



# NEWSLETTER



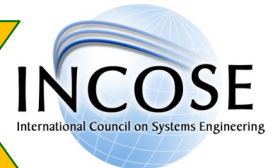
2002, 2004-14



2003



2008, 2012  
President's Award  
for Most  
Outstanding Chapter



## 2016 Elections Meet the Candidates

The transition from 2015 to 2016 quickly approaches. Your 2015 Board of Directors (BoD) calls on you, the members of the Chapter, to take time to read your slate of candidates for the 2016 The officers to be elected this year are: President, Vice-President, Secretary, Treasurer, Director of Ways and Means, and Director of Systems Engineering Education. These candidates are presented to you on the pages that follow.

The success of the Los Angeles Chapter is driven by two things: our officers and our members. INCOSE has acknowledged the Chapter with the Gold Circle Award every year since 2003 and with the President's Award for Most Outstanding Chapter in 2008 and 2012 (chapters are not considered for repetition more frequently). However, more important than awards are the services and value provided to and available to the Chapter members.

For those who are not familiar with the process of our Chapter elections, an explanation: the BoD consists of a voting body and an appointed body. The voting body consists of ten positions, five of which are the Executive Officers and five of which are the At-large Directors. The Executive Officers hold one-year terms while the At-large Directors hold two-year terms. The two-year terms are staggered to preserve Chapter knowledge from year to year.

(See "Elections," on page 4)

## 2016 Regional Mini-Conference Loyola Marymount University April 9 and 10, 2016

The groundwork continues apace, as presentations are coming in, exhibitors and sponsors are signing up, and a growing cadre of volunteers is pulling together to make this, the first regional conference, a success for the systems engineering profession. The team, members, from five chapters (Central Arizona, Southern Arizona, San Francisco Bay Area, San Diego and Los Angeles) and the INCOSE student division are hosting this two-day conference to explore Research and Advancements in Systems Engineering Methods for the 21st Century. The conference is open to all who are interested in systems engineering. We encourage those who think of systems engineering as applying only to big Aerospace and DoD environments to come and see that it is applicable over a much wider range of activities and industries.

(See "RMC" on page 5)

**Call for Papers open until  
December 11, 2015!  
See website for details at  
<http://www.rmc16.net>**

## YOUR VOTE COUNTS!

Go to the Chapter website at [incose.org/los-angeles](http://incose.org/los-angeles) to cast your vote

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#### Upcoming Events

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## October Speaker Meeting A Report from the International Symposium

Several members of the Chapter who were able to attend the 2015 International Symposium shared their experiences with the Chapter membership on Tuesday, November 10, 2015. The Aerospace Corporation graciously allowed us to use their facility as a host site, and Susan Ruth, supported by Shirley Tseng coordinated the event. In addition to the host site, people at remote sites in Azusa and Goleta participated.

President Stephen Guine opened the meeting with a warm welcome followed by a brief review of Chapter business and a reminder that Chapter elections were to be held next month and an update on the 2016 Regional Mini-conference to be held in April.

The presentations on the 2015 International Symposium opened with a presentation by Jorg Largent. Jorg described the setting, Bellvue, Washington, citadel of software giants such as Microsoft and Expedia. This year's symposium celebrated INCOSE's silver anniversary, and was the most popular on record. Of special note were the Outstanding Service Awards given to past-president Beth O'Donnell and the Chapter's current Technical Society Liaison, Shirley Tseng. Jorg noted Padman Nagenthiram's participation in an all-day workshop on systems thinking, Scott Jackson's participation in the Resilient Systems Working Group, and Josh Sparbar's participation in the Infrastructure Working Group. Eric Belle and Jorg also served as mentors for the symposium.

Phyllis Marbach experiences started with the INCOSE Leadership Meeting on Saturday, learning about how chapters are managed and organized, and how products are developed and maintained. Another Sunday activity for Phyllis was the "Transforming Systems Engineering" caucus. Phyllis shared the comments of keynote speakers Linda Katehi, Chacellor of the University of California Davis on Monday, and Jan Bosch, a professor of Software Engineering at Chalmers University of Technology in Gothenburg, Sweden. Professor Bosch had a "sound bite" that caught Phyllis' ear: "no efficiency improvement will beat cycle-time reduction."

Rick Hefner talked about the working groups and some of the current topics upon which they are currently focused. To illustrate the point, Rick presented a list of all of the business meetings. He noted that once an attendee learns how to navigate the plethora of meetings, there was always something of interest for most anyone in attendance.

