Vol. 15, Issue 2, April — May 2017

NEWSLETTER

2004-14 2015

2008, 2012 President's Award for Most Outstanding Chapter

Welcome to CSER 2017!

The Los Angeles Chapter of INCOSE is delighted to welcome the attendees at CSER 2017 and is honored to support the University of Southern California and the CSER leadership team.

2017 First Quarter Strategic Planning Meeting

The first Strategic Planning meeting of 2017 was held on February 18. Due to a need to relocate the meeting from Caltech the meeting was held at the La Cañada Congregational Church, (courtesy of Dick Emerson).

President Phyllis Marbach opened the meeting by welcoming all in attendance and then reviewing the agenda. The agenda was leverage off of the strategic planning and accomplishments in 2016 and the Town Hall meeting held in January, 2017.

The members can look forward to another year of opportunities. Planning is in work for:

- Three tutorials
- Three more quarterly planning meetings
- Eight speaker meetings (so, how are things going on Mars?)
- Eight networking events.

(See "More Value," on page 9)

Errors are not in the art but in the artificers. Sir Isaac Newton

The President's Corner

The Meeting with INCOSE Leadership

By Phyllis Marbach

INCOSE President Alan Harding met with our Chapter board and members during the International Workshop. President Harding joined us at [illegible]ée hosted by the Chapter on January 31. In preparing for the event, Alan asked me to talk about I[illegible]SE-LA's goals. Paul Cudney asked me what they were. [illegible]ortunately, I thought through my goals for the Chapter in writing the article for our previous newsletter.

First, my goal is to continue to operate at the high level of operational support to the membership that has been in place for many years. Next, we will actively support INCOSE's Strategic Objectives: Impactful Forums, Diverse Alliances and Growth.

Impactful Forums are supported by continuing to organize and hold conferences; CSER 2017, a one-day mini-Conference in 2018 and a Western Regional Conference in 2019.

(See "President's Corner" continued on page 6)

A note to our regular readers: This edition of the *Newsletter* contains the usual information on systems engineering and Chapter events you have come to expect. The Board of Directors elected to include the attendees to CSER in the distribution so as to let them know a little about the members of the Chapter and some of the many activities in our Chapter.

Inside This Edition

MBSE Comes Out of the Closet

The MBSE social event at the 2017 International Workshop included a light hearted moment with the tongue-in-cheek perspective that MBSE was coming out of the closet. To honor his contributions to this seminal event, Chapter member Chris Delp was awarded the spinner hat. The *Newsletter* regrets that it has no pictures of Chris wearing this haute couture affectation of systems engineering at it finest, but extends to Christ our congratulations and thanks for his contributions to the profession.

Group Genius Really Works

By Phyllis Marbach

In this world of complex systems, working with others is usually the only way to successfully develop a system that satisfies customers' expectations. Not everyone considers integrated system issues during the development of a complex system. Some might optimize their component or part but, in doing so, cause a failure at the interface with other parts or components. Individuals that are naturally drawn to considering the system from a general perspective (a generalist; a Jack of all trades, master of none) make good system engineers. I have heard some of my colleagues claim they were born systems engineers.

There are many roles a systems engineer might play on a large team: requirements analyst, requirements manager, system architect, reliability engineer, verification or validation engineer, test engineer, quality engineer, technical manager, and more. Early in my career, I got into control systems from chemical systems. More recently I became interested in applying Agile Practices to managing complexity and change as a part of developing aerospace systems.

Engineers in all domains must stay current in their technical field. This point led me to engage in one of INCOSE's working groups (WG): the Agile Systems and Systems Engineering (AS&SE) WG. No matter what your specialty or role in systems engineering, you will find a working group for you. Come join INCOSE-LA and INCOSE's working groups and help solve those gnarly, wicked problems that still challenge us. Working in groups helps us find our way more quickly and sparks our creativity (Group Genius: The Creative Power of Collaboration by Keith Sawyer).

To see the wide range of working groups available, go to www.incose.org. Across the top is a strip of colored boxes and the third from the left is "Chapters and Groups." That dropdown menu has the link to "Working Groups," which fall into four categories:

1. Analytic Enablers
2. Application Domains
3. Transformational, and
4. Process Enablers.

Hovering over each of these will show the list of Working Groups. Much of the WG material is available from these publicly available links.

In all of this are opportunities for a systems engineer to refine his or her systems engineering skills by cultivating or joining a group and by learning from established groups: the Los Angeles Chapter, INCOSE itself, and the INCOSE Working Groups.

