

NEWSLETTER



2008, 2012, 2017
President's Award
for Most
Outstanding Chapter



2004-14



2015-17

Coming This September!

Chapter Communications



What is special about September?

- The Autumnal Equinox?
- World Series hype?
- Going back to college?
- Football?
- Halloween candy and decorations on sale?

How about: Opportunity?

The Western States Regional Conference is an opportunity to improve your skillset and to expand your network without having to go all the way to events such as the International Symposium in Orlando. To learn more about this opportunity, see the article on page 6 and the advertisement on page 7.

You can also go to the conference webpage to learn more and to register.

<https://www.incose.org/wsrc2019>



See you
there!



*Have you looked at the
Chapter webpage — lately?*

Go to the Chapter webpage at:

www.incose.org/los-angeles

- Videos on training, insights, and INCOSE events
- Local training and networking events
- Speaker meetings
- Conferences

Check out the Chapter's website, for the latest information (or links) and these and other topics of interest to the systems engineering professional who wants to grow within the profession.

The potential is growing. Want to interest a youngster in engineering? Go to the Chapter website and follow the links (Now on YouTube) to the YouTube video, *The Engineer in a Hat*, produced by our colleagues in Britain.

*If you prefer to receive the
Newsletter in hardcopy...*

To save cost, the *Newsletter* is now being distributed electronically. If you would prefer to receive a hardcopy by mail, please email us at: newsletter@incose-la.org.

There is still time to submit a proposal to WSRC: go to <https://easychair.org/cfp/wsrc2019>
Volunteers needed as technical reviewers of the proposals. Contact Dr. Rick Hefner at: rhefner@caltech.edu

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Step 1 for a Project, Though Oft' Overlooked February Speaker Meeting

A good vision statement is not easy. It is not a slogan. These are two statements that were shared with the group gathered at The Aerospace Corporation by speaker Jorg Largent the evening of February 12, 2019 during his talk titled “The Vision Statement: Step 1 for a Project, though Off’ Overlooked”.

This was a discussion about both good and bad vision statements. The INCOSE website defines the problem statement of a system and what it should include. It is very verbose. Jorg pointed out that it includes problem statement content, mission statement content but it is not a good vision statement.

Frequently, there is overlap amongst the Problem Statement, the Mission Statement, and the Vision Statement. A project starts somewhere, wants to finish at a spot and the vision statement explains what the goal is.

Ethos provide the big picture. Pathos appeals to the emotion. Logos includes requirements, numbers and reason. To make a vision statement persuasive Jorg recommends it include mostly Ethos with a touch of Pathos and very little of Logos. Engineers frequently want to include heavy Logos, numbers, reasons and requirements; when they need to focus on the Ethos and Pathos more. The vision statement is to keep you focused on why you are doing the work and what is your purpose.

Cited examples of good vision statements included the opening lines of Star Trek and President John Kennedy's impassioned statement about going to the moon in the 1960s.

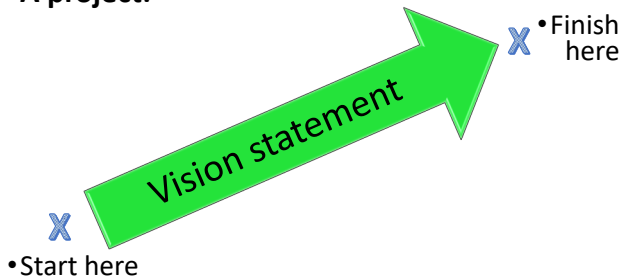
These are the voyages of the starship Enterprise. Her five-year mission: to explore strange new worlds, to seek out new life and new civilizations, to boldly go where no man has gone before.

In conclusion, Jorg described a good vision statement as one that is a sum of all needed vectors, includes top-level requirements, but not a shall statement, includes “ethos”, with a touch of “pathos” and at most a hint of “logos”. It should be succinct, ethically honest, has a time frame, manages expectations, is contemporaneous, helps maintain focus, and is persuasive.

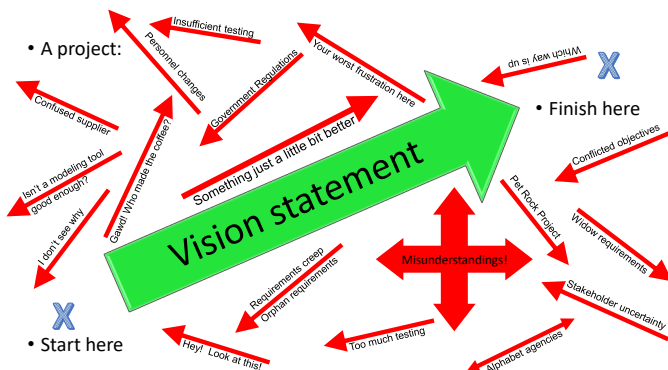
INCOSE's Vision 2025 is fifty pages and available here: <https://www.incose.org/products-and-publications/se-vision-2025>. Fifty pages suggests that it is not succinct however inside the front cover it starts with: "The purpose of the Vision 2025 is to inspire and guide the direction of systems engineering across diverse stakeholder communities, which include: Engineering Executives, Policy Makers, Academics & Researchers, Practitioners, Tool Vendors." This meets many of the attributes that Jorg said a vision statement should include.