Edwin Ordoukhanian, a student at the University of Southern California, appreciated the symposium for several reasons. Edwin noted that it was an opportunity to learn more about recent advancements and future visions in the profession. He appreciated seeing practitioners and academicians from all around the world under one roof discussing recent trends. For Edwin, the symposium provided opportunities to get insights and to connect and share ideas with peers.

Stephen Guine wrapped up the evening, noting several positive "take aways." Stephen has found the symposia to be a great place to appreciate the breadth and depth of INCOSE. He considered the symposium to be a great place to learn and to be challenged, and he spent most of his time talking to systems engineers from other (than aerospace) domains. In addition to the symposium being a learning experience, Stephen found it to be a great place to learn and to be challenged, Stephen appreciated it as an opportunity to strengthen networks and to meet fellow members of INCOSE-LA.

INCOSE concluded the symposium in grand style with a banquet in The Boeing Company Museum of Flight next to Boeing Field in Seattle. All of the Chapter members who were able to attend appreciated the opportunities to learn, to contribute, and to network.

**Join Us at the  
International  
Workshop in  
Torrance, January 30  
— February 2, 2016  
An Opportunity to  
learn, contribute, and  
to network at a  
legendary INCOSE-LA  
Soiree**

**The soiree is free for Chapter members  
independent of their attendance at the IW**

Volunteer!

You will learn something you never knew you needed to know

**Not a member? Join INCOSE!**

Learn more about becoming a member by clicking on <http://www.incose.org/membership/valueofmembership.aspx>

**INCOSE-LA Chapter NEWSLETTER**

Vol. 13, Issue 6: December 2015– January 2016

## 2015, A Year in Review: A President's Reflections

So, with my 2015 term as President of INCOSE LA coming to its conclusion, I'd like to share a few observations from the year.

First and foremost, this isn't an easy job but I don't think I'd have it any other way and I don't think the membership would deserve anything less. One of the things that I thought I knew but later realized that I didn't know quite as much as I thought, is that there are so very many opportunities to provide knowledge, and training, networking and other sources of value to our membership. This make the role of President continually invigorating because not only do I see opportunities that would make me individually a better systems engineer, but I also continually see opportunities that would make all of us better systems engineers.

This job is humbling because no matter how great you think you are at leadership, collaboration and mentorship, you are continually provided opportunities to become very aware of your deficiencies. However, those are also opportunities to continue to develop my skills.

The job is complex. There are many moving parts within the chapter, within our region, and within INCOSE. The more people I met, the more I understood this complexity which also, again, helped me understand the opportunities that were on the table to provide to our membership.

But mostly this job was very rewarding. I've been a member of INCOSE for over a decade, and for many of those years I simply sat in the back row and availed myself of what the chapter had to offer. For the past few years, I chose to step up and be a much more active participant. Even with the added time constraints, it has been very personally rewarding to me because of the challenge and because of the learning and growth that I feel that it afforded me.

So with that, I invite any member of our chapter to also step up, get active, and take part. Share your knowledge while developing new skills. Since all INCOSE chapters are volunteer-run organizations, I could simply state that we need you in order to be successful. But to put it more bluntly, we need each other to truly be successful. And your time is now.

### **Stay Connected**

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

If you wish to be placed on our e-mail distribution, contact Susan Ruth at [susan.c.ruth@aero.org](mailto:susan.c.ruth@aero.org)

### **TOWN HALL MEETING**

**MEET THE BOARD OF DIRECTORS**

**SHARE YOUR THOUGHTS**

**LEARN WHAT IS AHEAD IN 2016**

**DATE: TUESDAY, JANUARY 12, 2016**

**TIME: 5:00 P.M. TO 8:00 P.M.**

**LOCATION: AEROSPACE CORPORATION, EL SEGUNDO**

## Strategic Planning Meeting October 24, 2015

The Los Angeles Chapter hosts strategic planning meetings approximately quarterly to ensure that we are meeting the needs of our membership, to discuss chapter operations, and to address other topics of interest related to bringing value to chapter members.

The Board of Directors hosted the third quarter Strategic Planning Meeting on October 24, 2015 at the Northrop Grumman S Café in Redondo Beach. President Stephen Guine hosted the meeting. The objective for the day was to revise, as needed, the strategic guidance and planning for the Chapter for the remainder of 2015 and beyond. His opening message leveraged off of a concept: "review yesterday/plan for tomorrow." He discussed the challenges to get more people into the room and to then get the people in the room to stand up. Another challenge cited was a tighter link between budget planning and strategic and operational planning.

### **Help Spread the Word!**

**\$100 Amazon Gift Card**

**Help spread the word about the Call for Papers for the Regional Mini-Conference.**

**For details, go to the mini-conference webpage at [www.rmc16.net](http://www.rmc16.net) and click on the link "more details."**

A major activity for the Chapter is the preparations for the regional mini-conference scheduled for April 9 and 10, 2016. The Los Angeles Chapter is one of five chapters working to conduct this conference, and the leaders of the Chapter's contribution to the conference report to the Chapter through the Board of Directors.