Observations from the International Workshop

By Josh Spaber

The International Workshop (IW) has grown in significance over the last decade. Indeed, the overflow for lunch on the first day, January 28, 2017, a Saturday, was amazing. Space had to be created for attendees at the back of the restaurant. The closing plenary session disclosed that IW attendance is expanding yearly, reaching 532 this year.

I was importuned at the IW by a colleague, in a friendly way, to write the reasons why the conference stressed the use of Model-Based Systems Engineering (MBSE) in the application of Systems Engineering. While "why" is usually the question children ask before they receive a booster shot, engineers also face needling from their peers and higher ups. Usually this also involves a point: why invest in MBSE? The expected answer involves practical benefits in cost, schedule and performance.

The World Asks Why MBSE, System Engineers Say Why Not

Saturday, I spend most of my day listening to the plenary and informative speakers on MBSE. While MBSE is still evolving, it is already proving its worth. When practiced correctly, early adopters have already received benefits:

- MBSE is a single source of truth — to govern the information in systems now in use or to be designed. Ed Carroll of Sandia National Labs (SNL) stated that one satellite had 6,000 parts and 832 pages of functional requirements. With MBSE, one product with a baseline of 30 stated requirements grew to 350 requirements on further examination. Designers often do not go beyond traditional precedents in eliciting a full set of requirements.
- MBSE is even more efficient than systems engineering alone because it saves long-term costs in production from product failures and defects due to requirement tracing shortfalls or to interactions overlooked by either engineers or stakeholders. In a literature review by SNL of 67 case studies, Ed Carroll showed cost savings of 21%, 55%, and 62% using SE, MBSE and Model-Based Product Line Engineering (MBPLE) and on-time deliveries of 59%, 62% and 75% with systems engineering, MBSE, and MBPLE.
- MBSE can begin before a project starts and has been asked for in source selection.
- An MBSE model can be custom built. An engineer at Terumo (a manufacturer of medical devices) started with sequence diagrams that appealed to the marketing division for a blood cell growth medical device. With activity diagrams and context diagrams the engineer was able to correctly capture functionality — usually these are drawn up later. The "customer's voice" was satisfied and requirements gaps were uncovered.

(See "Working Groups at the IW," on page 10)

Total dependency on smart stuff is not very smart.
Professor Larry Leifer

Model-Based Systems Engineering Workshops at the Jet Propulsion Laboratory

INCOSE-LA President Phyllis Marbach interviewed Chi Lin, Manager, Jet Propulsion Laboratory (JPL) Systems Engineering and Formulation Division, Engineering Development Office, and INCOSE Corporate Advisory Board Representative for JPL. Lin recently spearheaded the NASA/ JPL Symposium and Workshop on Model-Based Systems Engineering (MBSE) in Pasadena, California. The workshop was held January 25-27, 2017. Lin has been an advocate for MBSE for many years and agreed to answer a few questions about the workshop for the INCOSE-LA membership.

President Marbach: What year was the first MBSE workshop at JPL?

Lin: 2013.

President Marbach: How often is the MBSE workshop held and how many has JPL hosted?

Lin: We hold the symposium every two years, and we have held three (2013, 2015 and 2017). We have scheduled it either before or after the INCOSE International Workshop (IW) so that out-of-town attendees coming for one event can attend the other as well. This has worked out well since the IW has been held in southern California recently.

President Marbach: What kind of changes have you seen between the first MBSE Workshop and the most recent MBSE Workshop regarding the use and acceptance of MBSE?

Lin: I have seen a steady increase in interest in establishing MBSE capabilities in government agencies, industry, and academia. The first workshop shared ideas about how organizations started their MBSE initiatives. The focus was more on the promise of MBSE. At the recent workshop many organizations provided overviews that indicate they have now started using MBSE for various systems engineering applications in their programs. More importantly, the benefits of applying MBSE have begun to be realized and supported at the institutional level as well as at the grass roots level.

Furthermore, the first workshop was about discovery. The second workshop was about the value proposition for MBSE. The third workshop began to bring in systems analysis and digital enterprise integration. I think this reflects the evolution of MBSE development and infusion for the past several years.

President Marbach: How many people attended the recent MBSE Workshop and what kind of change have you seen to the number and type of attendees?

