Vol. 10, Issue No. 8 September 2012

NEWSLETTER

2002, 2004-11 2003

2008 President's Award for Most Outstanding Chapter

UPCOMING EVENTS

Strategic Planning Meeting

NOTE NEW DATE

When: September 8, 2012
10:00 a.m. to 3:00 p.m.
Where: Booz Allen Hamilton, LAX Office
Details on page 3

Professional Networking Event

When: September 12, 2012
5:30 p.m. to 8:00 p.m.
Where: Manhattan Beach
Details on page 3

September Speaker Meeting

Toyota Software Regarding Unintended Acceleration
When: September 18, 2012
5:30 p.m. to 8:30 p.m.
Where: Booz Allen Hamilton, LAX Office
Presented by Dr. Ed Gamble, Principal Engineer at JPL
Details on page 2

2013 Mini-conference

WHEN: March, 2013
WHERE: Loyola Marymount University
Details in work; see the article on page 3

See more "save the date" activities on page 3

Inside This Edition

USC Student Division Presenter Reports from the International Symposium

By Douglas Orellana
University of Southern California Student Division

Rome, Italy was a perfect backdrop for the INCOSE International Symposium 2012. The mixture of ancient and modern parallels the constant trades and integration of legacy and new systems. The conference began with a keynote talk from the Honorable Michael Chertoff, past Secretary of the U.S. Department of Homeland Security from 2005 to 2009. He stressed the need for systems engineers to be included upfront and in the business development phases to better understand needs and gaps. His keynote set the stage for the conference, exchanging ideas and research from institutions around the world.

Although many tracks were available a big focus throughout the conference was in the area of model-based system engineering. One of the sessions offered a recap of the MBSE workshop from the INCOSE International Workshop 2012 in Jacksonville, FL. The poster sessions was no exception, as many of the posters were geared toward modeling and simulations for system engineering purposes. Although I was prepared to present my key reserve paper, "Analyzing Human Machine Interaction and Interfaces through Model Based System Engineering Practices" everyone in my section was in attendance so I was unable to present my paper during the sessions. Luckily, during the poster sessions my paper was well received as I was given the opportunity to present my paper to many of the conference attendees.

While presenting the paper I expressed the necessity of bringing human-machine interactions considerations upfront and throughout system developments. I stressed the need to extend Model-Based System Engineering methodologies and languages, and tools to analyze and optimize systems for integrating humans as agents. Through descriptive and analytical models, levels of automation, human workload, and functional allocation can be better understood for a system. Many of the attendees in the medical field were interested in the research for medical devices.

I would like to thank the Los Angeles chapter for providing me a grant to assist me in attending the conference to present my paper.

September Speaker Meeting

Logic Model Checking of Unintended Acceleration Claims in Toyota Vehicles

Co-sponsored by the Software Process Improvement Network of Southern California

Presenter: Dr. Ed Gamble, Principal Engineer,
Jet Propulsion Laboratory (JPL),
Santa Barbara, California

PARTICULARS

When: Tuesday, September 18, 2012, 5:30 — 7:45 p.m.
Where: Booz Allen Hamilton, LAX Office
Building 5220 — 2nd. Floor, Suite 200
5220 Pacific Concourse Drive
Remote sites will be available for this speaker meeting
Cost: Members-*FREE*; Non-members-*$10.00*

Meeting Agenda:

5:30 - 6:20 p.m. Registration, networking, refreshments
6:20 - 6:30 p.m. Welcome and announcements
6:30 - 7:45 p.m. Presentation followed by questions and answers

Abstract: Toyota had a growing number of unsubstantiated reports of "Sudden Unintended Acceleration." The US Department of Transportation promised to "get into the weeds." It was noted that the engine control systems share similarities with spacecraft control systems, hence the ensuing investigation. The Jet Propulsion Laboratory team applied logic model checking to the electronic throttle control system in 2005 Toyota Camry vehicles. A total of six logic models were developed; each model focused on a subset of the full control system that the team postulated as a potential cause for unintended acceleration. Correctness claims against the logic models were derived from Toyota design documents and from conditions leading to unintended acceleration.