A major challenge discussed during the meeting was how to communicate with the membership. Toward this end, the a team was formed to learn about the modifications to INCOSE Connect and to improve the Chapter website.

The Chapter is pursuing a variety of strategies to reach out tot the members. The Chapter is working to establish an ambassadorship to the University of California, Los Angeles (UCLA). The Chapter is reaching out to the companies which are on the INCOSE Corporate Advisor Board and which are located in the Los Angeles metropolitan area with an eye toward linking new members with a company ambassador. One of the challenges at UCLA is that many of the students who would be interested are associated with the continuing education program and are off-campus — a complication that is a part of many college programs.

*(See "Strategic Planning Meeting on page 8)*

"A good battle plan that you act on today can be better than a perfect one tomorrow." - Gen George S. Patton

*(Elections, continued from page 1)*

The appointed body consists of managers and chairpersons who are recruited to execute specific functions such as producing the *Newsletter* or the Reflector.

Each functional area generally falls under the oversight of one of the directors. We want to stress the importance of the appointed body: it is the primary method for someone to engage in the operations of the Chapter and to progress into a position of the voting body.

An election committee reviews a preliminary list of names, which is constructed from the recommendations made by current and past officers, directors, chairpersons, and managers. Recommendations are based upon many factors that range from participation as an attendee (speaker meetings, tutorials) to volunteering in capacity. The committee also considers those who are willing to serve on the Board. As Paul Cudney, a past Membership Director, so eloquently explained, "Serving on the Board is an excellent, low-risk method of gaining direct job-related experience." The committee then decides upon a slate of candidates.

It is now up to you, our members, to vote for the 2016 BoD. We proudly introduce to you our slate of candidates for next year's Board of Directors.

#### **President (one year term):**



Terry Rector is currently serving as Vice-president of the Chapter and is leading the team creating the 2016 Regional Mini-Conference. Terry has over thirty years of experience in the aerospace industry, holding positions of increased responsibility as a systems engineer, Program/Project Manager, Space Systems Operator, and Intelligence Analysis. Terry retired from the United States Air Force and currently is a Senior

Project Engineer at The Aerospace Corporation, El Segundo, California.

Terry serves as Aerospace's Program Test Lead supporting the Space and Missile Systems Center's MILSATCOM Protected Tactical Service programs. In addition, Terry supports Small Business Innovated Research efforts. In this role, Terry is supporting the research and development, requirements generation, integration and testing of MILSATCOM programs and projects, multiple contractors and technologies.

Prior to working for Aerospace, Terry was the Vice President of Government Relations for a high tech small business specializing in 3-D chip stacking, cognitive data processing, and tactical sensors for several different land, air and space platforms. With over five years experience in small business, Terry understands the value of successful leadership and management of short schedules, tight budgets, and highly complex technical systems delivered by highly diverse, geographically separated teams comprised of various engineering disciplines. Lastly, Terry served for more than twenty years in the United States Air Force in communications, space, and intelligence systems.

Terry also serves as vice-president of two homeowners association where he has responsible for executing decisions in response to the well being of over 2000 home owners. Terry is an active member of the Air Force Association, the Armed Forces Communications and Electronics Association, and the Institute of Electrical and Electronics Engineers.

Terry joined INCOSE-LA in 2005 and has supported the chapter on several occasions. He is quite efficient in locating and engaging sponsors and exhibitors for the various activities that INCOSE-LA sponsors. He has served as the Sponsorship and Exhibitor Chair for the INCOSE-LA 2009 Mini-Conference, the Conference for Systems Engineering Research (CSER) 2011 and CSER 2014 Conference Co-Chair, and has been ask to Co-Chair CSER 2017. Lastly, he has served in numerous leadership positions planning other conferences such as the Responsive Space and the Small Satellite Conference.

Terry earned his education attending college via night and weekend classes, completing a Bachelor of Science Degree in Electrical Engineering from Southern Illinois University, a Master's of Science Degree in Space Systems from the University of North Dakota, and a Master's of Science Degree in Program Management from the prestigious Whittemore School of Business and Economics, The University of New Hampshire, where he earned his Project Management Professional certifications.