Lin: This year we had just fewer than 300 participants, most in person with a few remotely via WebEx. The first workshop was about 100 attendees. We also had more attendees in top leadership positions at this workshop, which I see as a sign of interest and commitment from the enterprise executive level in the use of MBSE. We also saw an increase in attendance by the Department of Defense and Mission Assurance communities at the recent workshop.

President Marbach: What were the demographics of the attendees, such as number of companies, countries, types of domains/industries represented?

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Lin: We had attendees from NASA, the European Space Agency, The Japanese Space Agency, the Department of Defense, Draper Labs, The Aerospace Corporation, Sandia National Laboratories, The National Science Foundation, INCOSE, and MITRE. Industry participants have included BAE Systems, The Boeing Company, Booz Allen, Ford, General Motors, Proctor and Gamble, Lockheed Martin, Northrop Grumman, Orbital Sciences, and Raytheon. Participants from academia have included Caltech, Florida Institute of Technology, Georgia Tech, McGill University, Massachusetts Institute of Technology, Purdue University, and Stevens Institute of Technology. We also had great vendor participation this year, including NoMagic, Siemens, Vitech, Phoenix Model Center, and Intercax. Attendees came from all over the world, including the US, Canada, Japan, the United Kingdom, the Netherlands, Italy, Germany, France, Spain, and Australia.

President Marbach: What was the biggest surprise from the MBSE Workshop?

Lin: I would say there were two surprises. I was pleased with the appreciation and recognition for the importance of formalisms and ontologies. These concepts are taking root as it becomes understood that ontological foundations for SE disciplines are needed in order to integrate various types of models and support integrated analyses. This was evidenced in Dr. Steve Jenkins' talk on formalism, reasoning and ontologies, which was one of the most cited talks throughout the three-day event. The other surprise is the level of interest of applying MBSE to address and help manage risk and technical uncertainties. I think this is because, in part, dealing with uncertainties is an essential part of both the systems engineering function and the mission assurance function.

Practitioners are seeing potential benefits in using MBSE to do their jobs.

(See "Model-Based" on page 8)

Unity Workshop to Prepare for GameSIG Competition

By Phyllis Marbach

GameSIG is an intercollegiate competition in which student teams from all nearby campuses submit games to be judged by a panel of industry veterans. The event is a great opportunity for students of computer science, art, and business to work together as a team on a project and get actual industry insight on their efforts.

GameSIG and INCOSE-LA hosted a second GameSIG Showcase Workshop to prepare for the 2017 Video Game Competition to be held on June 10 at Fullerton College.

The workshop was held at Santa Ana College on February 25, 2017. The half-day event taught key concepts and techniques for using "Unity" to develop games. Unity is a cross-platform game engine developed by Unity Technologies and is used to develop video games for PCs, consoles, mobile devices and websites. First announced only for OS X, at Apple's Worldwide Developers Conference in 2005, it has since been extended to target 21 platforms.

INCOSE-LA mentors Connor Wynveen, Bill Chang, Shirley Tseng and Phyllis Marbach, along with other members of the GameSIG group, Varaz Shahmirian and Bill Fisher, were available at the workshop to advise teams and help them prepare their Submission Forms for the Best Engineered Game Award. More information about the competition can be found at gamesigshowcase.org. A marketing-style YouTube video of the game and the Submission Form will be submitted in May. Teams must submit at least three of the submission forms filled out at three different times during the development of their entry in order to compete for the Best Engineered Game Award. Filling out the form in the beginning, and periodically throughout the development, as well as at the end of development encourages early planning of the architecture and design of their candidate g[illegible]. The periodic updates help facilitate the teams learn[illegible]hat is working well and what needs to be changed.

INCOSE-LA has been supporting this blossoming arena of creativity and the incorporation of systems engineering into activities.

Americas Sector Activities

As the new sectors concept matures, the Americas Sector is increasingly active in fulfilling its role. The Americas Sector leadership conducts regular meetings and has established a mailing list. One example of outreach within the Sector is sharing activities amongst the chapters that have potential interest to systems engineering professionals throughout the sector. The sector leadership is considering tutorials, webinars, and conferences to help fill the gap created by the growth of INCOSE itself — growth not only in numbers but also in the breadth of the applications of the science and the increasingly international nature of the organization.

