highest priority is to satisfy the customer through early and continuous delivery of valuable software (and other systems elements). Agile development includes welcoming changing requirements.

The evening concluded with the traditional questions and answers. The Chapter will continue hosting speaker meetings addressing issues of interest to systems engineering professionals. Details will be available in future editions of the *Newsletter,* on the Chapter website and in Reflector notices.

Were You There... At the California State Science Fair... As a Judge?

Being a judge at the California State Science Fair is an opportunity to support and encourage the systems engineers of tomorrow. Turns out, several members of INCOSE-LA did! If you were one of the many members who served, please contact the Vice-President, Terry Rector at Terry.E.Rector@aero.org.

Strategic Planning Meeting Candids

("Column Fillers," continued from page 8)

- "When once you have tasted flight, you will forever walk the earth with your eyes turned skyward, for there you have been and there you will always long to return." Leonardo Da Vinci [Ed. How did he know?]
- "The most important tool of the theoretical physicist is the waste basket." Attributed to Albert Einstein
- "There can be no question but that modern research heaps observation upon observation, pours new facts into an ocean already brimful of details that no one can remember and seemingly no one can hope to digest. The purpose of science is to find simplicity and coherence in the billowing mass of material." Dr. Edward Teller, *The Pursuit of Simplicity*.
- "Information is not a scarce resource. Attention is." Herbert Simon, 1991.
- Did you miss "pi day of the century" at 9:26:53 on March 14, 2015?
- It is not enough that the title and mission statement, no matter how eloquent, of a proposed solution match the problem; the solution itself must match the problem.
- Requirements analysis is appropriate for the tools used to produce a product as it is for the product itself. Fancy software that does not do the job or that does much more than is needed can become shelf-ware or stale-ware – an expensive embarrassment.
- Requirements are independent of:
  - ◊ Difficulty
  - ◊ Schedule
  - ◊ Parts availability
  - ◊ The way it was built
  - ◊ What they did (or didn't do) in the lab
- Scratch a requirements engineer and you find a lawyer.
- "Failure to follow the procedure, no matter how irrelevant to the incident, is grounds for crucifixion before a board of inquiry." Old Flight Test maxim.
- "Not everything that can be measured counts. Not everything that counts can be measured." Old Flight Test maxim.
- "You don't need to understand (the changes made to a system about to be flown). Those software changes will be transparent to the data system and don't really involve data we want anyway." A software design engineer to a Flight Test Engineer walking to the airplane.
- Things will change as often as you let them.
- Being able to triumphantly assign blame does not solve a problem.
- "If this works, you are really going to like it!" Attributed to a software design engineer by a lab engineer
- "Most of the changes I made were trivial so I never checked any of them out." An avionics engineer.
- The founding troika of Caltech were astronomer George Hale, physicist Robert Millikin, and chemist Arthur Noyes. They were dubbed "Tinker, Thinker and Stinker" by an uncredited campus wag. Credited to the Caltech 101 column in the Pasadena *Star-News*.
- "However, even good things can be abused. Using computers, people have tried to make plans about the future. What is fed into the computer is often a set of not very reliable assumptions. The result of this planning is aptly described 'as garbage in – garbage out.' The worst consequence is that once a computer has spoken, the customer believes it. In Herman Kahn's words, 'garbage in – Gospel out.'" Edward Teller, *The Pursuit of Simplicity*.
- "The Grasshopper Principle: I jump to a conclusion and then ask, 'Where am I?'" Edward Teller, *The Pursuit of Simplicity*.
- An old aerospace adage: There comes a time in the history of every project when it becomes necessary to shoot the engineers and begin production. Corollary: There comes a time in the history of every project when it becomes necessary to shoot the architects and begin designing.
- "...a single risk averted late in product development can save millions of dollars on a mid- to large-scale project and pay for most, if not all, risk management expenditures. Averting more than one risk will often lead to cost savings and better delivery schedules. Management and Technology Associates web site http://www.risk-services.com/
- When it comes to binary, there are 10 groups of people; those who understand and those who don't.
- Better is the enemy of good enough.

Some Thoughts on Improved Communications:
Don't be too cocksure of your own knowledge
Listen to what is being said rather than plotting a response
Not everything that can be said needs to be said
Don't jump into a conversation to show off your own knowledge
Don't speculate
Don't gossip
Don't embellish
Don't interrupt to correct an error — it might be superfluous

The Board of Directors wishes to welcome the following new members to the Los Angeles Chapter of INCOSE.		
Note: The information listed below is from the member directory and is based upon your initial membership application. If the information is not correct or complete, then please access the member directory (at www.incose.org) to update your information.		
Name	**Title**	**Company or Organization**
Antonio R. Magorno	Senior INFOSEC Engineer	The MITRE Corporation
William Lott	Engineering	AeroVironment, Inc.
David Sharpin		Orbital ATK
Sarah Dagen		The Mathworks, Inc.
Roberto R. Castro	Verification and Validation Project Engineer	Stantec
John Doyle		Mission Director Support Contract
Ryan Phatinawin	Student	Quality Engineering Intern

DON'T FORGET!

