Vol. 12, Issue 3: June – July 2014

NEWSLETTER

2002, 2004-13 2003

2008, 2012 President's Award for Most Outstanding Chapter

A Presidential Perspective of CSER

By Michael Wallace

The twelfth annual Conference on Systems Engineering Research (CSER) was held in Redondo Beach, California. The event drew a record breaking attendance of 240-plus industry professionals and academic scholars. The conference was hosted by The University of Southern California (USC) and the Los Angeles Chapter of INCOSE. The theme, "Engineered Resilient Systems: challenges and opportunities in the 21st Century" afforded participants the opportunity to engage in hearty discussion that was pedagogically focused on the importance of systems engineering resolutions. The presentations and papers provided a plethora of applicable based solutions to socio-economic and technological complex systems in today's challenging environment.

A host of speakers brought varied perspectives touting the importance of solutions to resilient systems. Resiliency, as stated by Dr. Simon Goerger, Operation Research Analyst with the U.S. Army Corp of Engineers, is the "ability to repel or resist, the ability to recover and the ability to adapt to new changed conditions from natural and manmade systems." To paraphrase Dr. Goerger, resilience would be something that can absorb, adapt and sustain. The challenges that systems engineers face today are the design and development of resilient systems. As a solution to designing and developing resilient systems, Dr. Goerger noted that, "We must build a cohesive framework to share, leverage and reuse capabilities; we must develop architecture roadmaps to have a more in depth understanding of the system's complexity". Based on these recommended solutions, resiliency should be foundational and inherited as part of the systems design.

(See "Presidential Perspective" on page 2)

CSER 2014 Insights from the Attendees

The notes and observations compiled below were provided by members of INCOSE-LA who attended CSER 2014: Paul Cudney, Richard Emerson, Marvin Metcalf, Terry Rector, Yvette Rodriguez, Susan Ruth, Samridh Sharma, Dr. Mike Sievers, Mike Wallace, Marilee Wheaton, and Dr. Elliot Axelband. Rick Steiner from the San Diego Chapter also provide inputs. The compilation below reflects where the contributors were and what impressed them. For that reason, this compilation does not cover the conference in its entirety, but is a kaleidoscopic smorgasbord of "takeaways" that illustrates the quality and ambiance of an informative and enjoyable CSER. Editor

A SUMMARY:

The 2014 Conference on Systems Engineering Research (CSER) was a two-day, in depth, review of current research for systems engineering and of the challenges facing the profession. There was a consensus among attendees that the conference presented many insightful and thought-provoking concepts. Dr. Sievers from the Jet Propulsion Laboratory commented: "while dashing about (and who among us wasn't?) I noticed clutches of attendees talking about systems engineer stuff. To read the room, they were engaged and intent." In addition to the quality of the papers, the execution was complimented. Dr. Axelbrand noted that there was an "outstanding unity of intense effort [which] was a crucial ingredient of success, as was the volunteer student support." (Dr. Axelband, an INCOSE Fellow, is the Associate Dean for Research Development at the University of Southern California [USC] School of Engineering, a Research Professor of Electrical Engineering, and the Executive Director of the Graduate Program in Systems Architecting and

(See "CSER Insights" on page 4)

Inside This Edition

(Presidential Perspective, continued from page 1)

Stephen Welby, Deputy Assistant Secretary of Defense for System Engineering, described six challenges of complexity involving resilient systems; they are Energy, Environment, Health Care, Food, Water, and Security (violent protection/ threat). Mr. Welby believes the key challenges this nation will face will be system engineering related and depend on system engineering contributions. "We rely daily on the ubiquity of large scale engineered systems and the thousands of engineers who design and implement them". His message was clear that the need for complex solutions to today's challenging situations will require system thinkers from the systems engineering community.

Dr. Neil Siegel, Northrop Grumman sector Vice President and Chief Technology Officer, stated that systems engineers must deal with social problems as well as the technical aspect. The soft skills of the social sciences are equally important when it comes to developing complex systems. Dr. Wanda Austin, President and CEO of the Aerospace Corporation provided profound insight on the economical and technological challenges and the value they add when developing resilient systems. Dr. Austin stated, "How you buy is as important to what you buy". Austin expressed that "resilience and affordability is the key to the future."

Resilience in systems engineering is paramount to the design and development of complex systems. It is evident, based on the panel discussions and presentations at CSER 2014, that there are many factors involved in the development of resilient systems. These factors play a vital role to "Engineered Resilient Systems." Special thanks to the USC and INCOSE-LA partnership, as championed by Terry Rector, Dr. Azad Madni, Marilee Wheaton, Roz Lewis, Dr. Barry Boehm and Dr. Michael Sievers.

Going to the International Symposium?

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

The Power of Networking at an INCOSE-LA Conference

By Jeffrey Willis

I had been laid off from my previous job on Dec 15, 2006. I had no job leads, and had not been actively networking. In my last week of that job, a coworker mentioned an upcoming INCOSE-LA (2007) mini-conference to me, saying that it would be a good place to try to network.