[illegible] example in the Americas Sector is an outreach to the oil and gas industry is the "Inaugural Texas Gulf Coast Chapter Systems Engineering Conference (Systems Engineering in Aerospace and Oil and Gas – Opportunities for Collaboration)". This Inaugural Houston Area Systems Engineering Conference focuses on opportunities for collaboration and communication in Systems Engineering in the Aerospace and Oil and Gas communities. The conference program seeks to explore this area by addressing needs, capabilities, and best practices for SE in both environments. The conference will seek to provide insight into the business case for Systems Engineering: Complex systems in Aerospace and Oil and Gas, especially from the perspectives of compliance, cost savings, reliability, and safety. This particular conference is being held May 5, 2017, in Houston, Texas. For more details, go to http://www.incose.org/ChaptersGroups/Chapters/ChapterSites/texas-gulf-coast/chapter-events/conferences/tgcc-2017-conference).

The INCOSE Institute for Technical Leadership.

The INCOSE Institute for Technical Leadership is seeking candidates for "Cohort 3 (see, "A Report From the Americas Sector" in the January, 2017 edition of the *Newsletter*). The leadership has extended the nomination period until Monday, April 10, 2017 and is asking for help in identifying additional candidates. Members who are interested should contact the Chapter President, Phyllis Marbach at phyllismarbach@gmail.com.

Hyperloop:

An Opportunity for INCOSE-LA, the Critical Infrastructure Protection and Recovery Working Group, and the Transportation Working Group?

The following article is based on information for the Space X and University of Southern California websites:

http://www.spacex.com/hyperloop

http://www.uschyperloop.com/

Hyperloop is a hypothetical transportations system. As envisioned, it is a step beyond high-speed rail that would take advantage of "off the shelf" concepts of pneumatics, aerodynamics, and electro-magnetism. A merging of the three sciences, after a fashion.

SpaceX is revolutionizing terrestrial transportation through its Hyperloop transportation services. The company currently provides these services to innovators and universities interested in high-speed transportation technology and solutions. The Hyperloop system built by SpaceX at its headquarters in Hawthorne, California is approximately one mile in length with a six foot outer diameter.

SpaceX offered its Hyperloop Transportation services to 27 teams from across the country in the world's first Hyperloop Pod Competition just outside SpaceX headquarters in Hawthorne, California. The purpose of the competition was to help accelerate the development of functional prototypes and to encourage student innovation by challenging university students to design and build the best high-speed pod. This competition is the first of its kind anywhere in the world. Teams put their pods through a litany of tests, which was made possible through the SpaceX Hyperloop system.

Based on the high-quality of the submissions and the overwhelming enthusiasm surrounding the competition, SpaceX is moving forward with a second installment of the competition: Hyperloop Pod Competition II, which will culminate in a second competition in Summer 2017 at SpaceX's Hyperloop track. Hyperloop Competition II will be focused on a single criterion: maximum speed. The second competition is open to new student teams interested in competing on the track, as well as to existing student teams who have already built and tested Pods to further refine their designs.

The University of Southern California

"USC Hyperloop" aims to bring about a new era of fast and sustainable transportation by developing Elon Musk's Hyperloop concept and sharing its design with the world.

As reported on the USC Hyperloop web page (http://www.uschyperloop.com/), their mission starts at the SpaceX Hyperloop Pod Competition. USC Hyperloop will design a sub-scale Hyperloop pod and build a prototype throughout the spring semester. Their plans do not end there. Take a tour of USC Hyperloop's website to

(See "Americas," on page 8)

April Speaker Meeting

Is Systems Engineering Really Engineering? Plus a Short Subject on a Working Group

This speaker meeting will open with a short subject: *Critical Infrastructure Protection and Recovery Working Group, Accomplishments and Future Activities*, by Joshua Sparber, INCOSE-LA Member.

The main attraction:

Abstract: Engineering is a creative process. The object of engineering is to bring about a desired state of the world, typically through the creation of artifacts that use scientific principles to judge the state of the world in a desired direction. Although engineering disciplines differ in their problem domains and solution techniques, there are fundamental principles that unite them and distinguish engineering from other creative activities such as painting and writing. This talk will explore some of these fundamental principles and consider the degree to which systems engineering does or does not respect them. Finally, it will argue that "Model-Based Systems Engineering" is just a label for a much-needed effort to firmly establish systems engineering as a legitimate application of engineering.

