



INCOSE Chesapeake Chapter

International Council on Systems Engineering

INCOSE Chesapeake Chapter
P.O. Box 535
Laurel, MD 20725-0535

E-Newsletter

November 2016

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Ellie Gianni,
President,
ESEP

President's Point of View

INCOSE SEP Test at George Mason University – All That and a Bag of Chips

It was a cold brisk Saturday on October 29, the day of the Certified Systems Engineering Professional (CSEP) test offered at George Mason University (GMU) in Fairfax, Virginia. I started the day at 6:00 AM swinging by Panera to pick up the breakfast and lunch for our test takers riding the bus from APL to GMU. Armed with our muffins, bagels, pastries, sandwiches, pickles, chips, coffee and of course, Smart Water, I headed off to APL to meet the bus. While the Washington Metropolitan Area (WMA) Chapter sponsored the event, the Chesapeake Chapter funded a free bus for our membership to travel to the GMU site in order to take this free test offering. Patrick Shilts and George Anderson were the first to arrive, and thankfully helped me pass out breakfast and lunch for our passengers. Our test takers continued to arrive up until the bus departed sharply at 8:00 AM. I was happy to see many folks who I had worked with in the past and hadn't seen in years on the bus (some as long as 20 years ago)!

There was a hushed atmosphere on the way to the test as folks crammed and reviewed their Systems Engineering Handbook V4, note cards, V-Diagrams and quizzed each other with practice questions. We ended up with 21 people taking the bus to the test and 14 others driving themselves to the venue. We checked in at 9:15 AM and the test began at 10:00 AM. In total approximately 150 test takers from the region filled the GMU auditorium and 2 overflow classrooms in the Nguyen Engineering Building.

Our members spent time preparing for the exam in many ways. Some took the CTI Test Preparation Course or the UMBC Test Preparation offering while some prepared using online video training and still others reviewed the handbook on their own. George Anderson, ESEP, Myra Gross, ESEP, and I volunteered to be proctors for the test and helped Courtney Wright, CSEP, Program Manager for Certification and Muhammad Islam, CSEP, President of the WMA chapter administer it for that morning. The test lasted 2 hours and covered 120 questions. Everyone was relieved to have it behind them when it ended at noon. The ride home was much more relaxed. The trip gave us some time to get to know one another a little better and encourage and support each other in

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This is the monthly newsletter for INCOSE Chesapeake, a local chapter of INCOSE International. We are a not-for-profit organization dedicated to providing a forum for professionals practicing the art and science of Systems Engineering in the Northern & Central Maryland & Southern Pennsylvania area.



our professional growth. It was truly an enjoyable and memorable event. Good luck to everyone who took the time out of their busy schedules to sit for this exam.

INCOSE Chesapeake Chapter Programs Update



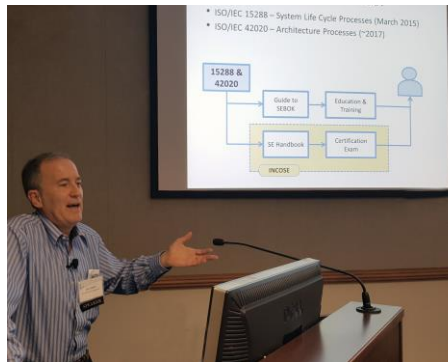
Gundars Osvalds
Programs
Director, ESEP

On October 19, 2016 we hosted our monthly dinner meeting and lecture provided by Dr. James Martin entitled “An Overview of an Emerging Standard on Architecture Process – ISO/IEC 42020”. This is a new, emerging standard on architecture practices currently under development as ISO/IEC 42020. The presentation provided an overview of the key concepts in this standard and the rationale for these ideas. The standard defines six architecture-related processes: governance, management, conceptualization, evaluation, elaboration, and enablement. These are comprised of 37 activities, having five to eight tasks specified for each activity. It is expected that these processes will be incorporated into the next version of INCOSE’s Systems Engineering Handbook and in the Guide to the Systems Engineering Body of Knowledge (SeBOK). This standard can be used as a foundation for organizational training and guidebooks on architecture management and development.