I went to the website for the conference, and saw that I would get a discount on the conference fee if I were an INCOSE member. Therefore, I first signed up to become an INCOSE member, and then I signed up for the conference. My receipt for the conference appeared, but before I could print it, my computer crashed. I went to the INCOSE-LA website and got the contact info for the registration chairman, who was Mike Wallace, of Northrop Grumman. I sent him an email explaining my situation and asking for a receipt. I was pleasantly surprised to see a brief yet friendly reply the next day that contained my receipt.

I went to the conference that morning full of hope that I might get at least one lead for a job. However, I figured that most people in attendance were there to learn about systems engineering, reconnect with friends and acquaintances in the field, and meet some new contacts for the purpose of expanding their networking circle - not to job hunt. I didn't want to impose on anyone by asking for help with finding work, so when asked what I did, I simply said something to the effect of having been recently laid off but looking for work.

I met several people that morning, but wasn't making any progress in terms of leads. By 10:30 a.m., I was getting frustrated, thinking that I should just cut my losses, leave, and get an early start on packing for my trip back home to Rockford, Illinois the next day. I felt myself succumbing to the thought that making a significant networking connection that day was a hopeless venture. However, I thought, "I'm already here, just

(See "Power" continued on page 9)

INCOSE-LA Networking Event - Hosted by Haas Entertainment

Join the INCOSE-Los Angeles Chapter for an evening of socializing and networking with members of the chapter and the Board. Chapter members and guests are welcome and encouraged to attend!
This event is being graciously hosted by a local business, Haas Entertainment, which specializes in high-end home theater. Their car audio – staff will be on hand to demonstrate some of the newest home theater and automation concepts.
WHEN: Tuesday, June 24, 2014, 5:30 pm to 8:00 pm
5:30 - 6:00pm Registration, welcoming
6:30 - 7:00pm Discussion of upcoming events
7:00 - 8:00pm Networking
WHERE: Haas Entertainment, 5774 Uplander Way, Culver City, CA 90230
COST: The chapter will provide wine and beer and light appetizers.
EVENT CONTACT: Scott Birtalan, phone 424-217-0743, email scott.birtalan@incose.org
Reservations are required by Friday June 20, 2014. Space is limited. Please make your reservation online at http://events.constantcontact.com/register/event?llr=l4ihvgeab&oeidk=a07e9bwf13e73fc0e6d. Also look for this event in the "Upcoming Events" section on the Chapter Home page http://www.incose-la.org/ or connect with our Facebook group "INCOSE - LA" at https://www.facebook.com/groups/INCOSE.LA/.

Chapter Second Quarter Strategic Planning Meeting

The Board of Directors hosted a Strategic Planning Meeting on May 17, 2014. The purpose of the meeting was to assess the progress of the Chapter in meeting its goals for 2014. In particular, the purpose of the meeting was to critique strategy and key chapter activities planned for remainder of 2014, to review the significance of core Chapter operating plans to educate and help improve chapter operations, and to have an in-depth membership discussion around maximizing the value proposition. After networking, introductions, and introductory remarks by President Mike Wallace, the attendees went to work on the business at hand.

The board continues to be concerned about providing value to the members of the Chapter, using member participation and retention as two of the metrics. The board reviewed activities that seemed to be working well, but quickly moved on to areas of potential improvement and outreach. Positives included monthly meetings and the use of remote site, facilities that have been made available for use by the Chapter, the Newsletter, and the Reflector notices.

The leadership discussed the importance of planning ahead and of having the plans reflected in actions and follow through. Opening up to other industries and doing a better job of engaging volunteers was discussed, particularly in matching volunteers with the help needed. Other topics included:

Have board members send job descriptions

Need a closed loop system; give feedback to volunteers

Analyze membership demographics – industries, geographical location

Better inter-societal connections, relationships; engage volunteers to be liaisons with different societies; find out who's in the organizations

Facilitating events to better connect people; be ambassadors to welcome attendees at each event; use networking activities to

Engage student divisions with Chapter meetings, events

Have mentors to students

Have USC, LMU be a host site

Networking was a topic, asking the questions, "what opportunities have you had to network with systems engineering professionals from our Chapter, student divisions, industry, working groups. How can we improve engagement?"

Emerging topics for speaker meetings and tutorials, were discussed, considering what other companies and industries do that is essentially systems engineering. How do other companies (SpaceX, movie industries, etc.) do what they call (or don't call) "systems engineering?" One idea was to do a workshop, present some data, and pull what was heard apart and come to a conclusion about what was presented and come to results of value. Another is to have a chapter working group that can feed into INCOSE working groups. Another idea discussed was to open up to a "lessons learned" type exercise by having a session for discussions about things that may have gone wrong or to extract general lessons, perhaps by doing a workshop.