Biograph: Dr. Steven Jenkins is a Principal Engineer in the Formulation and Systems Engineering Division at the Jet Propulsion Laboratory, California Institute of Technology. Dr. Jenkins serves as the Chief Engineer of Jet Propulsion Laboratory's Integrated Model-Centric Engineering Initiative, an institutionally-funded project aimed at enhancing the value of the engineering process through modeling. His interests include the integration of descriptive and analytical modeling and the application of knowledge representation and formal semantics to systems engineering. He holds a bachelor's of science degree in mathematics from Millsaps College, a Master's of Applied Mathematics from Southern Methodist University, and a Doctor of Philosophy in Electrical Engineering from the University of California, Los Angeles. He was awarded the NASA Outstanding Leadership Medal in 1999 and was a co-recipient of the NASA Systems Engineering Award in 2012.

(See "April Speaker Meeting," on page 10)

The Importance of Correct Communication...

...as illustrated by some headlines:

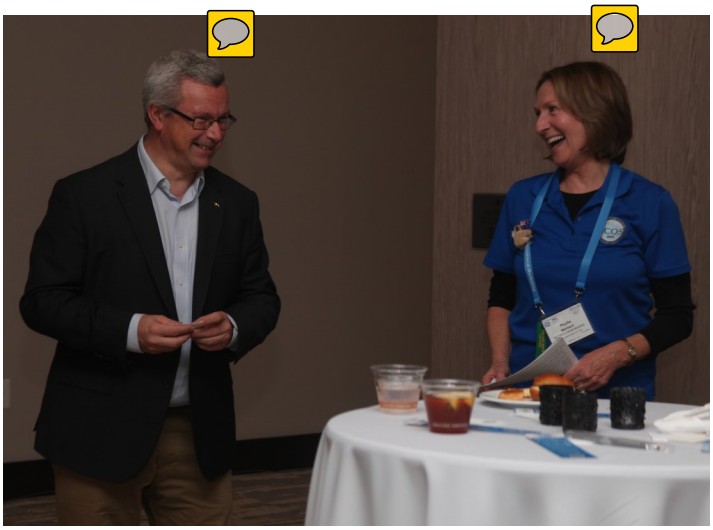
Red Tape Holds up New Bridge
Astronaut Takes Blame for Gas in Spacecraft
Kids Make Nutritious Snacks
Stolen Painting Found by Tree
Iraqi Head Seeks Arms
Police Begin Campaign to Run Down Jaywalkers
Juvenile Court to Try Shooting Defendant
New Study of Obesity Looks for Larger Test Group
Squad Helps Dog Bite Victim
Farmer Bill dies in house
British left waffles on Falkland Islands
Miners refuse to work after death
Teacher strikes idle students
Two Soviet ships collide, one dies

(President's Corner, continued from page 1)

Diverse Alliances are supported by our GameSIG Workshops and the Best Engineered Game Award in 2017 as well as the Mars Rover event in September and the GSAW/SPIN/INCOSE-LA Event in March, to mention just a few of our alliances.

Growth is supported by all of our membership events as well as a planned CSEP and ASEP testing. Another growth opportunity for INCOSE is for the Los Angeles Chapter to be a Good Neighbor to Mexico by helping get a chapter started for INCOSE members living there.

Members of the Chapter voted for a vision statement to help define a strategy for the Chapter during the Town Hall held Jan 10. The top two vision statements were: "Encourage systems thinking for wider community problems" and "Engage with forward thinking companies". During the January 31 social event we asked all attendees to vote on the top 10 vision statements from the Town Hall. "Encourage systems thinking for wider community problems" received the most number of votes and this is now our strategic direction for 2017. Those who attended the Strategic Planning Meeting on February 18, 2017 discussed how we might go about encouraging systems thinking and what wider community problems we will target first. This will be the topic of another article in a future newsletter.



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SYSTEMS ENGINEERING MANAGEMENT	LAS VEGAS, NV	4 - 8 DECEMBER

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Las Vegas, NV	Oct 30 - Nov 3
Chantilly, VA	Nov 13 - Nov 17
Atlanta, GA	Nov 27 - Dec 1

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(President Marbach, continued from page 5)
learn more about the competition, the team, and their mission.

From the Orange County Register, February 1, 2017

A team from the University of California, Irvine finished fifth in a competition to transform SpaceX and Tesla Motors co-founder Elon Musk's idea into a design for a Hyperloop to move pods of people at high speed.

More than 100 university teams and more than 1,000 college students presented design concepts to a panel of judges in an event that began Friday at Texas A&M University in College Station, Texas.

The top teams will build their pods and test them at the world's first Hyperloop Test Track, being built adjacent to SpaceX's Hawthorne, California, headquarters.