None of the logic model verifications lead to a correctness claim violation indicative of unintended acceleration. One logic model verification identified a software condition whereby high-power transistors moving the throttle plate could be shorted. The software condition was based on an obscure confluence of task and interrupt timing delays. Subsequent investigation confirmed that hardware control logic prevented software induced shorts.

This work was part of the 2010 Department of Transportation investigation of unintended acceleration claims against Toyota vehicles and was published in the software appendix to NASA's NESC report. This work was performed jointly with Gerard Holzmann.

Bio: Dr. Gamble is a Principal Engineer at JPL's Laboratory for Reliable Software. He obtained a bachelor's of science degree and a master's of science degree from UCLA and a Ph.D. from Massachusetts Institute of Technology in 1990. He worked as an Invited Researcher in Kyoto Japan at that Advanced Telecommunications Research Institute from 1990 to 1996.

He joined JPL to work on the Deep Space One mission and was awarded NASA Software of the Year.

He was a flight software engineer on the Mars Explorer Rover mission and he was the Project Software System Engineer for the Kepler mission.

R.S.V.P.: Please R.S.V.P. by Friday, September 14, 2012

ALL PARTICIPANTS: Attendees must R.S.V.P. Please register online at http://www.incose-la.org (this is important so as to help facilitate implementing the meeting). You will be asked to provide your full name, title, company, phone number, and email address. State whether you are a United States citizen, resident alien, or foreign national. Please bring your picture identification (driver's license, passport or green card) to the meeting.

Substantial refreshments will be provided at the host site. Refreshments may be provided at remote sites. Refer to the INCOSE-LA website or contact the point-of-contact for the respective remote site for more information.

Planned Remote Webcast Sites:

Antelope Valley (Edwards Air Force Base, Palmdale): Held on the campus of the Antelope Valley College in the "BE" (Business Education) building, room 207. Open to all; no R.S.V.P. deadline. POC: Mike Wallace, phone: 661-540-0290, email: m.wallace@ngc.com.

Huntington Beach: The Boeing Company, 14900 Bolsa Chica Road, Building 17, Conference Room 109. Please register by Friday, May 4, 2012. Open to U.S. citizens and non-resident aliens. ***We regret that foreign nationals will not be able to attend at the Boeing Company site.*** Visitors will need to bring identification and check in with Security in the lobby of Building 17 not later than 6:00 p.m. Please bring your picture identification (driver's license, passport and/or green card) to the meeting. Point of contact: Beth O'Donnell, phone: 714-372-2543, email: elizabeth.l.o'donnell@boeing.com. Refreshments will be provided at this site.

Goleta: Control Point Corporation, 110 Castilian, Suite 200, Goleta. Please register by Friday, May 4, 2012. POC: Scott Grant, scott.grant@control-pt.com. 805-882-1884, x108 for directions or more information.

Pasadena, JPL – Please register online by Thursday, May 3, 2012. Contact Michela Muñoz Fernández at Michela.Munoz.Fernandez@jpl.nasa.gov for specific location and directions. JPL, 4800 Oak Grove Dr, Pasadena CA. Open to all. Visitors must register by RSVP deadline. Site coordinator: Chelsea Dutenhoffer, chelsea.dutenhoffer@jpl.nasa.gov.

Directions to the host site at Booz Allen Hamilton:

From the San Diego (405) Freeway traveling south:

1. Take exit 46 toward Century Blvd. West/LAX.
2. Turn left (south) on south La Cienega Boulevard.
3. Turn right onto Pacific Concourse Drive.
4. Follow the road until you reach the second stop sign (immediately past court house parking garage on the right) and turn right. At gate on the far right, press the green button to receive a parking ticket (admin staff will validate parking).

(Continued on page 3)

(September Speaker Meeting, continued from page 2)

5. After passing the gate, turn left and park in the visitor parking lot. Walk past the water fountain, across the rotunda to building 5220. Meeting will be on the second floor, Suite 200.

From the San Diego (405) Freeway traveling north:

1. Take the El Segundo Boulevard exit, exit 44, toward Hawthorne Blvd.
2. Turn left onto west El Segundo Boulevard.
3. Turn right (north) on south La Cienega Boulevard.
4. Proceed on La Cienega until the third stoplight.
5. Turn left onto Pacific Concourse Drive.
6. Follow the road until you reach the second stop sign (immediately past court house parking garage on the right) and turn right. At gate on the far right, press the green button to receive a parking ticket (admin staff will validate parking).