#### **Vice-President (one year term):**



Phyllis Marbach is a Senior Software Engineer for Boeing Defense Space & Security. Phyllis has over 30 years' experience in aerospace programs; including satellites, chemical lasers, the International Space Station, and various propulsion systems. Currently she is working with Boeing Commercial Airline projects applying Systems Engineering Best Practices and the Boeing Agile Scrum for Engineering. Phyllis has been a Boeing Agile Coach for Unmanned Air Systems, Networked Radios, and research

programs. Ms Marbach, a Certified Scrum Master, a Certified Scrum Product Owner and a Scaled Agile Coach, holds an MS degree in Engineering from UCLA. She has been a member of INCOSE for four years and is an author of three papers and numerous presentations on Network Centric Operations Industry Consortium in 2006 and more recently agile systems engineering presented to local engineering groups, international conferences and publications.

Phyllis has been active in the INCOSE-LA chapter presenting at the Mini-Conference in 2012, running a panel discussion at the Mini-conference in 2013, helping run the Huntington Beach Remote Site during 2014 and hosting the August 2014 networking event in Orange County. She joined the INCOSE Agile Systems and System Engineering Working Group in January 2013.

*(See "Officers," on page 8)*

*You are invited to the  
INCOSE-LA Chapter  
Holiday Party*

*Saturday, December 12, 2015*

*5:00 p.m. to 9:00 p.m.*

*Del Rey Yacht Club*

*13900 Palawan Way,*

*Marina Del Rey, 90292*

Come join your fellow systems engineering professionals to celebrate another year, to enjoy an evening of fine dining and entertainment, and to relax and enjoy a social evening, an INCOSE-LA tradition. As a part of the festivities we will acknowledge those members who have been with the Chapter for twenty or more years. This year our festivities are on the same evening as a traditional celebration at the Marina: a pyrotechnic extravaganza and a boat parade of festively decorated and lit vessels.

The dinner this year will be a buffet with vegetarian and gluten-free options.

**The particulars:**

**COST:** No cost for members of the Los Angeles Chapter; only \$30.00 for one guest; cash bar

Parking is free but gated: just buzz in, say you are attending the INCOSE Holiday Party.

**Schedule:**

5:00 p.m. Networking (with appetizers)

5:55 p.m. fireworks (watch from the south jetty)

6:00-8:00 p.m. boat parade

7:00 p.m. dinner

9:00 p.m. closing, etc.

***R.S.V.P.: FIRM deadline is:  
Monday, December 7, 2015***

**Please note:** pace is limited to the first sixty registrants. Registration is required and will close as soon as the limit reaches. We request that all reservations be made and paid online at:

<http://events.r20.constantcontact.com/register/event?oeidk=a07ebrlave409873a85&llr=l4ihvgrab>

**EVENT CONTACT:** Scott Birtalan, [scott.birtalan@incose.org](mailto:scott.birtalan@incose.org)

**KEYNOTE SPEAKER:  
DR. AZAD MADNI  
OF THE  
UNIVERSITY OF SOUTHERN CALIFORNIA**

*(RMC, continued from page 1)*

We have also planned the conference to include students of systems engineering. There will be sessions addressing career paths and opportunities in systems engineering. We also are expecting students from colleges in our five areas to offer presentations of their work.

This conference will be addressing several topical areas:

- Autonomous Resiliency Research and Applications
- Systems Architecting and Tradespace Analysis
- Human-Systems Engineering
- Value-based, lean, agile systems engineering
- Modeling
- Complex Systems
- Big Data Analytics

Across the spectrum of systems engineering applications including:

- Aerospace
- Critical Systems
- Energy
- Health
- Safety
- Security
- Space.



**Conference Fees:**

Registration Tiers	Early Bird†	Regular	Walk-in
Time Frame	1/1/2016	2/16/2016	4/1/2016
	2/15/2016	3/31/2016	4/9/2016
Non-INCOSE member	\$145.00	\$165.00	\$165.00
INCOSE member	\$130.00	\$140.00	\$150.00
Students, presenters, active military, senior members	\$70.00	\$80.00	\$90.00
Sponsors and Exhibitors*	\$70.00	\$70.00	\$70.00

†Early Bird registrants will be entered into a pool for a drawing to be awarded a \$100 Amazon gift card.

\*Cost of each additional registration in addition to the registrations that are a part of the Sponsor or Exhibitor Package

Parking is an additional \$10 per day per vehicle.

Additional information regarding location, hotels, and registration will be available on the RMC16 website <http://www.rmc16.net>.