INCOSE-LA is grateful to Jorg for sharing his insights with the group. Jorg Largent's career spans 55 years and ranges from the enlisted ranks of the United States military to Lead Systems Engineer on the B-2. In between he matriculated at the Georgia Institute of Technology. After completing his formal training, he worked in orbital mechanics on the Apollo Program. At the close of the Apollo program Jorg became a Flight Test Engineer, primarily on the CH-46E, the B-1A, and the B-2. After he left Flight Test he moved on to liaison engineering and then to system engineering on the B-2 program and special projects. Jorg has been active in INCOSE working groups, including Transportation, Very Small Entity, and Systems Engineering Quality Management. The INCOSE-LA chapter a particularly happy that Jorg is a writer and the Editor of the INCOSE-LA *Newsletter*.

Jorg's presentation is available on the INCOSE Collaboration Portal (nee "CONNECT"). Once you log into the incose.org site go to this link: [https://connect.incose.org/Chapters/LosAngeles/Shared%20Documents%20Test/2019-CHAPTER-Folder/Co%20-%20Event%20Results/C1%20-%20Chapter%20Meetings%20and%20Events/20190212%20Speaker%20Meeting/Feb12SpeakerPresentation JorgLargent Vision.pptx](https://connect.incose.org/Chapters/LosAngeles/Shared%20Documents%20Test/2019-CHAPTER-Folder/Co%20-%20Event%20Results/C1%20-%20Chapter%20Meetings%20and%20Events/20190212%20Speaker%20Meeting/Feb12SpeakerPresentation%20JorgLargent%20Vision.pptx)



A Vision Statement — In Theory



A Vision Statement — In The Real World

Our profession — system engineering — is the discipline which sorts the vectors, eliminating the superfluous and architecting the remaining vectors into a pattern that provides the highest likelihood of success.

Attributes of a vision statement include Ethos, Logos and Pathos; three artistic proofs as defined by Aristotle.

Farming, the 21st. Century, and John Deere

The March Speaker Meeting presentation focused on farming. While the circumstances of the presentation might, at first glance, seem prosaic, the technology has all the “glam” of a rocket to the major planets and a utilization of systems engineering that can serve as a standard in any discipline. To mangle a line from “Oklahoma,” everything is up to date in John Deere.

The speaker, Rob Day, leads the John Deere Enterprise Systems Engineering adoption efforts, where he helps sets strategic direction, develops systems engineering methods and tools. Rob provides training and support to practitioners and manages relationships with INCOSE and academic institutions. Rob Day has over 32 years’ experience in system engineering, systems architecture, systems analysis, product design. He holds a degree in Manufacturing Engineering from Bradley University in Peoria, Illinois, plus graduate certificates from both Caltech and MIT in Systems Engineering and Management.

Rob’s presentation featured a video illustrating a day in the life of one of their customers; a de facto use case analysis. His presentation included a series of slides which buttressed his comprehensive talk.

The “Future of Farming” was an opening discussion and described the challenges, and opportunities. John Deere groups their products into nine “Platforms/Divisions,” ranging from agriculture and forestry to lawn and garden. From its beginnings in 1837, the company has built a heritage of understanding the challenges of agriculture and of providing the implements needed. Rob described how John Deere has taken on the challenge of developing products that improve the world’s food supply using modern technology to its fullest advantage.

Application of systems engineering moved John Deere from #3 to #1

To facilitate capability, the company has used systems engineering. Rob described how systems engineering was used to accomplish the production of these systems, “with specified performance, on time, within cost, with distinctive quality.” In discussing the reasons for adopting systems engineering, Rob cited several illustrations of using systems engineering, such as using the black box concept to define and control interfaces. He described planters that can vary seed distribution for an optimized yield. Another example of the functionality John Deere has incorporated into their products is the capability to detect pests in plants and the nutrients needed by a crop, followed quickly by a tailored response.

In addition to the improved facilitation of meeting the customers’ needs, two of John Deere’s benefits of following the systems engineering process are risk reduction and a reduction in the number of resources needed to deliver their products.

The implementation of systems engineering had management backing and drew on the resources of Caltech, MIT Systems Design and Management, SEBok (The Systems Engineering Body of Knowledge) and INCOSE. With this backing and foundation, John Deere is building a culture of applied, and applying, systems engineering.

The proper, and disciplined, application of systems engineering was highlighted (system architecture works if it is done right, patience is a virtue, traceability works; you got to take the time to do it right). Rob noted that systems engineering, properly applied, is more than just the pieces. “You can talk tools until you are blue in the face, but it is useless until you connect the dots.” Rob illustrated “connecting the dots” by overlaying the John Deere “Enterprise Systems Engineering Methodology” (ESE) on the Requirements “V.” Their use of the “V” included feedback paths from the right side of the “V” to the left.