After passing the gate, turn left and park in the visitor parking lot. Walk past the water fountain, across the rotunda to Building 5220. Meeting will be on the second floor, Suite 200.

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

susan.c.ruth@aero.org

Strategic Planning Meeting

The Los Angeles Chapter of INCOSE will hold a strategic planning meeting on Saturday, September 8, 2012. The purpose of the meeting is to discuss chapter strategy, objectives, and key chapter activities, including volunteer opportunities. And to maintain and improve the value of the Chapter to the members. Toward this end, the strategic planning meetings provide an opportunity for chapter officers, members, and volunteers to review in detail the Chapter's activities and annual operating plan, and to assess progress on the direction and goals of the chapter for the year.

The meeting time is 10:00 a.m. to 3:00 p.m., and the meeting will be held at the Booz Allen Hamilton facility near El Segundo. (5220 Pacific Concourse Drive, Building 5220 second floor, Suite 200), Los Angeles. An R.S.V.P. website linked from INCOSE-LA.org has been established at: https://events.r20.constantcontact.com/register/eventReg?oeidk=a07e6969qob96a6af24&oseq=.

The INCOSE-LA Board welcomes active participation and contributions from any chapter member. The results of this meeting will adjust the approaches the chapter employs to maintain and improve the health and vitality of the chapter and to provide value to chapter members. Members unable to attend are encouraged to provide inputs or to suggest agenda items via e-mail to Chapter President John Silvas at john.silvas@bah.com.

Networking Event

By Nehal Patel

Join the Los Angeles Chapter for an evening of socializing and networking with members of the Chapter and of the Board of Directors. Enjoy the company of other systems engineering professionals.

This latest Professional Networking Event will be held on Wednesday, September 12, 2012 from 5:30 p.m. to 8:00 p.m. in the Lido Di Manhattan Ristorante & Bar at 1550 Rosecrans Avenue in Manhattan Beach.

The purpose of this gathering is to welcome any new members and to provide an opportunity for Chapter members to gather and network in an informal setting. This is a great way to meet other systems engineering professionals and members of the INCOSE-LA Chapter, and your participation is welcomed. Appetizers will be provided, compliments of INCOSE-LA. There will be a "No Host" bar. Please come and join us.

R.S.V.P.: Please R.S.V.P. by September 10, 2012, at the Chapter's website: www.incose-la.org. Look for this event in the "Upcoming Events" section on the home page, and click on the link for Registration.

SAVE THE DATE

CASE: Complex Aerospace Systems Exchange, Hosted by AIAA

When: September 11 – 13, 2012
Where: Sheraton Pasadena
For more information, go to www.aiaa.org/case

Solar Decathlon

Hosted by the U. S. Department of Energy,
October 3 – 13, 2012
at the Orange County Great Park in Irvine

Joint INCOSE-LA, AIAA, IEEE Professional Development Workshop on Financial Planning

When: Saturday, October 6, 2012
9:00 a.m. to 2:00 p.m.
This is tentative; more details in a future Newsletter and Reflector notice

October Speaker Meeting

Lean Enablers for Systems Engineering and Managing Engineering Programs
Presenter: Dr. Oppenhiem of Loyola Marymout University
When: Wednesday, October 17, 2012
5:30 p.m. to 8:30 p.m.
Where: Booz Allen Hamilton, LAX Office
Details in work

One-day Tutorial: LEAN Enablers

Presenter: Dr. Oppenhiem of Loyola Marymout University
When: Saturday, October 20, 2012, 9:00 a.m.
Details in work

The August Speaker Meeting Re-cap: "Space Mission Engineering (SMAD) IV: Updates to a Classic Standard?

The recent successes of the mission to Mars has piqued interest in space programs, and the evening's speaker, David Parsley, Director of Hardware Engineering, Northrop-Grumman Electronic Systems in Azusa, provided yet another excellent discussion of the challenges of applying the systems engineering process in the esoteric domain of space and interplanetary exploration.