The Hyperloop is a high-speed ground transport concept proposed by Musk to transport "pods" of 20 to 30 people through a 12-foot diameter tube at speeds of roughly 700 mph.

The 24-person UCI team built a scale model of their HyperXite pod (pronounced Hyper Excite) for the contest. The concept uses compressed air to levitate and glide the pod on a track. Powerful magnets would serve as breaks for the 1,067-pound train.

Dean Defuria, the team captain for the train's levitation and networking systems, said last week the team's 1-foot scale model had gotten up to speeds of 219 mph.

What sets HyperXite's design apart, said Jacob Gantz, the team's project manager, is its redundant breaking, levitation, navigation, control systems, making their pod safer than those they're competing against.

"If we were to make the system less safe it just wouldn't feel right," Gantz said. "Right from the start safety was a priority."

The HyperXite design uses a control system most often seen in nuclear power plants. The system translates well because of the number of valves on which the HyperXite relies, Gantz said. The team based their dimensions on an airplane's fuselage.

The team already has passed two milestones with SpaceX, but the remaining hurdle is money. If the team can raise $60,000 needed to make a half-scale model, they can make it to the June final, Defuria said.

In last week's contest, a team from Massachusetts Institute of Technology, based in Cambridge, Massachusetts, was named the winner Saturday.

Delft University of Technology from The Netherlands finished second, the University of Wisconsin third and Virginia Tech fourth

(Model-Based, continued from page 3)

President Marbach: Is attendance at the MBSE Workshop by invitation only?

Lin: Yes. Although participation by WebEx has not been limited.

President Marbach: Several of the keynote speakers and panelists mentioned successful MBSE use on programs. Could you mention the programs at JPL where MBSE is being used and the difference it is making?

Lin: There are several planned flagship missions, such as Mars 2020, Europa, and the proposed Asteroid Robotic Redirect Mission, that are adopting MBSE. Although the degree in the use of MBSE is different for each mission, as a whole, we have seen efficiency gains and the early detection of inconsistencies. In particular, Todd Bayer presented how Europa scored positively by applying MBSE techniques to address the five grand SE challenges that he laid out 6 years ago and are cited in the INCOSE MBSE Vision 2025.

President Marbach: Do you expect that JPL will continue to host an MBSE Workshop?

Lin: It was an honor to organize and host the workshop, and it is my strong belief that events such as this are essential to help the SE community accelerate practice modernization and transformation to digital processes. Hosting future events like this is definitely our intent. That being said, whether JPL will continue to host depends on demand, or if other organizations would like to take the torch.

President Marbach: Is there anything else you would like to share with our INCOSE Membership?

Lin: Many of us have shared the view that MBSE is an aid to systems engineers to perform systems engineering. It does not replace systems thinking and system engineering. Pursuing SE modernization via MBSE is a journey that we all need to contribute to and share information on technical, tooling and/or social adoption. As in mentioned in my opening address, when we work together as a community we will achieve more to help accelerate the transformation for systems engineering modernization.

Data is not information, information is not knowledge, knowledge is not understanding, understanding is not wisdom.

The internet is a telephone network that's gotten uppity.

Clifford Stoll

One of the purposes of the systems engineering process, and a challenge to the systems engineering professional, is to recognize, at any point in time, that a project, in spite of all the best of efforts and intentions, is an intrinsic failure and to stop the project (avoid target fixation).

Check out a Use-Case-Oriented Vision Statement!
https://www.youtube.com/watch?v=EQFYedsXg7M&feature=share

No problem can be solved at the same level of consciousness that created it.

It is more fun to talk with someone who doesn't use long, difficult words, but rather short, easy to understand words like "What about lunch?"
A. A. Milne's Winnie-the-Pooh

(More Value, continued from page 1)

In addition to the obligatory business items, several other topics were discussed.

There are opportunities to support community outreach (see GameSIG article on page 4) by mentoring, speaking and participating in Chapter events.

Other potential outreach concepts were discussed, such as a "good neighbor" outreach to the systems engineers in Mexico. The possibility of hosting future conferences and symposia as a part of the Americas Sector were also mentioned.

Volunteer!

You will learn things you never knew you needed to know!

Josh Sparber reported on the meeting of the Critical Protection and Recovery (CIPR) Working Group (WG) at the recent International Workshop.

The mission of this working group is to:

Extend the work of the International CIPR WG Chapter to advance the state of the art revitalizing, preserving, and finding pathways to sustainment of local and global life-supporting systems.