(See "Strategic Planning Meeting," on page 11)

A Deeper Perspective on the State of Aerospace Today

By Shirley Tseng

The Los Angeles Economic Develop Corp Newsletter write-up (April 2014 edition) and the usual advocacy to state and Federal government is more of the status quo. However, advocacy and lobbying haven't worked to date and I can't see the conditions changing in Sacramento and Washington anytime soon. Each is bent on pushing their current agenda. The American Institute of Aeronautics and Astronautics has an active Congressional outreach with annual visits to Sacramento and Washington. The National Defense Industry Association and the Institute of Electrical and Electronics Engineers also have governmental outreach programs. However, current lobbying hasn't work as politicians are happy to continue with pushing their existing agendas and to not being accountable for the impacts of the laws and actions that they have imposed on us (I was shocked to hear that we have about >80% re-election rate – higher than in Russia). International Traffic in Arms Regulations on space export is an example of a counterproductive initiative that has contributed to the decline in the US Space enterprise in the last 15 years.

However, I do think that what is missing is stakeholder feedback – and that "transparency and accountability" (with regular feedback – closing the loop on the open loop government that we are operating under) is what is needed to start making impact on the status quo. You may remember my Newsletter write-up on the systems engineering of Lawmaking talk from INCOSE-SD chapter more on "proper" engineering of laws and focus on quality system for law. (see David Schrunk's web site http://www.scienceoflaws.org). I think David's frontal attack on lawyers to remake lawmaking is an upward climb up a steep mountain. However, I think the obvious "gap" that systems engineering should identify is the absence of regular feedback to close the loop on any system to control and improve the system. Government in the Seventeenth Century did not have the luxury of electronic communication (the feedback mechanism in the Constitution is that you can vote every 2 years). With the real-time feedback now available with modern communication systems, it is not acceptable to not have regular feedback in our civil government/society organizations. Each elected person, government entity (FAA, EPA, IRS, NOAA) need to have at least annual self-performance assessment and mechanism for stakeholders to provide feedback. The voting records and actions of our political representative need to be made available and a new aggregation mechanism should be available to provide feedback. This is an example of a thread that we should "unbundle" from the Newsletter and start a discussion thread or via web blog.

Anyone else interested in the problem?

(CSER Insights, continued from page 1)
Engineering from 1994–2004, and currently a Research Professor of Astronautics at USC and a Senior Engineer at the RAND Corporation)

Marilee Wheaton from The Aerospace Corporation observed that many of the attendees (and some of our toughest crowd) noted the high quality of the papers. The leadership team reviewed of all of the many excellent papers to ensure that those ultimately presented were of the highest quality and reflective of the theme of the conference.

University of Southern California (USC) Student Division member Samridh Sharma, who helped with registration on Friday, commented that logistics-wise, everything was planned well. "I had a great experience interacting with guests and had some very insightful conversations with industry professionals."

Lockheed Martin's Marvin Metcalf noted that the attendees at the conference were a mix drawn from academia, industry, and government. In general terms, the representatives from industry and government were "graybeards," whereas academia was represented by a mix of "graybeards" and students. Marvin also opined that the keynote speakers were excellent. He noted that six tracks of papers were available during the two days, and it was easy to find a paper of interest at every time slot. Yvette Rodriguez, a member of the Chapter's Board of Directors, observed that the Student Division volunteers worked out great.

Much of the discussion about systems engineering was embedded in examples of the challenges facing the systems of the future, leveraged off of experiences with past systems.

A caution raised more than once was the limitations of tools: what the tool can do versus what is needed of the tool in order to architect, design, and produce the desired system. That is to say, the tools can limit the solutions. If the use of a given tool is axiomatic, then the capabilities of that tool are a limit on the tradespace. Such a decision should engage the risk-management element of the systems engineering process.

A question was raised, wondering if the pursuit of "resilience" might be at odds with the established methodology of optimal versus sub-optimal solutions—another risk.

It was noted that hardware mean-time-between-failures (MTBF) is good and getting better, however "system" MTBF is low due to software. An interesting statistic regarding software: the number of latent imbedded defects per line of code is unchanged, a phenomenon of increasing significance given the growth in the number of lines of code (equivalent or real). Automobiles, fifty years ago, had only de facto software in the form of mechanical systems, and rudimentary hardwire circuitry. The current problem is, in part, attributed to the immaturity of the software engineering processes—and a need for more rigorously following the systems engineering process.

One challenge is unplanned dynamic behavior — a growing phenomenon. "Unplanned dynamic behavior" would include using a system in a manner different than any envisioned by the creators. The "resilience" challenge would be to control undesirable interactions. A new factor is societal expectations with respect to software-intensive systems. One such expectation is that the innovative use of an application in a manner not envisioned by the designers would not compromise the application, other applications, or the hosting device. One approach to mitigating unplanned dynamic behavior would be to be more inclusive by having a broader spectrum of stakeholders. While this would be deferential to the perceived need for increased inclusiveness of societal expectations, this trend dilutes the role of "stakeholder" and increases the risk of chaos.

Don't take "no" from someone who can't say "yes."

—Sign on the desk of the Nevada Northern Railroad dispatcher

There is a challenge to write requirements so that the software design engineers understand them, but that is the same challenge with respect to writing requirements for any other design engineering discipline.