Rob had some observations with respect to the profession: Systems engineering is experiential (70%), coaching/mentoring (20%), and formal education 10%. He also commented that a master’s program that consists of a bunch of engineering classes and a bunch of management classes is probably not really systems engineering

The ESE includes systems engineering metrics, a systems engineering culture, systems engineering leadership and governance, subject matter experts, a system engineering community, and targeted system engineering training. Rob’s discussion of ESE segued to a discussion of the culture and, in particular, the development of systems engineers — “talent management.” John Deere uses a five tiered approach to systems engineering:

1. Foundation training/leadership (1 hour)
2. Systems engineering in core processes (4 hours)
3. Systems engineering fundamentals — Caltech and John Deere (1 week across four months)
4. Certificate — Caltech and MIT (1 year)
5. Master’s degree

Time proved to be a limiting factor and necessitated the conclusion of Rob’s comprehensive and informative presentation. The Chapter and all who were in attendance were highly appreciative of Rob’s presentation.

Want to attend the next speaker meeting but can’t make it to the host site?

Not a problem.

Several remote sites are available, as is virtual attendance. Remote attendance at the March Speaker Meeting was geographically dispersed (San Diego, San Francisco, Virginia, Texas, Ventura, Antelope Valley), and included academic sites (CSU Dominguez Hills, CSU Long Beach), and industrial sites (Northrop Grumman). Check out the options as a part of registering in the Reflector Notice.

Any bird can build a nest, but not all of them can lay an egg.

Stan Laurel.

INCOSE-LA Supports 23rd. Annual Ground System Architectures Workshop

By Phyllis Marbach

The theme of the 23rd Annual Ground System Architectures Workshop (GSAW) was: Creating Smarter Ground Systems.” The workshop was held February 25-28, 2019. On Wednesday evening, Feb 27, the Chapter, along with the Los Angeles Chapter, the Society of Women Engineers (SWE), and the University of Southern California Center for Systems and Software Engineering (USC CSSE) co-hosted an evening of educators, students and engineering professionals discussing Science, Technology, Engineering, and Mathematics (STEM) opportunities.

Dr. L. DeWayne Cecil, Founder and Chief Scientist Destination SPACE is a teacher in North Carolina teaching students to develop space systems. Dr. Cecil introduced Kimberly Cates who is a graduate student in data analytics. Kimberly shared her story about how she got into STEM. She was studying applied neuro-science which led to data analytics while in school. She got involved in machine learning to model satellite behavior. Eventually, they were able to predict whether the satellite was stable or rotating. Kimberly shared that collaboration is an important aspect of professional development. One challenge of entering a STEM field can be communicating in English — a second language students. An example of a benefit from working in STEM is exposure to novel approaches from others and learning teamwork.

Two other panelists introduced were Austin Gleydura and Lauren Ballard, Auburn University (AU) students. Austin and Lauren, high school students in 2017, learned about climate, weather and small satellites during a space camp. They learned project management and systems engineering skills, as well. Sponsors of this work included climatologists and educators, NOAA Climate and Weather Center and NASA. During Satellite Week Space Camp 2018, Lauren and Austin were mentors at the camp for students from KY, VA, NC and SC. Skills learned while at Space Camp included small circuit robotics, weather balloon assembly, data interpretation, presentation building, and data analytics.

Panelist Rachel Morford, SWE board of directors’ member for K-12 Outreach Programs and FY19 Director of Advocacy spoke about her organization, its goals and activities. Other panelists were Dr. Barry Boehm founding director of the Center for Systems and Software Engineering at the University of Southern California, Dr. Mark McKelvin, a Senior Analyst at The Aerospace Corporation and the INCOSE-LA President, and Kathy Dooley, a Student and Educator, destination SPACE. Dr. Boehm, Chapter President Dr. McKelvin and Ms Dooley described their journey toward STEM education. Following the panel discussion, a question and answer session was moderated by Michelle Carter. All agreed that continued encouragement of our youth toward STEM opportunities was needed. Thanks go to Michelle Carter, Sr. Engineering Specialist, The Aerospace Corporation, and Judy Kerner, Sr. Project Leader, The Aerospace Corporation for coordinating and leading the session.

INCOSE-LA Supports AIAA Outreach and Search for Systems Engineering

By Karen Grothe

Your fearless Membership Director was invited by the American Institute of Aeronautics and Astronautics (AIAA) Los Angeles-Las Vegas (LA-LV) Section’s Events Chair to be an exhibitor representing INCOSE LA at their AIAA University Student Branches Mini-Conference 2019 held at the Hawthorne Memorial Center on Saturday, March 2, 2019. I had been planning to attend the event anyway, so I accepted the opportunity to represent the chapter and talk systems engineering with students from California State University Long Beach (CSULB); University of Southern California (USC); University of California, Los Angeles (UCLA); and University of Nevada, Las Vegas (UNLV).