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### Systems Engineering for Technology-Based Projects and Product Developments

February 8 - February 12, 2016	Las Vegas, NV
April 25 - April 29, 2016	Las Vegas, NV
August 1 - August 5, 2016	Hoboken, NJ

### Systems Engineering Management

March 14 - March 18, 2016	Las Vegas, NV
October 24 - October 28, 2016	Austin, TX
December 5 - December 9, 2016	Las Vegas, NV

### Requirements Analysis & Specification Writing

January 25 - January 29, 2016	Seattle, WA
April 4 - April 8, 2016	Las Vegas, NV
May 2 - May 6, 2016	Washington D.C

### Human Systems Integration: The Cognitive Element

February 29 - March 4, 2016	Los Angeles, CA
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# CSEP EXAM PREPARATION COURSE



Now based on INCOSE Handbook version 4

UPCOMING DELIVERY

**Feb 22 -26, 2016**  
**LAS VEGAS, NV**

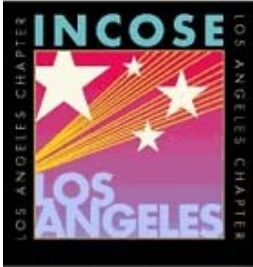
CTI's learning approach is based on over 20 years of sound experience. This 5-Day course is delivered using a mixture of presentation, discussion and a variety of practical exercises and group work sessions. Instead of presenting a lot of content and hoping that something will 'stick', the course utilizes different adult learning techniques optimized for the type of content that needs to be mastered. Courses are facilitated by expert leaders, who are highly experienced and knowledgeable in dealing with all aspects of the ASEP, CSEP and ESEP application process. This interactive course will place you in the best position to pass your CSEP examination on the first attempt.

Find out more by visiting our website: [www.certificationtraining-int.com](http://www.certificationtraining-int.com)

# Regional Mini-Conference 2016

April 9 – 10, 2016

Los Angeles, California



## *Research and Advancements in Systems Engineering Methods for the 21<sup>st</sup> Century*

### Theme:

SYSTEMS ENGINEERING PROFESSIONALS AND STUDENTS EXCHANGING CONCEPTS AND EXPERIENCES IN A FORUM TO DISCUSS KEY TOPICS RELATED TO THE FUTURE OF SYSTEMS ENGINEERING.



The conference will feature the following topical areas:

- Autonomous Resiliency Research and Applications
- Human-Systems Engineering
- Value-based, lean, agile systems engineering
- Modeling
- Complex Systems
- Big Data Analytics
- Systems Architecting and Tradespace Analysis

Across the spectrum of systems engineering applications including:

- Aerospace
- Health
- Safety
- Critical Systems
- Security
- Energy
- Space



### Keynote Speaker

Dr. Azad Madni of The University of Southern California Viterbi School of Engineering

### Features

Presentations by systems engineering colleagues, panel discussions with industry leaders, displays by exhibitors and sponsors, with more being developed. Watch for updates.

### Schedule

Registration opens on **January 1, 2016**.

See article on page 1  
for more details

### Cost

Cost ranges from **\$70.00 to \$150.00**, depending upon your membership status and when you register. A continental breakfast and lunch are included both days. Attendees who register before February 16, 2016 will be entered into drawing to be awarded a \$100.00 gift card from Amazon. Other meals and lodging are not included.



Student Division

### General Information

Additional information regarding the conference, the venue and registration is available on the conference website: <http://www.rmc16.net>. Arrangements are being developed with nearby hotels; information will be posted on the website as it becomes available.

Regional Mini-Conference 2016 is a collaboration of the Los Angeles, San Francisco, San Diego, and Central and Southern Arizona INCOSE chapters and the INCOSE Student Divisions.

For questions about general conference issues contact Terry Rector, [terry.e.rector@aero.org](mailto:terry.e.rector@aero.org) or Dick Emerson, [remerson9@gmail.com](mailto:remerson9@gmail.com).



Central Arizona Chapter



## Call for Papers!

Want to have your say?

The call for papers is open until **December 11, 2015**  
See the Regional Mini-Conference webpage for details, [www.rmc16.net](http://www.rmc16.net)

(Officers, continued from page 4)

Phyllis recently joined the board of directors for the Women in Science and Engineering at California State University Northridge and is the current Membership Director for INCOSE-LA.

**Secretary (one-year term):**



Stephen Guine has just completed a term serving as President of the INCOSE-LA Chapter. In his statement describing his eligibility for President, he expressed a strong belief in systems engineering and in INCOSE. He had found that in an increasingly interconnected and complex world, the discipline, science, and execution of systems engineering would be a key determinant in the ongoing and emerging quality of life in our communities and our abilities to pursue our professional and personal passions.

Therefore, as Secretary of INCOSE-LA, he plans to continue building on the solid foundation of leadership in this Chapter and leverage our shared skills and experience to help push the message of systems engineering value into the "non-traditional" domains. He continues to see this as a critical exercise in ensuring that our Chapter remains vibrant and vital in the greater Los Angeles area.