The Twenty-fifth Silver Anniversary International Symposium in Seattle, July 13 — 16, 2015!

Go to the INCOSE website for details
http://events.incose.org/

Going to the International Symposium?

Let us know and look forward to an invitation to the Chapter-hosted soiree!

Stay Connected

Get the latest on INCOSE-LA happenings in the Reflector e-mails

If you wish to be placed on our e-mail distribution, contact Susan Ruth at *susan.c.ruth@aero.org*

Errata

The April — May edition contained an error in the "Call for Volunteers!" article on page 2. After further consideration the Board of Directors has decided that there is no need for a "Conference Risk Manager" per se at this time. The Editor regrets the error.

2015 Board of Directors

Elected Officers			**Elected At-large Directors**		
President	Stephen Guine	Stephen.Guine@ngc.com	Membership	Phyllis Marbach	phyllis.r.marbach@boeing.com
Vice President	Terry Rector	Terry.E.Rector@aero.org	Programs	Dr. Rick Hefner	rhefner@caltech.edu
Immediate Past President	Michael Wallace	m.wallace@ngc.com	Systems Engineering Education	Padman Nagenthiram	padman.nagenthiram @gmail.com
Secretary	Jeffrey Willis	Jeffrey.Willis@ngc.com	Ways and Means	Paul Cudney	paulcudney@dslextreme.com
Treasurer	Harvey Soldan	harvey.soldan@jpl.nasa.gov	Communications	Bob Noel	robert.noel@boeing.com
Appointed Positions					
Newsletter Editor	Jorg Largent	jorg.largent@incose.org	Student Division Ambassadors	Scott Birtalan	scott.birtalan@ngc.com
Technical Society Liaison	Shirley Tseng	shirleytseng@earthlink.net	Reflector Manager	Susan Ruth	susan.c.ruth@aero.org
Chapter Recognition Manager	Michael Marr	mm3733@ca.rr.com	Industrial Relations Manager	Jose Garcia Jr.	jose.s.garcia-jr@boeing.com
Professional Networking Chair	Scott Birtalan	scott.birtalan@ngc.com	Website Technical Manager	Kirk Kittell	Kirk.kittell@gmail.com
Representative to the SF Valley Engineer's Council	Stephen Guine	Stephen.Guine@ngc.com	Volunteer Coordinator	Karen Miller	karmill888@aol.com

INCOSE-LA Chapter NEWSLETTER
Vol. 13, Issue 3: June – July 2015

Return Address:

PO Box 10969
Westminster, CA 92685-0969

Forwarding Service Requested

The International Council on Systems Engineering (INCOSE) is a not-for-profit membership organization founded to develop and disseminate the interdisciplinary principles and practices that enable the realization of successful systems. INCOSE's mission is to share, promote, and advance the best of systems engineering from across the globe for the benefit of humanity and the planet.
The Los Angeles Chapter meets several times per year for speaker meetings and, in addition, sponsors tutorials, mini-conferences and other activities of interest to those in systems engineering or related fields.

UPCOMING EVENTS

For more details on Chapter-sponsored events and registration, go to http://www.incose-la.org

Speaker Meeting
Unleashing Big Space: Next Generation Applications with Small Satellite Advances
Presenter: USC Professor David Barnhart
Date: Tuesday, June 9, 2015
Time: 5:30 p.m. – 7:00 p.m.
Host site: Aerospace Corporation,
200 North Aviation Boulevard, El Segundo, California
Cost: Free for members; $10.00 for non-members
See article on page 3. Look for a Reflector Notice in your email or check the Chapter website for more details

Systems Thinking Workshop:
Learning to Think About Systems in a Holistic Manner
Presenter: Dr. James Martin
Date: Wednesday, June 20, 2015
Time: 8:00 a.m. – 5:00 p.m.
Location: Northrop Grumman Corporation Space Cafe,
1 Space Park Drive, Redondo Beach, California
See article on page 3. Look for a Reflector Notice in your email or check the Chapter website for more details

Networking Event in Orange County
Date: Wednesday, June 17, 2015
Time: 5:30 p.m. – 7:00 p.m.
Look for a Reflector Notice in your email or check the Chapter website for more details

International Symposium — "Celebrating Leadership"
Date: July 13—16, 2015
Location: Seattle, Washington
Go to the INCOSE website for details

Speaker Meeting
Body of Knowledge and Curriculum to Advance Systems Engineering (BKCASE)
Presenter: Dr. Barry Boehm
Date: Tuesday, September 8, 2015
Look for a Reflector Notice in your email or check the Chapter website for more details

Tutorial: Body of Knowledge and Curriculum to Advance Systems Engineering (BKCASE)
Presenter: Dr. Barry Boehm
Date: Saturday, September 12, 2015
Look for a Reflector Notice in your email or check the Chapter website for more details