The AIAA LA-LV Section set up a full program, featuring the following presentations:

- “Planetary Defense and Near Earth Objects (NEOs) Deflection Application” by Dr. Nahum Melamed of the Aerospace Corporation – an overview of the threat of space debris and NEOs, with references to Aerospace Corporation’s Center for Orbital and Reentry Debris Studies (CORDS) website (<https://aerospace.org/cords>) and the NEO Deflection App (<https://cneos.jpl.nasa.gov/nda/>).
- “Plasma/Electric Propulsion” by Dr. Rostislav Spektor also of the Aerospace Corporation – an overview of plasma propulsion systems, particularly Hall Thrusters and tiny thrusters that can be used in CubeSats
- “Mars/Planetary Driving Simulator” by Alan Chan – a presentation about the planetary driving simulator, Red Rover, that Alan designed using actual Mars imagery from the Mars Reconnaissance Orbiter’s High Resolution Imaging Science Experiment (HiRISE) instrument. Red Rover is available on Steam, a video game distribution platform: (https://store.steampowered.com/app/819060/Red_Rover/).
- “Mars, Robots, and Fellowships” by Bob Barboza of Barboza Space Center – an overview of the Barboza Space Center’s efforts in robotics and Science, Technology, Engineering, Arts, and Mathematics (STEAM) education. They offer internships, fellowships, and prototyping opportunities for middle school, high school, and university students.
- CSULB Beach Launch Team presented their latest test results from their static-fire test on February 15 and 16 of their B1-B launch vehicle, describing the problems they encountered and their lessons learned.
- “Astrophotography: The Dark Arts” by Marc Leatham, a systems engineer at Booz Allen Hamilton – a presentation about how Marc learned astrophotography and what equipment he recommends for wide field astrophotography, featuring many beautiful images he has taking over the last few years.

(See “AIAA,” continued on page 10)



April Speaker Meeting



Healthcare Systems Engineering

The April Speaker Meeting features the world-renowned Dr. "Bo" Oppenheim, a popular and well spoken member of the INCOSE-LA Chapter.



Dr. Bohdan Oppenheim is a Professor of Systems Engineering at Loyola Marymount University (LMU) and has served in that capacity since 1982. He has 35 year experience in aerospace and marine engineering. Dr. Oppenheim, a prolific writer, is the author or co-author of six books and 30 publications on Lean Systems Engineering and on Program and Systems Engineering Integration. His background includes six years in the healthcare industry. In 2016 he created the Healthcare Systems Engineering (HSE) Master's program at LMU. INCOSE Fellow. Shingo Prize 2011, 2013, 2017. Over \$2 million in external grants.

ABSTRACT:

The presentation will describe the new field of Healthcare Systems Engineering. We start with a review of a highly-imperfect healthcare system in the U.S. Then we introduce how HSE started: the 2014 meeting at the White House of the President's Council of Advisors on Science and Technology. The report called for the use of systems engineering in healthcare. The discussion will then move on to a review of the basics of systems engineering as needed in healthcare — needs that are very different from the aerospace-type of systems engineering. Next, we present in depth the power of various elements of Healthcare systems engineering. Finally, the prestigious Master's program in HSE at Loyola Marymount University in Healthcare Systems Engineering is briefly described. The program was created in cooperation with Kaiser Permanente. LMU differentiates the HSE education from that of MBA, Master of Public Health, or medical. The curriculum has been designed to address the biggest challenges in U.S. healthcare, including fragmentation, suboptimal outcomes and imperfect patient safety, plus imperfect electronic records, provider burnout, waste, accelerating technology, and others.

**Note the different day of the week:
Thursday, April 4, 2019**

DETAILS:

WHEN: April 4, 2019, 5:30 p.m. to 7:30 p.m.

The meeting starts at 5:30 p.m. with our traditional networking and socializing. Dr. Oppenheim's presentation is scheduled to begin at 6:30 p.m.

WHERE: Loyola Marymount University, University Hall, Room ECC 1857

LMU is located in the West Chester neighborhood of Los Angeles, west of the 405 and south of the Marina (90) freeway. The easiest access is from Lincoln Boulevard.

COST:

- INCOSE Members (and virtual attendees): FREE.
- Non-members (at host site, refreshments provided): \$10
- CAB Associate Members (at host site, refreshments provided) \$5

PARKING:

Convenient, on-campus parking costs \$12.50.

Park in the P2/P3 underground garage under the building and pay \$12.50 for parking at kiosk in the garage.

FROM YOUR CAR TO THE MEETING ROOM:

Take Elevator to ground floor and exit to the main atrium. The room ECC 1857 is accessible from a corridor which runs parallel to the main atrium, to the North. There are signs from the atrium how to get there. Call Bo Oppenheim on (805)268-0484, or Mark McKelvin (510) 599-2879 if you have a problem navigating.