A major portion of the time was spent discussing the continuation of a topic of special interest in 2016: value to the members of the Chapter. Value to the members has been an ongoing focus for leadership (see "Fourth Quarter Planning Meeting," December 2016 — January 2017 edition of the *Newsletter*).

To follow up on the intentions of the 2016 planning, the Board of Directors conducted surveys at the Town Hall Meeting (see "Town Hall Meeting… The Questionnaire," January 2017 — edition of *Newsletter*) and during the Chapter soirée at the International Workshop.

Phyllis consolidated the results of the survey and identified the top five values for the members:

1. Encourage systems thinking for wider community problems
2. Make systems engineering personally meaningful to new and potential members
3. Engage with forward thinking companies
4. Develop an educational path for execution of state-of-the-art systems engineering practices (certification)
5. Make systems engineering implementable across domains.

The attendees discussed the topics and then wrote notes and comments on implementation. Phyllis collected the notes and will correlate and compile them as a basis for continued discussions and implementation.

Discussions continued over lunch and into the afternoon and concluded with a refreshed dedication to providing value to the systems engineering professional in the greater Los Angeles area?

Interested in learning and doing more? Attend any one of the many Chapter-hosted activities or contact a member of the Board of Directors listed on page 11.

(Working Groups at the IW, continued from page 2)

- MBSE is a natural tool to use in engineering — to some extent, engineering itself is modeling. System engineering and modeling are being taught in secondary schools, as well as at all levels of collegiate engineering at several schools: Georgia Tech, Cornell, LMU, University of Arizona, and several others.

Modeling includes regular model-based engineering (MBE), as well as MBSE, as expressed through System Modeling Language: SysML. The combination of MBE and MBSE is known as MBx. The use of MBx initially involves some upfront engineering costs — similar to buying a Tesla 3. While this all-electric automobile has a comparatively high initial cost ($35,000), it will exhibit remarkable yearly cost savings in energy. Similarly, while MBSE, entails some upfront costs, it shows promise for sizable savings across the continuum of a program.

The Object Management Group (OMG) that created System Modeling Language (SysML) version 1.0 is hot on the trail of MBSE improvements. Sanford Friedenthal explained the anticipated work of the OMG standards group in transitioning SysML from just an extension of Universal Modeling Language (UML) to successively more and more capable versions. Sandy noted that the development of SysML paralleled the development of Computer-Aided Development and Engineering. Sandy went on to envision potential updates:

- Interactive viewing with geometric models,
- Extensible system engineering based on industry standards,
- Interoperability at the element level — the propagation of changes, and the exchange of version information between models.

There is a dizzying number of standards related to SysML. Among these are UML, the Unified Architecture Framework, UML Test Protocol, Extensible Markup Language, Business Process Model and Notation, Requirements Interchange Format, Meta–Object Facility Versioning and Development, Software and Systems Process Engineering Metamodel, Diagram Definition, Profile for Safety and Reliability and Open Source Lifecycle Collaboration, among many others.

Words to get off the stage?

(April Speaker Meeting, continued from page 5)

The particulars:
Date: Tuesday, April 11, 2017
Schedule:
5:15 – 5:30 p.m.: Sign in and registration
5:30 – 6:00 p.m.: Networking and refreshments
6:00 – 6:10 p.m.: Working Group presentation
6:10 – 7:30 p.m.: Guest speaker presentation
Host venue:
The Aerospace Corporation
Building D8/1010
200 N. Aviation Boulevard
El Segundo, California
COST: Members, free, non-memb $10.00
Light refreshments will be provide
REGISTRATION REQUIRED:
Registration by April 4, 2017 is required by security at The Aerospace Corporation. Register on-line at:
http://www.incose.org/ChaptersGroups/Chapters/ChapterSites/los-angeles/chapter-home
and scroll down to Upcoming LA Chapter Events.

DIRECTIONS TO THE AEROSPACE CORPORATION

Location: between Imperial and El Segundo Blvd (north to south), between the 405 Freeway and Sepulveda (east to west).

From the San Diego (405) Freeway heading SOUTH:
Take the exit towards El Segundo Blvd.
Turn Left onto S La Cienega Blvd.
Take the 1st Right onto W El Segundo Blvd.
Take the 2nd Right onto N Aviation Blvd.
Bldg. D8 will be the third building on the right, just past the discount bakery.