On a positive note, one speaker commented that we are in exciting times with great opportunities. This note of encouragement was echoed in several presentations and discussions: there is an increasing understanding of and appreciation for systems engineering as a discipline.

THURSDAY

A lead-in to CSER was a social for the participants in Systems Engineering and Architecting Doctoral Network for Research (SEANET), which had been meeting at USC. The SEANET social provided a transition into the opening of the CSER during registration on Thursday, the evening before the formal CSER events. This networking event provided an opportunity for the students to network with other students, early registrants, and veteran systems engineers. The SEANET social was also an opportunity for the students to exhibit posters on their research—a learning experience for the seasoned practitioners who attended. One veteran systems engineer in the INCOSE-LA cadre was impressed by the diversity of international students, particularly from George Washington University and Stevens, and their depth of understanding and their enthusiastic sharing.

(See "CSER Insights" on page 6)

The most important tool of the theoretical physicist is the waste basket.

—Attributed to Albert Einstein

Los Angeles Chapter Acknowledged as a Gold Circle Award Chapter

Barclay Brown, INCOSE Director for the Americas Sector sent to following letter to INCOSE-LA President Mike Wallace:

Dear Mr. Wallace:

On behalf of the International Council on Systems Engineering (INCOSE), we are pleased to recognize the Los Angeles Chapter as a **Gold Circle Award Chapter** based upon its contributions and accomplishments in 2013. The Gold Circle Award recognizes chapters adopting best practices and reaching the highest goals and standards established by our organization.

For many, chapters provide the primary day-to-day interface with INCOSE. 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 Los Angeles Chapter leaders and members have committed significant time and energy to further the goals of our organization.

To honor these efforts and achievements, this Gold Circle Award will be presented at the 2014 INCOSE International Symposium in Las Vegas, NV. In doing so, INCOSE recognizes and celebrates the contributions and achievements of the Los Angeles Chapter, its leaders, and its sponsors.

High quality, vibrant chapters are essential in INCOSE's drive to enrich, educate, and enlighten the INCOSE membership while improving recognition of INCOSE and the systems engineering profession. The Sector Directors and INCOSE extend heartfelt congratulations, thanks and appreciation to the Los Angeles Chapter for its contributions towards attaining these goals.

Signed,
Barclay Brown

Dr. "Bo" Oppenheim to Receive Outstanding Service Award

Dr. "Bo" Oppenheim of Loyola Marymount University has been awarded an Outstanding Service Award. Alan Harding, President-Elect, and the Chair, Honors and Awards Committee sent the following announcement to Dr. Oppenheim.

Dear Bo,

I am delighted to tell you that you are the recipient of an INCOSE 2014 Outstanding Service Award. You join a distinguished group of INCOSE members recognized for their significant volunteer effort on behalf of our organization.

The award recognizes you for significant and continuous contributions to the creation, evolution, and dissemination of Lean Enablers for Systems Engineering; and, for personal commitment to the INCOSE Polish chapter.

Your award will be formally announced during the Tuesday plenary session at our International Symposium in Henderson, 30th June – 3rd July 2014. I would be delighted if you are able to attend in person to receive this honour and to be publicly recognized for your contribution to the discipline of systems engineering. Further details of the ceremony will be provided to you closer to the time. In the interim, you are free to share the news of this recognition as you see fit.

Once again, congratulations and thank you for all you do for INCOSE!

Signed,
Alan Harding

The INCOSE-LA membership and leadership joins the INCOSE Honors and Awards Committee in their expression of appreciation and gratitude to one of our own: Dr. "Bo" Oppenheim.

"Gdyby kózka nie skakała, to by smutne życie miała"
"Kto się czubi, ten się lubi"

2015 Mini-conference: It is Closer Than You Think!

The leadership team for the 2015 Mini-conference is forming, and has many opportunities for the members of the Los Angeles Chapter to produce another conference that will reach out to the systems engineering community in southern California. The conference is planned for the middle of next March.

Jeffery Willis is the chair with Mike Wallace as co-chair and Terry Rector serving as a mentor. The technical program chair is Helayna Roberts, assisted by co-chair Padman Nagenthiram and mentor Dick emerson. The team has an opening for an additional technical co-chair. Volunteers for the session and the tracks include Chyrl Yeatts, Karen Miller, and Gelys Tancho, plus a first-of-several-needed volunteers as reviewers. Beth O'Donnell and Harvey Soldan have signed on to support the financial team and Scott Birtalan and Dr. Bohdan Oppenheim are supporting the venue coordination effort. Eric Belle is the chair of the sponsorship committee and Beth O'Donnell has agreed to help with the operations and exhibits activities. The chair of the publicity team is Christine Ito, and the co-chair is Stephen Guine. Gelys Trancho and the editor of the *Newsletter* have signed on for the communications team. Jessica Maiten, Melissa Wallace, Waltraut Fehrmann, Chyrl Yeatts, and Philipp Stadler have also volunteered

As this list shows, the architecture of the team is coming into place and is aleady being populated with volunteers. If you can help and would like to be a part of this effort, please contact Jeffery Willis at Jeffrey.Willis@ngc.com or Helayna Roberts at Helayna.Roberts@ngc.com.