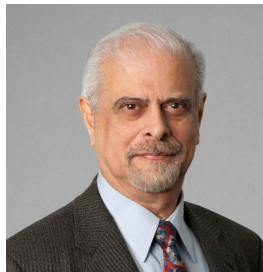
REMOTE SITES WILL BE AVAILABLE:

- Antelope Valley, Coordinator: Dr. J. S. Shelley, J.Shelley@csulb.edu
- Dominguez Hills CSU, Coordinator: Dr. Antonia Boadi, aboadi@csudh.edu

ON-LINE REGISTRATION:

<http://events.constantcontact.com/register/event?llr=l4ihvgeab&oeidk=a07egomohfw95e9715f>

Dr. Madni's Contributions Recognized



Dr. Azad Madni was awarded the William G. Johnson Founders Award by The Engineers' Council. Dr. Madni was presented the award at a formal dinner in Universal City on February 23, 2019.

The council annually awards this award to honor an individual who is outstanding in professional qualities and has a top reputation

for accomplishments and leadership.

The award, established in 1992, is named for Bill Johnson, one of the founders of the San Fernando Valley Engineers' Council. Bill had an untiring commitment to form and build the Council into a unified and effective body representing all facets of the engineering and scientific community. His standards and professional aura were to emulate perfection and elegance. He was laying the groundwork for the younger generation to participate and enjoy the future in leading and influencing the developing international engineering community. He chose giving recognition to outstanding people as a means of providing a model of excellence. The William B. Johnson International Inter-professional Founders Memorial Award was established by the San Fernando Valley Engineers' Council to perpetuate the image and memories of Bill, his leadership, methods, fortitude, standards, efforts, and achievements with compassion for others while focusing on bettering the engineering community. Selection of recipients for the memorial award reflect Mr. Johnson's image.



Looking for a career change to a top
Glassdoor rated company?
Come join us!

We are looking for talented engineers across a number of disciplines to join our teams in our Bellevue, WA and Brea, CA locations. Check out our careers (at base2s.com/about-us/careers/) to explore our current openings in southern California and the Pacific northwest.

Caltech

**Executive education solutions to the challenges
faced by today's technology-based organizations**

Public Programs — Winter 2019

**Model-Based Systems Engineering
Project Management
Predictive Analytics
Advanced Analytics
Deep Learning with TensorFlow
Business Analysis**

**To enroll, or to learn about other
Caltech-quality opportunities, go to
<https://ctme.caltech.edu>**

**Contact us at 626.395.4042 to bring a
customized course to your company**

WSRC

**The Call for Proposals
An Opportunity for Volunteers**

There is still time to submit a proposed presentation to the WSRC. For particulars and to submit a proposed presentation, go to:

<https://easychair.org/cfp/wsrc2019>

In addition, volunteers are needed as technical reviewers of the proposals. Contact Dr. Rick Hefner at: rhefner@caltech.edu

About INCOSE and the U.S. Western States Regional Conference

What's INCOSE, Its Vision, and Its Mission?

The International Council on Systems Engineering (INCOSE) provides a professional forum for systems engineers. INCOSE is a not-for-profit organization, founded to develop and disseminate the interdisciplinary principles and practices that enable the realization of successful systems. INCOSE is designed to connect systems engineering professionals with educational, networking, and career-advancement opportunities in the interest of developing the global community of systems engineers and systems approaches to problems. INCOSE is also focused on producing state-of-the-art work products that support and enhance this discipline's visibility in the world. In short, the INCOSE Vision is to build a better world through a systems approach.

INCOSE has grown significantly since its formation in 1990 with a membership that represents a broad spectrum – from student to senior practitioner, from technical engineer to program and corporate management, from science and engineering to business development. Members work together to advance their technical knowledge, exchange ideas with colleagues, and collaborate to advance systems engineering.

What makes up the Western States Region of INCOSE?

The Western States Region of INCOSE spans the continental United States from the Rocky Mountains to the Pacific Ocean. It's made up of eleven chapters including: Cascade (WA, OR), Central Arizona (AZ), Colorado Front Range (CO), Land of Enchantment (NM), Los Angeles (CA), San Diego (CA), San Francisco Bay Area (CA), Seattle Metro (WA), Snake River (ID), Southern Arizona (AZ), and the Wasatch (UT) with a combined membership of approximately 1500. The LA chapter alone has over 400 members.

What specifically is the 2019 INCOSE Western States Regional Conference (WSRC 19)?

In addition to INCOSE's annual International Conference, the regions hold conferences which may be more accessible to members. This year, the Western States Regional Conference will be hosted by the Los Angeles Chapter at Loyola Marymount University, Marina Del Rey, with the partnership and sponsorship of the other regional chapters. It takes place September 13-15.

This year's conference theme is *Systems Engineering Relevance: Time for a Sea Change*, selected to keep up with the complex systems of today and to evolve to support systems of the future across many domains. Covering both diverse applications domains and a variety of functional expertise areas, over the three days, the conference will include a wide range of technical presentations, tutorials, workshops, and keynote speakers. There will also be time set aside for networking and information sharing at social events, at meal times, and for optional tours. Between 100 and 200 professionals are expected to attend.