Well over thirty people at six sites attended the meeting and attended virtually. Chapter President John Silvas opened the meeting, by welcoming the guests, acknowledging new members to the Chapter, and briefly discussing upcoming Chapter events. John also mentioned the need for volunteers; volunteers being the essence of the Chapter's successes and the need for volunteers for the 2013 conference to be hosted by the Chapter next March. John turned the meeting over to Dr. Larry Earnst who introduced Mr. Parsley.

Dave used the book, "Space Mission Engineering: The New SMAD," as a basis for his presentation. Published in 2011, the book presents updated and expanded material, including a revamping of the principal mission used as an example throughout the book. The lecture gave an overview of the principal changes from the previous edition, and served as a backdrop for the aforementioned applications of systems engineering. The book was written for systems engineers, and covers all the topics needed to plan, design and work a space mission. The increased emphasis on systems engineering that is woven throughout the book (and the presentation) is educational regarding the application of systems engineering in other domains. Topics of note are the use of reliability testing, Markov process, alternative architectures, and risk management. Dave spoke about the user communities and questions that need to be asked, such as who needs to get to space and why and what are the user needs; the answers to these questions being the basis for requirements. Dave discussed the value of object-oriented methods and models, the latter resulting in model-driven engineering, which, in turn, leads to model development, validation, and life cycle.

He discussed a cycle of higher costs and longer schedules for space systems and the challenge to reduce the cost and shorten the schedules, which necessitates a reduced demand for reliability. Dave noted that this can be a source of controversy and that the systems engineering job is that of balance.

One of the slides was the basis for a discussion of trade-offs and methods for low- and high-rate production, asking the question, "How can Systems Engineering improve cost and schedule?" with the comment that this is a quantum leap forward. The importance of testing, and of testing models was a part of the presentation, Dave noting that the role of testing is sometimes over looked.

Dave's thirty slides and attendant discussion presented a lot of information on the challenges facing those planning space missions and how the applications of the systems engineering process help facilitate resolving those challenges.

The evening concluded with questions and answers followed by an expression of the Chapter's appreciation for an interesting and beneficial presentation on systems engineering in the domain of space exploration.

If I had a dollar for every time I got distracted I wish I had some ice cream.

Mini-Conference 2013

Another INCOSE-LA Tradition, An Opportunity to Learn, Network, and Share (Without the Travel)

Planning continues for the next conference, and we need you!

We, the Board of Directors and the nucleus team, need people to plan and organize the conference. Positions include: conference leadership, program, publicity, finance, venue, volunteer coordination, sponsorship and vendors, website and registration. Even if you don't feel comfortable taking on the lead, we encourage you to volunteer to assist. This gives you a great way to learn the ropes and contribute your expertise while fitting into your available time.

The conference will be an economical single-day systems engineering conference in March 2013 at Loyola Marymount University (LMU). The Board of Directors of the Chapter is working with the preliminary planning committee to select the particular date, and would welcome comments and suggestions from the members. One very notional idea is to add an activity on Friday evening, perhaps social in nature, in addition to the usual Saturday morning format. Sponsors and exhibitors are being courted, and both commercial and academic organizations have expressed tentative interest.

The beautiful Loyola Marymount campus, located in west Los Angeles, will again the venue for the conference, promising the same quality accommodations that have contributed so much to our past conferences. With the generous sponsorship of LMU and the INCOSE-LA Chapter, we hope to offer this conference, including materials and meals, at a general member rate of $50 or less (the exact amount is yet to be determined).

As in the past, the conference will address current important issues in systems engineering. The theme — *Education, Development and Collaborative Exploration* — will combine traditional conferences methods with the "un-conference" structure. New this time will be a job faire segment to the program.

Want to be a part of the next Mini-conference? Join the team now and help guide and shape this Mini-conference! Contact:

Terry Rector at **949.910.1128** or **terry.rector@scientist.com**

OR

Richard Emerson at **818.926.0013** or **remerson9@gmail.com**

Look for updates on the details, the presentations, and the opportunities to participate on the INCOSE-LA website and in future editions of the *Newsletter*.

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The Trip to Mars

By Micah

The following article is written from the perspective of Mars Science Laboratory status and perspectives at the time of the May Speakers Meeting.by a high school student who was in attendance. Ed.