(CSER Insights, continued from page 4)

FRIDAY

Rick Steiner of the San Diego Chapter had several observations. During the Friday morning plenary, keynote speaker Dr. Wanda Austin, President and CEO of The Aerospace Corporation, spoke to the challenges facing system engineering in space. Dr. Austin commented on the move toward resilient space systems—systems with distributed capabilities across multiple, smaller satellites rather than the typical larger, single-capability concept. She used the term, *disaggregation.* Dr. Austin also noted that design flaws are still the major source of operational anomalies. We are the in "late adolescence" of space systems engineering.

Dr. David Whelan, Vice President of Engineering for Boeing Defense, Space and Security, also a keynote speaker Friday morning, discussed systems engineering from the perspective of building commercial aircraft and building launch-to-orbit rockets. Dr. Whelan noted that the design lifecycles have been getting longer since the advent of automated design tools! Systems engineers need to do more so that designers will do less.

During the Friday morning model based systems engineering (MBSE) track, Dr. Azad Madni discussed a hypothetical experiential design language. Part of the challenge of the execution of the systems engineering process is the need for the systems engineer to have some experience with the expected functionality. An experiential design language would involve creating experiences and would require multisensory environments enabled by appropriate metaphors. Colors, sounds, and animation could be used to illustrate key points. Technical storytelling (telling stories about technical systems) could be used without requiring a new notation, a consideration given that non-engineers have difficulties with SysML. The experiential design language would involve mapping the design space to the technical story space.

Other challenges discussed in MBSE applications were virtual design verification and dealing with overlapping objects in different models.

As a part of the Systems Thinking track, INCOSE Fellow Jack Ring discussed the need for an unambiguous language for system design and engineering, referencing a concept from Wayne Wymore.

During the Department of Defense (DoD) Systems Engineering Research Panel, moderator Kristin Baldwin spoke of the "bathtub" of engineering age, which still exists, but noted that the mean age is relatively stable at forty-three years old. The peak around age fifty-five represents peak capacity, and we as a country will never see that again, opined Ms. Baldwin. We cannot hire enough technologists. She noted that the Department of Defense has no career code for systems engineers, so it is difficult to count the number of systems engineers working for the Department.

Panelist Jon Wade explained that the Systems Engineering Research Center is intended to be a network, not a node. He also discussed "experience acceleration": how to develop competent systems engineers more quickly.

SATURDAY

Metcalf and Steiner made several observations from plenary session held Saturday morning. During that session, keynote speakers Dr. Simon Goerger, an Operations Research Analyst with the United States Army Corp of Engineers and Stephen Welby, Deputy Assistant Secretary of Defense for Systems Engineering, provided some insights into the challenges facing the profession.

Dr. Georger offered a succinct definition of a resilient system as being one with an ability to repel, resist, or absorb disruptions (whether natural or manmade), an ability to recover from disruptions, and an ability to adapt to changed conditions. A question was raised, wondering if the pursuit of "resilience" might be at odds with the established methodology of optimal versus sub-optimal solutions, a consideration which should be catalogued under risk analysis. One INCOSE Fellow questioned the difference between "resilience" and "sensitivity analysis." Regardless, the use of the term encapsulated a paradigm shift in how one might pursue the application of the systems engineering process to the implementation of systems of the future.

Mr. Welby listed the following national challenges:

- Reliable and dependable energy supply (our current systems lacks resiliency);
- Sustainable development in harmony with our natural environment (environmental sustainability);
- Affordable healthcare (need for structure and efficiency);
- Refurbishment and upgrading of our aging infrastructure (including roads, dams, waterways, and electrical and communications networks);
- Safe and sustainable delivery of food and water for a growing world population;
- Security in the face of new and emerging threats.

Mr. Welby proposed applying systems engineering to solving these challenges.

Other comments noted by Marvin Metcalf are:

- There do not appear to be any good universal measures of systems engineering effectiveness.
- The systems engineering community is struggling to define metrics for resiliency.
- The resilient system solution may not be the "optimum" system.
- An accurate high-level plan is better than a detail-level plan that is based on a lot of assumptions.
- Defining a design tradespace helps prevent starting with a point design.

Rick Steiner also noted speaker Steve Welby's observation that we count on the flawless reliability and safety of highly complex national and global infrastructure every day. We don't often even think about these large-scale systems, yet they are excellent examples of our systems engineering profession.

(See "CSER Insights" on page 8)

Systems Engineering Management

5-Day Course

November 3 - 7, 2014
Las Vegas, NV

Designed for individuals who plan, manage, control, specify or support the development or acquisition of products, including software products, or systems. The course will be of particular value to program managers, project chief engineers, engineering managers and system engineers.

PROJECT PERFORMANCE INTERNATIONAL

Complete course description or for online registration please visit:

www.ppi-int.com/sem

Prepare for the CSEP Exam today

Attend CTI's CSEP Preparation course over 4-days and gain the knowledge and confidence to successfully complete the INCOSE CSEP Exam.