INCOSE-LA Chapter NEWSLETTER

Vol. 17: Issue 2, April — May 2019

Western States Regional Conference

Systems Engineering Relevance: Time for a Sea Change!

13-15 September 2019

Los Angeles, California

International in scope with a local flavor

Out here in the west, close to home

Prominent speakers from within the profession

Panels, Presentations and Tutorials covering leading systems engineering issues and applications:

Attracting and Developing Tomorrow's Systems Engineering Workforce

Systems Engineering in Natural and Social Systems

Systems Engineering in Transportation Systems

Agile Systems Engineering

Model-Based Systems Engineering

Systems Engineering in Large Observatories

Resilient and Sustainable Systems

Systems Research and Analysis

Systems Engineering Application to Healthcare and Medical Devices

Held on the beautiful campus of
Loyola Marymount University

Convenient to Los Angeles International Airport

For the latest information and details as they come on line, go to:

<https://www.incose.org/wsrc2019>

Hosted by the Los Angeles Chapter, in collaboration with the Cascade, Central Arizona, Colorado Front Range, Enchantment, San Diego, San Francisco, Seattle Metropolitan, Southern Arizona, and Wasatch chapters.



INCOS-~~E~~-LA Chapter NEWSLETTER

Vol. 17: Issue 2, April — May 2019

Imagining the Present A Report from the International Workshop 2019

By Josh Sparber

Chapter member Josh Sparber participated in several INCOSE Working Groups meetings at the International Workshop (IW) and filed this report. Ed.

IW 2019 was a significant event with the opportunities for continuing research and renewing past friendships.

An alcove wall on the second story of the Marriott, Torrance, California, the venue, states “The World is But a Canvas for the Imagination” (Thoreau). Envisioning the future fails miserably and perpetually: monorail, Ahwatukee, Arizona’s House of the Future, one-worldism, the theme of the 1964 New York World Fair, (“Peace Through Understanding”), and of course, the Titanic. However, we can often see a different world in our current situation, which is what IW 2019 conveyed.

My involvement was for all four days: some meetings with MBSE themes, plus the Critical Infrastructure Protection and Recovery Working Group (CIPR WG), the Patterns WG, the System Science WG, and a short visit to the Automotive WG.

Ideas are cheap, implementation is hard.

An MBSE forum leader

Boeing conducted a forum on Open Systems MBSE. Boeing is performing a long-range project involving intensive user contact and education, with a direct verbal exchange with diverse groups of working engineers on the value proposition of the particular portion of MBSE that group has adapted. Forums of project leaders and engineers were a basis for identifying and eliminating bad ideas early and for finding out what works. Other MBSE meetings stated that customers are “seeing value from MBSE” and that there is an “MBSE skills shortage”. Compliments were laid on MBSE: MBSE smooths the life cycle, expands the problem space, and improves the solution space, tool functionality and usability.

The Automotive WG revealed that SAE and INCOSE now have an Memorandum of Understanding to share Best Practices and MBSE. The WG will examine both hardware architecture and software architecture of the Connected Vehicle Systems and Intelligent Vehicles. Collaboration of the electric grid with Electric Vehicle (EV) fast charging was a topic. The lack of EV interface standardization across the United States, Europe, and Japan was probed.

John Juhasz, co-chair of the CIPR WG mentioned the Energy Tech Conference to be held in the Cleveland I-X Center in the Fall, 2019. One speaker will be Harrison ‘Jack’ Schmitt, a “System Advocate”, an Apollo 17 geologist and one of the last astronauts to walk on the moon.

Mr. Juhasz introduced a top-level, Sandy Friedenthal-derived, SysML Use Case for a protective and recoverable critical infrastructure — an important actor being defined is the threat environment.

The CIPR WG had been approached to architect a hospital able to withstand a month-long disruption, not just an existing 72 hour standard disruption.

Resilience, “fall back” positions, and handling “the bad day scenario” will be a major portion of a protective and recoverable infrastructure. A Lean Agile approach is being considered, well ahead of any model.

The WG is a winner of the Outreach Award and Mr. Juhasz displayed a chart of the WG’s many enterprise connections.

Idaho National Labs took a lead in other CIPR WG discussions. Dr. Mitchell Kerman and Bob Turk, referencing a Sandia Distributed Energy Resource depiction, led discussions on microgrids and nanogrids, grid separability, avoiding power peaking and the testing of new power grid technology. It was agreed that in order to maintain capability and resilience (the ability to recover from adversity), hospitals would need more than one renewable energy resource. Examples include co-generation, solar, wind, and geothermal.

Engineers are daring to go where no engineer has gone before—at least not the timid. Dr. James Martin, chairman of the System Science WG, presented the results of a survey of 7,200 system engineering papers and concluded that system engineers are influenced by about 48 “worldviews.” In order to experience transdisciplinary advantages, engineers will need to be open-minded, flexible, and respectful of the diverse thought in other worldviews.

Within the System Science WG, Dr. Len Troncale laid out his system processes map of the universe and this covered an entire indented wall. This was a genuinely cross-cutting look at the interconnected processes of science and technology. Dr. Troncale presented many lists of System Pathology groupings. I took upon myself to help categorize the 83 Dr. Polinho Katina categories of Pathologies in System Engineering, labeled “List A.11”.