Dr. Martin is an enterprise architect and systems engineer with the Aerospace Corporation supporting information and space systems. He was a key author on the BKCASE project in development SeBOK for which he contributed articles on Enterprise Systems Engineering. Dr. Martin is an INCOSE Fellow, leader of the Standards Technical Committee and received the INCOSE Founders Award for his long and distinguished achievements in the field.

November 16 Meeting and Dinner Lecture-LOCATION CHANGE TO BUILDING 200

Coming up on November 16, 2016, Ken Zemrowski will discuss the Impact of Standards on Systems Engineering and how standards affect the practice of SE in multiple ways. Standards such as ISO/IEC/IEEE 15288 establish a common base for SE, as well as a foundation for assessing competency. Other standards promote the usability of SE tools, from a knowledge perspective and tools being able to work together. Standards also affect the systems we engineer; standards can impose requirements but can also help systems work together, such as interface protocols. Ken will discuss current SE standards projects, including standards for tools. He will provide an overview of how standards affect systems and actions we can take to influence those standards.



Dr. Martin describing an overview of the emerging ISO/IEC 42020 Standard at the October Chesapeake Chapter Lecture hosted by JHU/APL.

**Join
INCOSE
Today**

<http://www.incose.org/about/Membership/Join>

The Chesapeake Chapter is always looking for volunteers to speak at our upcoming meetings! Please contact our Programs Director at programs@incose-cc.org if you would like the opportunity to speak or can recommend someone.



The Chesapeake Chapter of INCOSE is proud to recognize the following organizations for sponsoring our endeavors to expanding the understanding and appreciation of Systems Engineering in the local area.

The November 16 dinner and meeting will take place at JHU/APL in Building 200 (due to ongoing construction in Building 1).



Holiday Party – Awards Ceremony – Silent Auction

Next month on December 7, 2016 we will host our Holiday Party, Awards Ceremony at The Garrett Jacobs Mansion – The Engineers Club in Baltimore, Maryland. The evening will begin with cocktails and a Silent Auction at 5:30 PM to benefit The INCOSE Foundation Chesapeake Scholarship Fund. Dinner will be served at 7:00 PM and the Awards Ceremony will commence at 8:00 PM. Tickets are \$50 each and sponsor tables for 10 seats are available for \$500. Program Sponsorship is available at \$1000. Valet parking is available at \$20 per vehicle. A Harpist will provide music for your listening pleasure during the evening.

Advertising in our program is also available at \$250 (1/2 Page) and \$500 (full page). Registration is open on our web site at:

http://www.incose-cc.org/registration/?regevent_action=show_shopping_cart

Silent Auction Donations and Sponsors to Date (All Proceeds Benefit the INCOSE Foundation Chesapeake Scholarship Fund). Please contact Mike Pafford at <mailto:mepafford@verizon.net> to donate.

- Champagne Brunch for 4 at the Garrett-Jacobs Mansion in Baltimore, MD, valued at \$300; *Donated by: The Engineers Club, Baltimore, MD*
 - 1 seat in the CTI CSEP/ASEP 5 Day Training Class in February at JHU APL (a \$2500 value); *Donated by CTI*
 - 2 Ravens - Eagles Club Level Tickets for last Ravens home game on December 18, valued at \$500; *Donated by: Sawyer Group Wealth Management*
 - Photographs; *Donated by: Osvalds Photography*
 - "Bryces Canyon" 20" x 48" Canvas Gallery Wrap, valued at \$300
 - "Sleeping Koala" 16" x 20" Framed, valued at \$150
 - "500 Flags" 20" x 30" Canvas Gallery Wrap, valued at \$200
 - ASEP Application Fee Waiver; *Donated by: INCOSE Certification Program Manager, Courtney Wright, CSEP-Acq, valued at \$150*
 - Other Donations:
 - Gift Cards -
 - Target (\$50)
 - Home Depot (\$50)
 - AMC Theaters (\$40)
 - Bass Pro Shops (\$50)
 - Starbucks (\$20)
 - Amazon (\$25)
 - Two Baskets of Cheer Value: \$120 each
 - Art Work and \$50 Cash Donation
- Sports Memorabilia from Dean Zindler