UPCOMING COURSES *	
December 1 - 4, 2014	Las Vegas, NV
February 9 - 12, 2015	San Diego, CA
February 23 - 26, 2015	Las Vegas, NV
March 23 - 26, 2015	Los Angeles, CA

***INCOSE LA members receive a $200 discount**

CERTIFICATION TRAINING INTERNATIONAL
A PPI Company

Register today at: www.certificationtraining-int.com

(CSER Insights, continued from page 6)

Mr. Welby further noted that the social contract between engineers and test pilots as part of flight-testing is analogous to the social contract between engineers and consumers of the national infrastructure. The world needs systems engineers.

A comment during the plenary was that the value of systems engineering is very long-lived, rendering short-term metrics counterproductive. Metrics are important but need to be re-evaluated over time.

As a part of the MBSE track Sebastian Herzig was understood to say that managing inconsistencies among the various models was a challenge, with the added thought that perhaps stochastic reasoning could help.

EXECUTIVE LEADERSHIP PANEL

The Executive Leadership Panel was the concluding event of the CSER and was well attended and well received. The panel featured Dr. Neil Siegel (Sector Vice President and Chief Technology Officer at Northrop Grumman Corporation), Mr. Thomas P. Hannon (Corporate Director, Engineering Business Engagement, Lockheed Martin), Dr. Robert D. Rasmussen (Technology Fellow, Jet Propulsion Laboratory and the California Institute of Technology), and Mr. Rick Baily (Vice President—Engineering, Mission Assurance and Product Support, Boeing Defense, Space and Security).

Dr. Elliot Axelband, moderated the panel. Dr. Axelband provided the following insights:

The Executive Leadership Panel has been a staple of all three recent CSER conferences hosted in Los Angeles. Each of this year's panelists provided a twenty-minute presentation addressing resilient affordable systems from his perspective. This was followed by a forty-minute question and answer session during which members of the audience used open microphones to ask questions of the panel.

By rough estimate, the audience numbered well over half the attendees at the conference, and their questions overran the time allotted for them. Informal polls taken after the panel suggest that the audience evaluated the panel very positively. The topics which drew the greatest comment were:

- the seemingly irreducible latent defects per lines of code and therefore the need to write shorter code or develop a new language that is not so defect prone
- the need to more seriously consider processes employed by biological systems as a means to adapt
- using digital tools in the system-design process that simultaneously consider:
  - the customer's fielded enterprise and its sustainment system, as well a system design process that includes system-of-systems, enterprise, sustainment and supply chain considerations;
  - and the use of avoidance (e.g. mobility and covertness), robustness (e.g. high damage thresholds), recovery (e.g. redundancy, self-healing) and reconstitution (e.g. replace and rebuild).

The panel discussion included an interesting "think-outside-the box" challenge. In a concept reminiscent of the 1979 movie *Star Trek: The Motion Picture*, those in attendance were challenged to consider resilience, adaptability, and agility in the context of "engineering genomes," as illustrated by a hypothetical satellite that might be launched to explore a nearby star and to then return to earth. In the movie, NASA's Voyager 1 (which was launched in 1977) returns in 2271, its "engineering genomes" having "evolved" the vehicle into the threatening "V'Ger." While the hyperbolical extrapolation of a theory might be viewed with some caution, the concept has merit as a challenge to the barnacles of over-defined procedures and low-risk past solutions.

One comment was that systems engineering must deal with social aspects as well as technical, which may be beyond contract scope (understand stakeholder needs). A key social challenge for a future military system might be, "Am I willing to kill someone based on what this 'video game' says?"

Niel Siegel of Northrop Grumman used a comparison between aerospace and the automotive industry to illustrate the looming challenges and opportunities facing the systems engineering profession. Aerospace has broadest variance in quality, due probably to software. In the automotive industry companies other than General Motors (GM) focused on building reliable cars before GM did, and now GM is "playing catch up." The reliability and performance of automobiles are all very close to each other, while Defense has a defect rate that is over twenty times higher.

Dr. Siegel, in his comments about the software latent defect rate per lines of code—which hasn't improved over last several years—versus productivity, which has skyrocketed, and about unplanned dynamic behavior noted a need to build control structures to prevent unwanted behavior. This is fundamentally a systems engineering issue.

Tom Hannon of Lockheed Martin added that there is a need for cross-system trades: more trades equates to more resilience.

Rick Bailey, in discussing systems engineering issues, used the term, "silver tsunami" to describe the talent drain. He also mentioned biology as a source of inspiration, which raised the question of how one does this affordably.

Resilience is a capability-based metric.

One concluding concept that caught contributor Steiner's ear: MBSE still requires the fundamentals. Don't blindly believe the models. Don't take away from good, fundamental systems engineering; tools should augment the process, not replace it.

As Dr. Axelband noted, the clock brought to a close the Executive Leadership Panel and, with it, the 2014 CSER. Those who attended left on a high note and with an appreciation for the researchers, facilitators, moderators, and panelists who made the 2014 CSER a rousing success.