**Treasurer (one-year term):**



Harvey Soldan is a senior systems engineer at the Jet Propulsion Laboratory (JPL) and has over 34-years of experience in NASA, military, and commercial systems.

He joined NASA/JPL as a contractor in 1987 and is currently the Deep Space Network (DSN) Systems Engineer for the DSN Aperture Enhancement Project, which is adding

new 34m Beam Waveguide antennas to the existing DSN at all three complexes around the world. The new antennas feature new commercial digital servo systems and new commercial transmitters, which will eventually be retrofit throughout the DSN. In this role, he spent 5 weeks last year at the Canberra, Australia Deep Space Complex supporting final system installation and acceptance testing. Previously, he was the Deep Space Network Tracking, Telemetry, and Command Systems Engineer. With another DSN systems engineer, Harvey created and taught to both JPL and NASA personnel, a very well respected and received course on infrastructure system engineering.

Harvey has worked on many military and commercial programs (from commercial airline in-cabin systems and mainframe databases to being the Fantasyland ride and show engineer at the WEDisney Enterprises – forerunner of Disney Imagineering). He has expertise in technical publications, testing (all levels), communications, and systems engineering for hardware and software intensive systems.

Harvey’s previous work was for projects at TELOS, Raytheon, Walt Disney, Avicom International (now part of Rockwell Collins), Enterworks and Gould NAVCOM (now NavCom Defense Electronics).

With INCOSE-LA, Harvey has been our treasurer for several years, as well as an INCOSE-LA Mini-Conference Chair, and supported CSER 2012 and 2014 in various roles.

Harvey received his Bachelor of Arts degree in Biology from The Johns Hopkins University with a minor in Chemistry.

At press time, the following opportunities remained available:

- Director of Ways and Means (two-year term):
- Membership: (one year term — Phyllis is moving up)
- Director of Communications (Bob Noel resigned)
- Director of Systems Engineering Education:

Our Chapter has a rich tradition and history of members stepping up and serving the membership. Their efforts over the years have resulted in the many services offered to the members, services such as speaker meetings, training opportunities by leading experts in the profession, and networking events throughout the Los Angeles metropolitan area. Members of the leadership team are often recognized internationally by INCOSE at the annual International Symposium. The contributions of past teams are reflected by the numerous awards cited in the masthead of the *Newsletter* (top of page 1).

Past members of the leadership team speak of the rewards of volunteering – rewards such as the benefits provided to the membership at large and rewards in terms of personal and professional growth. Rather than resting on our laurels, the leadership teams is always looking for new members who can reap the same benefits while bring fresh ideas and new talents to the leadership team.

“If the wings are traveling faster than the fuselage it has to be a helicopter and therefore, unsafe.” — A Fixed Wing Pilot

(Strategic Planning Meeting, continued from page 3)

Future events to serve the community were discussed with several potential workshops, speaker meetings, tutorials, and networking events. Several excellent opportunities were identified and as the necessary scheduling commitments are made, the membership will be informed through the *Newsletter* and Reflector notices.

Opportunities for involvement abound, and the next opportunity for involvement is the Holiday Party (see article on page 5) and the town hall meeting scheduled for Tuesday, January 12, 2016. The Chapter is here to serve the members, so please join us and join in on the sharing.

“The cost of painting a single yellow line would be of the order of £10,000. Clearly the majority of this is not the actual cost of the man with a pot of paint; but it is the cost of the process that has to be gone through to legitimize what he is doing.”  
A local British government official



**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](http://www.incose.org)) to update your information.

<b>Name</b>	<b>Title</b>	<b>Company or Organization</b>
Khuyen Tran		Stevens Institute of Technology
Anthony Shao		University of Southern California
Jacklyn Green		Jet Propulsion Laboratory
John Halet		
Mario Didonna		Northrop Grumman Corporation
Amy Hays		NPS
Kourosh Afshari		Crane Aerospace & Electronics
Alan Bartky		Intel Corporation
Arun Padmanabhan		Crane Aerospace & Electronics
Ernie Acosta		Millennium Space Systems
Sudeep Deshpande		Amgen
Jennifer Le		Loyola Marymount University
Jonathan Fagoaga	Student	Loyola Marymount University
Rendel Myles	Student	Loyola Marymount University
Hunter Braverman	Student	Loyola Marymount University
Mary Magillian		
Mohamed Rabee Alzebaq		Loyola Marymount University
Amanda Vieira		Northrop Grumman Corporation
Timothy Torsney		Loyola Marymount University
Noel Rabina		Loyola Marymount University
Andrea Quillen		Loyola Marymount University
PJ Mallari		Loyola Marymount University
abdulla alsumalt		Loyola Marymount University
Michael Trelinski		Loyola Marymount University
Nina Lepp		Loyola Marymount University
Yingfen Huang		Loyola Marymount University
Jonathan Roberts		Raytheon Corporation
Christopher Green		Loyola Marymount University
Adnan Alromi		National Clearing House
fahad alotaibi		
Parisa Puoya		Loyola Marymount University
Khaled Alghemias	Mr.	Loyola Marymount University
Bradley Pietzyk		University of Southern California
Ian Heidenberger		
Todd Uramoto		Northrop Grumman Corporation
Kenneth Blakeslee		
Susan Gabriele		Gabriele Education Materials & Systems
Neil Schleimer		Northrop Grumman Corporation
John Poladian		Loyola Marymount University
David Saber		CALTROP
Jeff Brown		Northrop Grumman Corporation
Pedrito Rudulfo		Northrop Grumman Corporation