From the San Diego (405) Freeway traveling NORTH:
Take the El Segundo Blvd exit, Exit 44.
Turn Left onto W El Segundo Blvd.
Turn Right (North) on N Aviation Blvd.
Bldg. D8 will be the third building on the right, just past the discount bakery.

From the 105 Freeway traveling WEST:
Take the exit towards 405 South
Before getting onto the 405 Freeway, take the El Segundo Blvd exit
At the bottom of the ramp, turn left (west).
Turn right on Aviation Blvd.
Bldg. D8 will be the third building on the right, just past the discount bakery.

Truth is ever to be found in simplicity, and not in the multiplicity and confusion of things. Sir Isaac Newton

It is the weight, not numbers of experiments that is to be regarded. Sir Isaac Newton

Not a member? Join INCOSE!

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

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	Organization
Mona Barjasteh	Loyola Marymount University
Brian Marquez	Loyola Marymount University
Ronald Uchimiya	Loyola Marymount University
ali ghobadi	Kaiser Permanente
Turner	Loyola Marymount University
Brian DeJarnett	
Amanda Cueto-Moll	Thirty Meter Telescope
Alexander Masetti	Moog Inc.
John Miles	GMTO Corporation
dhipthee pujar	Loyola Marymount University
Philip Cojanis	Aerospace Corporation, The
June Kobayashi	Northrop Grumman Corporation
Amit Natu	Leagal Zoom
Abdulaziz Almusaed	Loyola Marymount University
michael kanter	Kaiser Permanente
Gurinder Chauhan	Loyola Marymount University
Bryan Calungcagin	Northrop Grumman Corporation
Grant Green	Lockheed Martin Corporation
Stephen Spenler	Kapsch TrafficCom

2017 Board of Directors

Elected Officers			**Elected At-large Directors**		
President	Phyllis Marbach	pmarbach@gmail.com	Membership	Mark TenEyck	Mark.teneyck@3ds.com
Vice-president	Rick Hefner	rhefner@caltech.edu	Programs	Michael Do	michael.do@comcast.net
Immediate Past President	Terry Rector	Terry.e.rector@aero.org	Systems Engineering Education	Tony Magorno	tmagorno@gmail.com
Secretary	Jeffrey Willis	raptor0089@aol.com	Ways and Means	Stephen Guine	Stephen.Guine@ngc.com
Treasurer	Lin Yi	Lin.yi.dr@ieee.org	Communications	Neil Wigner	Neil.wigner@ngc.com
Appointed Positions					
Newsletter Editor	Jorg Largent	jorg.largent@incose.org	Student Division Ambassadors	Scott.Birtalan	scott.birtalan@ngc.com
Technical Society Liaison	Shirley Tseng	shirleytseng@earthlink.net	Reflector Manager	Deborah Cannon	Deborah.a.cannon@aero.org
Chapter Awards Manager	Rick Hefner	rhefner@caltech.edu	Social Media Manager	Doris Gebelein	doris.gebelein@lmco.com
Professional Networking Chair	Scott Birtalan	scott.birtalan@ngc.com	New Member Ambassador	Collette Kurtz	kurtz905@aol.com
Representative to the SF Valley Engineer's Council	Stephen Guine	Stephen.Guine@ngc.com	Volunteer Coordinator	Karen Miller	karmill888@aol.com

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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 incose-la.org

Is Systems Engineering Really Engineering?
Presented by Steve Jenkins
Tuesday, April 11, 2017
The Aerospace Corporation
El Segundo, California

Second Quarter Strategic Planning Meeting
Tuesday, May 13, 2017
The California Institute of Technology
Pasadena, California

MOBIUS — Supersynchronous Earth Orbits for Lunar Missions
Presented by Madhu Thangavelu
Tuesday, May 9, 2017
The Aerospace Corporation
El Segundo, California

Systems Engineering "V" Model Applied to CALTRANS
Presented by Randy Woolley
Tuesday, June 13, 2017
The Aerospace Corporation
El Segundo, California

Systems Engineering in Power Generation Industry
Presented by Ali Moharrer
Tuesday, July 11, 2017
The Aerospace Corporation
El Segundo, California

INCOSE International Symposium IS 2017
Dates: July 17 — 20, 2017
Adelaide, Australia
Learn more and register at
http://www.incose.org/symp2017/home

A Report from Mars and the Martian Curiosity
September, 2017
The Northrop Grumman S-Café in Redondo Beach
Details in work

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
Also like us on facebook!