"I think it was the Brookings Institution," he told one audience, "that made a study that said the more education you had the less likely you were to become an inventor. The reason why is: from the time a kid starts kindergarten to the time he graduates from college, he will be examined two or three or four times a year, and if he flunks once, he's out. Now an inventor fails 999 times, and if he succeeds once, he's in. An inventor treats his failures simply as practice shots."

Charles Kettering

(Power, continued from page 2)

hang in there and keep trying, I'll never know what good might have come if I don't see this through to the end."

Lunch time came, and I remember making the long walk across the conference facility at Loyola Marymount by myself. I said a silent prayer, asking God to help me make a connection with anyone who could help me. However, I must admit that I didn't hold out a lot of hope for God to answer my prayer that day. I got in the line for the buffet lunch. I was just about to get to the food portion of the line when I suddenly heard some guys behind me start laughing. I turned around to see what the commotion was, and I saw the nametag of the guy directly behind me: Mike Wallace. Had he not had a name in common with a celebrity (Mike Wallace of *60 Minutes*), I might not have remembered having previous contact with him via email.

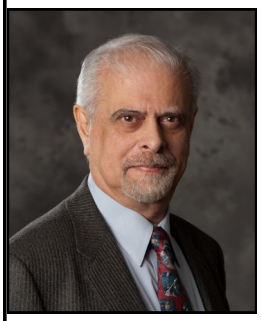
I waited until Mike turned back around and faced me to introduce myself and mention the context of our previous exchange. I found Mike to be very personable, charismatic, and sincere. He invited me to join him at a table full of Northrop guys once we made it through the line, and I gladly accepted.

I talked to Mike and the rest of the table, enjoying very good conversation. Mike invited me to talk to him more in the afternoon, between the speaking sessions, and I told him I would.

Sometime during that afternoon, I passed on one of the speaker's sessions to talk to Mike at one of the tables outside in a more private setting. Mike and I talked about my background and in what type of work I was interested. He gave me his card and told me to send my resume to him. I did so that evening before I packed.

Just a few days later, Mike called me and said that a manager at Northrop was interested in my applying for a certain posting on the company's website. I immediately spent about two hours tailoring my resume as closely as I honestly could to that posting and then submitted my application. What seems like about two weeks later, I got a call from a Northrop recruiter, asking me to interview for that position. The rest of the story, in brief, is that I interviewed, got the job, and after seven years, I'm still there. Since then, I've come to appreciate more and more the power of networking and the treasures it can yield, particularly at a conference!

Lifetime Achievement Award presented to Dr. Azad M. Madni.



Dr. Azad Madni

The CSER and INCOSE-LA leadership team presented a special award to Dr. Madni:

"In recognition of a lifetime of significant, industry changing systems engineering research and education advances, and for your devotion to developing the industry's finest engineers, engineering managers, and engineering leaders. Your spirit of optimism will forever remain your lifelong legacy that will inspire generations to come."

SOUND BITES

Search the Internet: you can always tell me the answer, but you can't tell me if it is true.

What is the difference between "resilience" and "sensitivity analysis" and "design margin" of "classical" systems engineering?

Would the "classical" N2 analysis be a technique to control "unplanned dynamic behavior"? The fundamentals are the same, only the tools and the magnitude of the challenge have changed.

Reduce the number of CDRLs—nobody reads them anyway.

The SA-5 was the B-70's "black swan," or an example of how a system cannot be 100 percent resilient.

Be wary of "wisdom of crowds." Not all crowds are wise.

INCOSE Fellow Jack Ring and Dr. Michael Sievers of the Jet Propulsion Laboratory head for the buffet (left), while Rick Steiner enjoys his meal (center). At right Cecelia Haskins discusses a SEANET poster board with a fellow researcher.

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**
David Moller	Sr Systems Engineer	Woodward Inc
Ali Kani		
Mike Delaney	Instrumentation & Flight Test Engineer	National Test Pilot School
Douglas Dillard	Senior Systems Integration	Leidos
Edwin Ordoukhanian	Student	University of Southern California
Courtney Paulson	Graduate Assistant/ PhD Student	University of Southern California
Balakrishnan Ranganathan	PhD Student	University of Southern California
Hector Hernandez	System Engineer Project Lead	Leidos Corporation
Atash Soltani	Program/Project Quality Engineer	Northrop Grumman
Susan Heuchert	Sr. Project Engineer	Heuchert Consulting
Alex Minassi	Systems Engineer	Northrop Grumman Corporation
Eric Bolognini	NAM CATIA Systems Engineering Center of Excellence / Manager	Dassault Systemes
Mark Delsman	Systems Engineer	Honeywell Safety Products
Richard Koziol	Sr. Staff Engineer - Systems	Woodward HRT
Cesar Uriate	MANUFACTURING AND LAUNCHING MANAGER	Ford

CSER Candids

Paul Cudney and Dr. Malcom Currie doing a yeoman's job at the registration desk as others look on (left), Aerospace's Susan Ruth volunteering, also at the registration desk (below);

Renew Your Membership!