Bill Schindel, chairman of the Patterns Working Group, was considering what all systems had in common; domain models, stakeholder features and states. Using schemas will help open up the models to reveal all possible requirements. For example, stakeholder features will make explicit decisions, trade-offs, optimizations and outcomes. Multi-level learning can be instantiated. Anti-fragility is a process (developed by Dr. Nassim Taleb, author of the “The Black Swan: The Impact of the Highly Improbable”) which consumes system damage and rebuilds the system to achieve superior system health.

System Engineering is about thinking great things
and minimizing the risk to achieve them.

Lunch hours presented socializing opportunities, with pity extemporaneous observations. One engineer ventured that MBSE, as a single source of truth (or untruth), could use a really good search engine for viewpoints (possibly IBM’s Watson). Others expressed the opinion that complex systems need engineers with system awareness, or employees who make no major mistakes.

The systems engineering process without a product is useless; a product produced with nothing more than the native or intuitive systems engineering process is over budget and behind schedule, plus it does not meet all of the requirements and it has requirements creep.

John Thomas, 2011 President of INCOSE,
February, 2011 Los Angeles Chapter Speaker Meeting

Systems Science Working Group and Natural Systems Working Group Activities

By Prof. Len Troncale

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The 2019 International Workshop of INCOSE was held in Torrance, California. The event had many different and unique workshops. These notes are on only two: the Systems Science Working Group (SSWG) and the Natural Systems Working Group (NSWG). As such, it is a glimpse of only a small part of the entire International Workshop enterprise.

The SSWG gave twenty sessions that attracted 75 participants locally, plus fifteen more who participated via the internet ("virtual").

On Saturday the meeting began with a Systems Principles Action Group Report by Drs. Rousseau and Calvo-Amodio followed by "New Definitions of Systems Engineering and System" by Dr. James Martin and Dorothy McKinney. The meeting continued with a survey of TRIZ (an acronym for the Russian Teoriya Resheniya Izobretatelskikh Zadach (теория решения изобретательских задач), or in English, The Theory of Inventive Problem Solving. The Saturday program continued with a suggestion of Systems Principles for Designing Human Activity Systems by Drs. Calvo-Amodio and Rousseau.

Topics discussed on Sunday included:

- Systems Science Enterprise via a Periodic Table of Systems was attempted by Gary Smith and using the Isomorphic-based Systems Processes Theory by Dr. Troncale,
- A coverage of the Systems science Enterprise by Dr. Martin,
- A presentation of Systemology, Principles and Laws by Dr. Rousseau, Dr. Calvo, and Dr. Julie Billingham, (University College London),
- Systemic Transformations by Dr. Swaminathan Natarajan (of Tata Industries, from Pune, India)
- A discussion of systems engineering foundations by Dr. Natarajan, and William Schindel, and
- A survey of Systems Integration using the Unified Sequence of Origins by Dr. Troncale.
- The system life cycle processes by Lomax.

On Monday, Peter Tuddenham, the incoming ISSS President, described his success on Ocean Literacy with geologists and proposed Systems Literacy while Schindel described System Patterns and Languages.

On the half day of Tuesday, Dr. Sue Gabriel explained her concepts of Systems Research and Development using Human agency in Social Systems and Dr. Troncale presented over 400 reoccurring dysfunctions of complex systems projects reviewing the literature of both systems science, systems thinking, and systems engineering.

Finally, a joint meeting between SSWG and NSWG (Natural Systems) was held. Of note is a review of more than 300 case studies of phenomena from all of the conventional natural sciences showing isomorphies in their key phenomena.

It is interesting to note that INCOSE now has four systems-based working groups trying to identify, construct, and utilize a better systems foundation for systems engineering (Complex Systems, Systems Science; Natural Systems; and System of Systems working groups).

If any of these SSWG or NSWG topics are appealing to you please contact ltroncale@cpp.edu.

Systems Science Working Group: The Players

The Systems Science Working Group membership includes many well known systems thinkers. A few of the members, in addition to Dr. Troncale, and "our own" Dr. Scott Jackson and Dr. Sue Gabriele are:

Dr David Rousseau, of Surry, England, is the Founder and Managing Director of the Centre for Systems Philosophy, which promotes the use of Systems Philosophy in methodologies for addressing problems that require both scientific and philosophical analysis. In particular, he is interested in how we can use systems thinking to bring matters of ultimate concern into the domain of science.

His current research is focused on advances in General Systems Theory and its application in the scientific investigation of philosophical questions such as the unity of knowledge, the nature of Nature, the brain-consciousness relationship, and the ontological foundations of moral and aesthetic intuitions.