The Jet Propulsions Lab is the organization that is sending the rover "Curiosity" to Mars. The rover is supposed to last for a Martian year (687 earth days). It will be lowered on to the surface of Mars by a hovering crane. This mission will be relying on the technology and communication with the rover on Mars. After it lands on Mars it will drill and do various tests. The problem with the time is that Mars are almost the exact opposite time of earth. Scientists have to program the rover every single day that it is on Mars and working. This means that scientists will have to be awake and programming the rover at 2:00 a.m. and then go home and then go back to work a few hours later to their work of observing what it is doing. It will take another 82 days for the rover to land on Mars.

There are many stages to launching and landing a vehicle on another planet. The four stages of this are going to be the cruising stage, the descent and landing stages; the final stage is the actual exploration of the Martian atmosphere.

This landing stage of the mission will be the hardest to do. We cannot operate the rover so it will have to operate on its own. Even though we have done tests on the earth, anything can go wrong.

The capsule will break off from the rocket, start spinning around the planet, and enter the atmosphere at Mach 3. The parachute on the crane will shoot out at 2.2M. Once at the right speed, the crane will lower the rover, using four rocket boosters that keep it level while cables lower the rover. After the rover is on the ground the crane will cut the cables and fly about one mile in front of the rover.

The main purpose of the mission is to explor the surface. The rover uses a drill, a claw, a small brush, and an internal microscope. The drill is not a normal drill. It sucks the rock or dirt up when it starts to drill and then the rocks and dirt go through a tube to be analyzed by a microscope that will send the information to the earth and they can analyze it even better. The claw is for grabbing bigger rocks and putting them in a different compartment after the brush cleans it.

All in all this is a very complicated process. It is very expensive and a new experiment. Lots of people are pessimistic. Lets hope that this will work out!

Changes on the INCOSE-LA Leadership

Edie Ung has resigned from the INCOSE-LA Board of Directors. Edie served as the editor and producer of the *Newsletter* as well as the Communications Director. Her contributions were integral to the quality of the *Newsletter* and to the Chapter's communications.

Joshua Sparber, the Chapter Recognition Manager, has resigned from his position. Josh has been accepted at the University of Denver for the Masters of Applied Science in Environmental Policy and Management with a concentration in Sustainability and Energy.

Thank you, Edie and Josh. The board and the membership appreciate your service.

The International Society for Systems Science Meeting

by Joshua Sparber

The International Society for the Systems Sciences (ISSS) consists of a diverse group of individuals pioneering the foundation for a true "System Science." The society hosted its annual meeting on July 15, 2012, through July 20, 2012, in San Jose California. Several INCOSE members participated, including Kent Palmer, Jack Ring, Dr. Len Troncale (speaker at the June 2012 speaker meeting) and the author. A few hundred people participated; some from as far away as Finland.

Topics discussed crossed many disciplines: biology, computer science, geology, psychology, astronomy and the social sciences. Dr. Ramirez stressed research on the System Science literature. The quantities of Systems Science research and papers have flattened out over the last five years. One person did contend that this might be the result of the use of new media and a falling away from the established research methods.

Dr. Palmer explained his new special theory of system schemas. Schemas are entities that overarch and partition systems into various groupings. Schemas display 9 levels of dimensions, starting with -1 dimensional quarks, up through super realities that extend to dimensions 8 and 9. Various levels can be equated with planes of human consciousness: dissipative ordering, autopoietic, symbiotic and reflexive. Each grouping has its dual, or dyad, which Kent coins a 'meta-system' or an 'openscape'. The human sense of a system in time and space occurs at the 4 and 5 level, but its dual meta-system is "a whole with holes (a sponge)", an entity that depends upon "systems" and is less than the sum of its parts. Dr. Palmer traces his foundational work to Emmanuel Kant's Critique of Pure Reason. Dr. Palmer says that Kant, who mentions systems, form and patterns, was the first philosopher to give meaning to the word 'system', as an a priori lever into scientific reasoning.

Jack Ring spoke of new methods of software analysis of systems pathologies. The inadequacy of software system analyses is that their highly complex code can be "tried" but not "proven correct." This has resulted in an inability to uncover the existence of incoherencies within system analyses because weak conditions could not be detected within the analyzing software code itself. But, a new method of actually proving code correctness can be accomplished by using upper and lower test case bounds, limits whose successful proof would cover all the intermediate test cases. He expanded on how a recently developed general purpose processor that uses extremely long bit codes could accomplish this and be used to identify system problems across many disciplines, now continually growing too complex to be analyzed using ordinary methods.