## Do Systems Engineers need Requirements for a Requirement Statement?

By Dr. Malcolm Currie

*Dr. Malcolm Currie is a Systems Engineering Trainer and Consultant. His experiences have included developing requirements for systems from elevators to UAV navigation to weapon systems, especially utilizing Use Cases and Visual modeling, aka MBSE.*

The term “requirements” has many meanings to systems engineers. The term “requirements” generally refers to a requirements document, whereas “a requirement” generally refers to what might be called a “requirement statement” which would be in a requirements document. Is every “requirement” a “requirement statement”, or are there ways to express a requirement for an entity in other ways? While the answer to that question is “yes,” the focus of this article on the so-called “requirement statement.” In particular, what are the requirements of a requirement statement and of a set of requirement statements for an entity?

### DO WE NEED REQUIREMENTS FOR A REQUIREMENT STATEMENT?

Each requirement statement is a declarative statement, sometimes referred to as a “Shall” statement. For each requirement statement, how do you know that a declarative sentence is a requirement? If you have such a description, a sentence can be verified to see if it is indeed a requirements statement. If the statement is not verifiable as a requirement statement, how do you know if it is a requirement statement or not? Can we make the requirement more definitive? It should be clear from the foregoing that requirements are needed for a requirement statement.

### WHAT IS A REQUIREMENT STATEMENT OF A SYSTEM?

A requirement statement is a declarative sentence that expresses something that an entity is to do (a functional requirement) or expresses a characteristic of the entity (constraint or performance).

### ARE THERE REQUIREMENTS FOR REQUIREMENT STATEMENTS?

A system development project is an entity. A development process has a set of requirements for a project. What might be the requirements for requirement statements? Do these requirements include requirements for each requirement statement?

As systems engineers, why wouldn't we have requirements for requirement statements? As managers, do you want the systems engineers to have a standard form of a requirement statement that would increase the likelihood that each requirement statement is correct and that the requirements documents are complete?

(See “Requirements,” continued on page 11)

## Defining the Global Energy and Water Crisis

By Josh Sparbar

*Josh Sparbar, is a member of the INCOSE-LA Chapter, and an ambassador for system thinking with environmental impacts.*

A “Transformational Systems Engineering Workshop on the Global Energy Water Nexus (GWEN) was held

September 25-27, 2015 at the Arthur Lakes Library of the Colorado School of Mines in Golden, Colorado.

Using transformational thinking, Dr. Scott Workinger, led a workshop towards clarifying obstacles against, and refining solutions towards, the sustainment and urgent re-architecture of our water and energy systems. Among the fifteen participants, there were diverse backgrounds and insights: from aerospace to water to power systems. Among notable individuals that attended, were Dr. Ron McKenzie, of IS 2015 South African water system fame, and the Bill Good, Denver INCOSE chapter member. Bill is a Marine, commercial airline pilot, and Colorado School of Mines instructor. Others attending were John Pitts of the Aurora, Colorado Water Authority, Neil Snyder of National Renewable Energy Laboratory, and Diana Mann of Ball Aerospace.

Interesting thought: in an aside, Bill promoted the use of the assembly line-style manufacture of 1 MW small-scale nuclear power plants to bolster the power grid.

Dr. Workinger, acting as facilitator, divided the participants into three teams. Their purpose was to delve into and explore unforeseen consequences of increasing demands on water and energy systems, to highlight interfaces between disparate system segments, to find measurable knowns and unknowns of those systems, and to discover solutions that could enable the survival of humans and their human systems into and beyond the Twenty-first Century.

Current systems need to be re-scoped for indefinite maintenance, increased inter-system capabilities, and ongoing optimization in order to serve the world's enlarging global democracy – a “Wicked Problem.” Transformational thinking galvanizes resources and expands insights by looking beyond perceptual limitations bounded by culture and values.