Dr. Javier Calvo-Amodio is an assistant professor of Industrial and Manufacturing Engineering at Oregon State University, where he directs the Change and Reliable Systems Engineering and Management Research Group. He received his Ph.D. in Systems and Engineering Management from Texas Tech University. Dr. Javier Calvo-Amodio's research focuses on developing fundamental understanding of how to engineer and manage systemic change in organizations by combining engineering management, industrial engineering, and systems science. His research group works with Oregon's industry, state agencies, and NSF to derive fundamental theory and test how organizations can engineer and maintain systemic change under an action-research format. Dr. Javier Calvo-Amodio is active in the International Society for Systems Science.

Dr. James Martin, a one-time Los Angeles resident, student at the University of Southern California, is a popular author and speaker on a wide range of systems engineering topics. Dr. Martin, a leading proponent of systems engineering works at The Aerospace Corporation and has been known to attend speaker meetings hosted by the Chapter.

Dorothy McKinney attended the Pepperdine Graziadio Business School in Malibu and earned a master's degree in Computer Engineering from Stanford University. She worked at Lockheed Martin and as an Adjunct Professor at Portland State University. She has been active in various chapter and central-INCOSE leadership positions since her joining in 1991.

International Workshop 2019 Overview

The 2019 International Workshop, held in Torrance this year, was a four-day event, January 26 – 29. As in years past, the IW started with an opening plenary and the settled into a schedule packed with meetings of the working groups.

Gary Roedler, President of INCOSE, spoke of the challenges facing the professional systems engineer and INCOSE as the defining organization of the profession. One challenge is to create better world through a systems approach and to address complex societal and technical challenges by enabling, promoting, and advancing systems engineering and systems approaches. The leadership of INCOSE is continuing to emphasize the importance of the organization to the membership so that INCOSE would continue to be the premier choice of systems engineers for professional affiliation. David Endler the Technical Director, echoed President Roedler's sentiments and added an appeal for members to participate in the work of the organization. Bill Chown, the Chief Information Officer, spoke about the improvements in Collaboration Portal (nee "INCOSE Connect") and the efforts to accomplish more improvements – within the limitations of changing privacy requirements. Bill noted that resources – people – are a limitation and appealed for those interested to contact him.

**Check out the help function when using the
Collaboration portal.**

One of the initiatives taken by INCOSE is a collaborative effort with the Society of Automotive Engineers to address the "Future of Systems Engineering (FuSE)." INCOSE will include a representative from SAE on the core FuSE team.

Members of the Chapter were active throughout the IW, and of special note is Dr. Sue Gabriele who co-hosted a Systems Thinking Roundtable at the start of each day. The Chapter soiree on Monday evening (always open to Chapter members, even if they are not attending the IW itself) was well attended, and included visits from Gary Roedler and Kerry Lunney, President-elect of INCOSE. The Chapter was well represented with over 20 members in attendance. Articles about the working groups, written by Chapter members, are included in this edition.



("AIAA," Continued from page 4)

In addition, the student chapters each had fifteen minutes to present their activities and the aerospace projects going on at their schools, which included Design-Build-Fly aircraft designs, rocket launch teams participating in various competitions such as the FAR-Mars Launch Contest (website: <https://friendsofamateurrcketry.org/far-mars-launch-contest/>), and Unmanned Aerial Systems. I mentioned to all the students who came by the INCOSE LA exhibitor table that they are doing systems engineering for all these projects.

The event ended with a panel of several of the speakers, the AIAA LA-LV Young Professionals Chair, and the representative from Aerojet Rocketdyne discussing their careers and answering the students' questions.

Overall, it was an informative event, and many participants came by to learn more about systems engineering and INCOSE LA.



Photo above: Chapter membership Director Karen Grothe at the AIAA University Student Branches Mini-Conference.

Photo at left: A few of the Chapter members who attended the Chapter-hosted soiree at the 2019 International Working Group

Your organization might be in trouble if an increasing number of co-workers mispronounce "pedagogy" and then double down by using the word to describe non-pedagogical things.

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.

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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 information on these and other events of interest in the Los Angeles area, look for a Reflector Notice in your email, and check the Chapter website: www.incose.org/los-angeles . Like us on Facebook

April Speaker Meeting

Healthcare Systems Engineering

Dr. Bohdan Oppenheim

Thursday, April 4, 2019

Loyola Marymount University

Los Angeles, California

See article on page 5 for details

May Speaker Meeting

Randa Milliron, CEO/Cofounder, Interorbital Systems

Tuesday, May 14, 2019

The Aerospace Corporation

El Segundo, California

Standby for a Reflector Notice in your e-mail

INCOSE International Symposium

July 20 — 25, 2019

Orlando, Florida

The Aerospace Corporation

El Segundo, California

For more information, go to

<https://www.incose.org/symp2019/home>

Western States Regional Conference

Systems Engineering Relevance:

Time for a Sea Change!

September 13 — 15, 2019

Loyola Marymount University

Los Angeles, California, overlooking Marina Del Rey

See articles and advertisement on pages 1, 6, and 7

Standby for a Reflector Notice in your e-mail

Conference on Systems Engineering Research

March, 2020

The University of Southern California

Standby for a Reflector Notice in your e-mail