INCOSE membership must be renewed annually.
Go to https://www.incose.org/membership/renew.aspx to renew today!

The Benefits of Volunteering

By Susan Ruth

Susan shared an e-mail in which she discussed volunteering. The text is below. [Ed.]

Here are some thoughts for engagement.

For any organization you engage with, you need to have a general idea of what you are willing to "give" and what you expect to "get". In a volunteer environment what you give is typically time and energy and what you get can be technical knowledge, the ability to practice managing, the ability to practice leading, the development of a professional network, professional visibility and there are probably a few more I haven't mentioned.

For someone who is relatively early in their career, all of the above are useful (maybe I'm biased, but I engaged in all of the areas listed above). Obviously if you are in school or have a family, the amount of discretionary time for this kind of activity goes down, but you can still engage.

1) The easiest is to attend the monthly speaker meetings or the quarterly social meetings. For speaker meetings, we typically have a site in the South Bay, right now we are meeting at Aerospace in El Segundo. The social meetings spread all around, but about every other one is up in the Pasadena area.

2) We also try to have a tutorial about once a quarter.

3) The leadership of the chapter has a weekly telecon and you are always welcome to lurk to see how the chapter is run. If you have interests in learning the skills of management and leadership, this is a great environment in which to start, maybe first by observing and later by taking on roles yourself.

4) We typically have at least one larger event every year and we're always looking for people to work that special event, typically people who do NOT work the regular chapter events.

5) There are always behind the scenes activities going on: the *Newsletter* (articles, editing, print/mail), gathering information of related events in the area, the email reflector (my contribution), the website, membership, etc.

The idea is that it is YOUR chapter for your benefit, but it doesn't come free. You get out of your participation what you put into it. I've been doing this for many years and have never been sorry I've spent the time on this rather than other things.

(Strategic Planning Meeting, continued from page 3)

The leadership continues to be concerned about job security and career development for the members. Toward that end, several topics were discussed. Lessons learned and opportunities could be available in new domains such as health care featuring a biomedical panel or in energy and power systems featuring, possibly, Susim Gedam of Capstone Turbine, another speaker from Southern California Edison, or another report on the UCLA Smart Grid initiative. Shirley Tseng's presentation included the suggestion of two or three personal and career development events and partnering with other technical societies.

Vice-president Stephen Guine proposed a strategy to bolster a sense of inclusion on the part of members. Stephen noted that outreach needs to be linked with volunteerism, brand value creation, and member value return.

The Board of Directors conducts these quarterly strategic planning meeting to facilitate providing value to the membership, and welcome the participation of all who are interested in learning more, volunteering, or providing input, which is always welcome and appreciated. The next meeting will be announce in a future edition of the Newsletter and in a reflector notice.

2014 Board of Directors

Elected Officers			**Elected At-large Directors**		
President	Michael Wallace	m.wallace@ngc.com	Membership	Marsha Weiskopf	Marsha.v.weiskopf@aero.org
Vice President	Stephen Guine	Stephen.Guine@ngc.com	Programs	Shirley Tseng	shirleytseng@earthlink.net
Immediate Past President	Eric Belle	eric.belle@incose.org	Systems Engineering Education	Yvette Rodriguez	usc.chica@gmail.com
Secretary	Scott Birtalan	scott.birtalan@ngc.com	Ways and Means	Paul Cudney	paul.cudney@incose.org
Treasurer	Harvey Soldan	harvey.soldan@jpl.nasa.gov	Communications	Robert Noel	robert.noel@boeing.com
Appointed Positions					
Newsletter Editor	Jorg Largent	jorg.largent@incose.org	Student Division Ambassador	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	OPEN		Industrial Relations Manager	Jose Garcia Jr.	jose.s.garcia-jr@boeing.com
Professional Networking Chair	Scott Birtalan	scott.birtalan@ngc.com	Website Technical Manager	OPEN	
Representative to the SF Valley Engineer's Council	Stephen Guine	Stephen.Guine@ngc.com	Lead Site Coordinator	OPEN	

INCOSE-LA Chapter NEWSLETTER
Vol. 12, Issue 3: June – July 2014

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
Date: Tuesday, June 10, 2014
Time: 5:30 p.m. – 9:00 p.m.
Panel Discussion, Model Based Systems Engineering
Cost: Free for members; $10.00 for non-members
See Reflector Notice in your email for details

Networking Event in Culver City
Date: Tuesday, June 24, 2014
Time: 5:30 p.m. – 8:00 p.m.
Place: Haas Entertainment
5774 Uplander Way
Culver City, California 90230
See article on page 2 and a Reflector Notice in your email for details

The Twenty-fourth International Symposium
June 30 – July 3 2014
Las Vegas (Henderson) Nevada
For more information go to http://www.incose.org/symp2014/
Come enjoy the finest of systems engineering
and join other INCOSE-LA members

Speaker Meeting
Date: Tuesday, July 8, 2014
Time: 5:30 p.m. – 9:00 p.m.
Details in work — save the date
Cost: Free for members; $10.00 for non-members
See Reflector Notice in your email for details