Team One focused on Water Systems. Team Two focused on the Power Grid, and Team Three focused on global concerns of water and power.

Team One examined the intricacies of Colorado water planning—Aurora having to sell back some of its water to Denver to finance city growth. An odd mixture of water rights and seniority in water usage threads through all segments of this system. To serve the needs of the poorer population, Catholic Charities has bought some water for communal distribution. According to John Pitts, the Colorado water system is unprepared for catastrophe. In 2013, Colorado suffered severe flooding.

(See “GWEN/INCOSE” continued on page 11)

(Requirements, continued from page 10)

**WHAT MIGHT BE THE REQUIREMENTS FOR A REQUIREMENTS STATEMENT AND A SET OF THEM?**

Requirements for each requirement statement must be verifiable. That is, there must be a test, analysis, or demonstration for each requirement statement to verify that the statement is in fact a correct requirement statement:

- It can be used to construct a syntactically correct requirement statement – it is unambiguous.
- It can be used for version control of each “requirement statement”.
- It can automatically apply a unique ID for each “requirement statement”.
- It is searchable for all requirement statements for an entity.
- It can insure that each requirement statement is unique in the set of requirement statements – no duplicates.
- It can be used to trace the interactions between entities.
- It can be used to generate a version controlled requirements document for each entity.
- It can be used to verify completeness of the requirement statements for the conditions of the entity.

**WHAT MIGHT BE THE FORM OF EACH REQUIREMENTS STATEMENT?**

There is not sufficient space in this writing to show specific forms of a “requirement statement” and the database to satisfy the requirements outlined above. If a form is used which satisfies the requirements for automated syntactic correctness and automated completeness checking of the set of requirement statements, then use it – just don't use more than one.

A subsequent article will describe how these requirements for a requirement statement can be met with a specific standard form for a requirement statement.

(GWEN/INCOSE continued from page 10)

In addition, Denver faces a half million acre-feet water deficit by 2050, bringing Colorado’s own water needs into direct conflict with California’s water borrowings. The California system thinking is for an economy of plenty and Colorado’s is for an economy of scarcity. Although extensively modeled in System Dynamic “River Models,” John Pitts described the overall Colorado water system description as “chaordic,” a system of both open ended chaos and closed system order.

Team Two divined that main objectives would be to rally the stakeholders around and evolve a working approach towards dilemmas of power usage. Values affected by system upgrades could be cost, reliability, efficiency, aesthetics, safety, security and resource control. This team noted that emerging complexities would be problem multi-layering, and hidden impacts, risks, and conflicts of any new division of resources.

Team Three noted the last large scale infrastructure upgrade took place in 1935. There is now a need to uncover Life Cycle rhythms, diagram longer timelines of dependent systems, and possibly re-scope the infrastructure outlook. For example, many water pipes still contain lead, and many pipes are subject to continuing breakage and leakage. These maintenance needs become more urgent with population growth.

Finally, each team was able to refine a unique problem statement. Team One’s main concern was having sufficient water storage facilities, with water conservation viewed as ineffective as a driving force in water system reform. Team Two refined its problem statement as defining an optimal balance between the power grids capable of independent operation and those that could still remain safely integral to the main grid.

The teams continued brainstorming the problems, breaking concerns down into ten to thirty possible problem statements. The group plans to meet again and continue their efforts solve a complex issue they find of great importance, preserving the hydrological and electrical safety net.

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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 details on Chapter-sponsored events and registration, go to [incose.org/los-angeles](http://incose.org/los-angeles)

**Year-end Holiday Party**

Date: Saturday, December 12, 2015

Time: 5:00 p.m. to 9:00 p.m.

Location: Del Rey Yacht Club

13900 Palawan Way,

Marina Del Rey, 90292

*See article on page 3 for more details*

**January Town Hall Meeting**

**Meet the Board of Directors and tell them what you think!**

Date: Tuesday, January 12, 2016

Time: 5:00 p.m. to 8:00 p.m.

Location: Aerospace Corporation, El Segundo

*Look for a Reflector Notice in your email or check the Chapter website for more details*

**International Workshop 2016**

**Torrance, California**

Date: January 30 through February 2, 2016

Features Working Groups designed to meet the needs of the systems engineering professional and the traditional INCOSE-LA soiree

*See article on page 4. Details are available on the INCOSE website: <http://www.incose.org/newsevents/EventIW>*

**Regional Conference**

Date: Saturday and Sunday, April 9 and 10, 2016

Location: Loyola Marymount University,  
Culver City, California

*See article on page 1 and advertisement on page 7 for details. Look for "snail mail flyers" in your mailbox, a Reflector Notice in your email, and check the Chapter website for more details*