A Cautionary Tale, Safety Critical Fasteners



George Anderson
Past President,
ESEP

Standards Day was celebrated here in the United States on October 27, 2016. Celebrations generally included speakers from various standards development organizations describing the latest progress in solving major problems ranging from computer security to counterfeit parts in our military and commercial supply chains. As I listened to these well-crafted visions of future successes, I thought about how a seemingly simple technical standard can fail to achieve its intended purpose leaving serious concerns unaddressed. Here in the best Halloween spirit is my scary story.

I believe that the integrity of the standards process has been challenged by the sporadic failure of the Aerospace Industry, Government, and the engineering profession to effectively address the hazards created by defective threaded components -mainly bolts. We are all familiar with disaster scenarios dealing with rampant spread of disease causing widespread suffering, but can there be a counterpart in the world of man-made systems?

Consider the lowly bolt in its many applications. Millions are produced each year and go into just about every system produced on the planet. What if there was a production defect that caused up to 20 percent of the product to fail to meet the specifications set by an accepted testing standard? Added to this, imagine that because of their use in safety critical applications, customers have contractually specified that all delivered bolts must meet a dimensional specification. Finally, consider the customer who discovers bolts installed in his products that do not meet the standard's dimensional tolerances and decides to continue to use the bolts anyway.

Does this seem bothersome? What if the customers included the DoD and commercial airlines? Could we imagine that they would move to correct a condition that has safety implications? What would the Government regulators and Congress say about this? Has there been applicable legislation passed? What position(s) have the bolt manufacturers' trade associations adopted? Have professional engineering societies weighed in on the technical claims?

Audit Report



DOD REVIEW OF FLIGHT SAFETY CRITICAL THREADED
FASTENERS AND COMPONENTS

Report No. D-2001-150

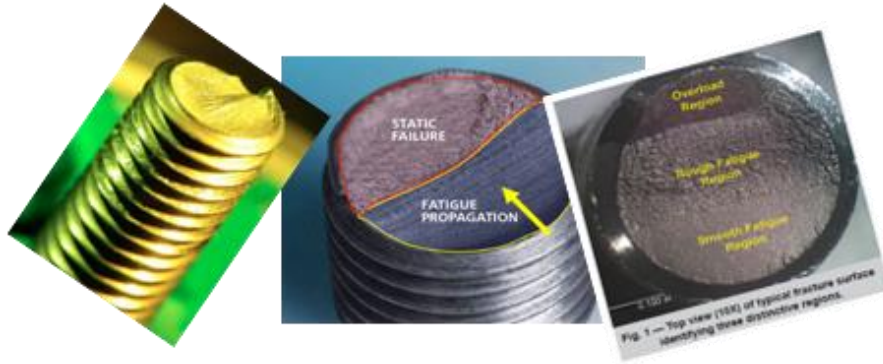
June 25, 2001

Office of the Inspector General
Department of Defense



This Newsletter is to serve our members and is open to all for contributions. Do you have an interesting idea for an article? A review of a new book related to engineering? Let us know. We'd love to hear about it. It may wind up in a future issue of our Newsletter.





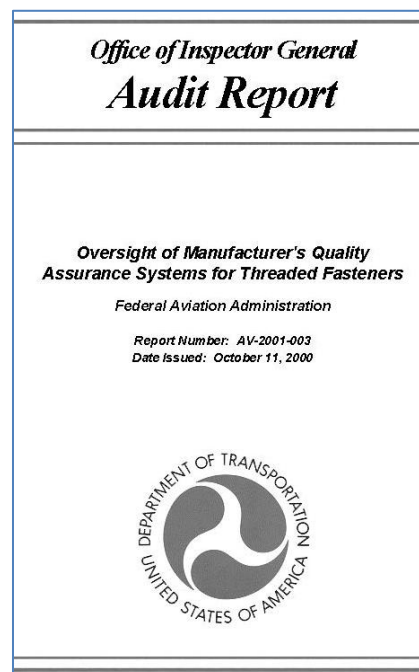
I have provided links to the Government's Inspector General Reports¹ that contain answers to these questions but I will move on to describe the most interesting part of the story. There appears to be a great deal of sophistry being employed to keep this problem below the public's consciousness.