Dr. Troncale illustrated concepts 'pleiotropy' and 'pleioetiology', how defective system end effects could be the result of and be stimulated into degeneracy through multiple causes. The inadvertent acknowledgment of these multiply caused defects in current biological pathology work displays system defects that have convergent formats, similarities known as isomorphisms, which are scale invariant. An ongoing conscious effort is now needed to intellectually capture these particular sets of isomorphisms for the sake of advancing the understanding of system pathologies.

Outreach that Reaches Out!

Looking for top-notch systems engineers? Do you have a product that would be of interest to hundreds of the top systems engineering professionals in southern California? Consider advertising in the INCOSE-LA *Newsletter!*

We would be delighted to run an advertisement for your program. The data below are some considerations.

Space available:

- Full page, 7.5 inches wide, 10 inches tall.
- Half page, 7.5 inches wide, 5 inches tall; the shorter axis is the vertical axis or 3.6775 inches wide and 10 inches tall, the longer axis is the vertical axis
- Quarter page, 3.6775 inches wide, 5 inches tall; the shorter axis is the vertical axis
- Column wide ads, 3.6775 inches wide, variable height.

Cost, assuming shades-of-gray and "camera ready:"

- Full page, $300.00
- Half page, $200.00
- Quarter page, $125.00
- Column-wide ads, $30.00 per inch.

Advertisements will be printed "as is;" copy editing and proofreading, other than the obligatory second-set-of eyes, is a negotiable extra. Inputs should not be .pdf unless the advertiser is willing to accept the loss in quality the occurs going from .pdf to Publisher to .pdf.

Inputs can be in Word, PowerPoint, or graphics.

The most important aspect is the resolution of the submitted artwork. An example of the quality of the input is JPG, and it should be at least 200 dpi (dots per inch) in order to print cleanly. 300 is ideal. Ideally, if the advertiser has a graphics department, they'd be able to produce a TIF file - which could be imported into Publisher. Recent advances in camera technology might render that nuance as moot; we routinely use photographs in the *Newsletter.* The concern is the loss of quality; we do not want the production process to compromise the quality of your advertisement.

Advertising can be in shades of gray or color – color being the more expensive. If an advertisement is in color then the whole *Newsletter* is in color because the cost is the same. The rates for color would require contacting our printer.

Interested? Please contact the Editor at jorg.largent@incose.org for details. We are looking forward to this opportunity to serve potential advertisers and the systems engineering community of Southern California.

Volunteers!

Would you like to be a part of the hard-working team that provides these benefits to the members of INCOSE-LA? If you are interesting in volunteering, speak to a member of the Board of Directors or send an email to President@incose-la.org

The Board of Directors wishes to welcome the following new members in the Los Angeles Chapter of INCOSE:

Note: The information listed below is from the member directory and is based upon your initial membership application. If the information is not correct or complete, then please access the member directory (at www.incose.org) to update your information.

Name	Title	Company
Angelica (Angie) Amador	Engineer	TASC Inc.
Robert (Tom) T Carpenter	WGS Acq Services Lead	LinQuest Corporation
Ming U Chang	Corporate Engineer	LinQuest Corporation
Nicholas T Dutton	Systems Engineer/Simulation & Modeling	TASC Inc.
Waltraut G Fehrmann	Subject Matter Expert	The Boeing Company
Shereazad (Jimmy) Gandhi	Assistant Professor	California State University, Northridge
Paul Goss		Self
Brian E Kirkpatrick	Systems Engineer 3	TASC, Inc.
Kristine M Koontz	Systems Engineer	TASC
Gina M Parodi de Reid	Test & Evaluation Engineer	The Boeing Company
John R Razzano	Modeling and Simulation Engineer	TASC Inc
Oleg Yakimenko	Professor	Naval Postgraduate School

Return Address:

PO Box 10969
Westminster, CA 92685-0969

Forwarding Address 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 the systems engineering field or related fields.

2012 Board of Directors

Elected Officers			**Elected At-large Directors**		
President	John Silvas	silvas_john@bah.com	Membership	Paul Cudney	paul.cudney@incose.org
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