Engineers have long established the relationship between proper bolt thread geometry and performance. Fatigue failures in bolts are more common than many people think. They cause wheels to fall off trucks and buses and are cited in countless aircraft accidents. Regardless, the mantra-like response from many quarters is that there is no problem because there have been no accidents traceable to improper thread dimensions.

Most bolt failures not related to material properties tend to be attributed to human error for improper tightening. NTSB accident reports are replete with statements that indict a mechanic for failing to properly torque a bolt. The possibility that the fastener did not have enough thread area to hold the torque is not checked by most investigators even if the means are available.

The number of accidents in the NTSB data base attributed to fasteners is a potential indication of the flawed logic clouding our minds and preventing an honest investigation. Do airplanes, buses and trucks still have undetected bolt manufacturing discrepancies? Only if there is a credible and redundant inspection program in place can we expect an answer.

I am sure that this is not the only standards story of this type, but hopefully it can serve as an example of where standards developing organizations working with engineering societies, engineers and industry manufacturers can demonstrate responsible collaborative leadership towards making the world's bolt systems safer.



What people are saying about Chesapeake Chapter in 2015:

"... What a wonderful, innovative, and impactful year for the Chesapeake Chapter. I hope you, your board, and the entire chapter is proud of what you have accomplished..."

Past President,
INCOSE

Booz | Allen | Hamilton



¹ See titles at end of article

Bolt Failure References

- Audit Report, DoD Review of Flight Safety Critical Threaded Fasteners and Components, Office of the Dod Inspector General. 2001: <http://www.dodig.mil/Audit/reports/fy01/01-150.pdf>
- Military Fasteners, Changes to Specifications Are Justified, GAO, Sept 1991: <http://gao.gov/assets/220/214991.pdf>
- Oversight of Manufacturer's Quality Assurance Systems for Threaded Fasteners Federal Aviation Administration Report Number: AV-2001-003 Date Issued: October 11, 2000: <https://www.oig.dot.gov/sites/default/files/av2001003.pdf>
- FAA Technical Report June 13, 2001: https://www.pdfFiller.com/en/project/82242894.htm?f_hash=3009c1&reload=true
- Consequences of Bolt Failures, Charles C. Roberts. Jr., <http://www.croberts.com/bolt.htm>
- Bolt Threads: http://www.bayoucitybolt.com/pdf/BCB_WP_boltthreads.pdf
- Wheel Stud Failures, Bolt Science: <http://www.boltscience.com/pages/failure4.htm>
- How to Diagnose Common Fastener Failures: <http://www.onalicylinders.com/2014/03/13/diagnose-common-fastener-failuresf>
- Bolt Failures: http://prairiebearing.com/files/5413/9745/4419/Bolt_failure.pdf
- ASM: <http://www.asminternational.org/documents/10192/20564188/amp17208p18.pdf/5cddb014-2b4a-40a1-b0f6-07b58906754d>
- Bridge Failure: <http://www.mercurynews.com/2013/07/08/bay-bridges-steel-bolt-failures-reveal-inadequate-metallurgy-expertise-experts-say/>

Systems Engineering Grand Challenges Workshop Series

Ellie Gianni, ESEP

On October 12-13, 2016, I attended a workshop at the Johns Hopkins University (JHU) Applied Physics Laboratory (APL) called "Systems Engineering Grand Challenges". This first in a series of three workshops was hosted by JHU Whiting School of Engineering and sponsored by INCOSE. These workshops are being chaired by the Academic Forum Team made up of:

- Mr. Rick Adcock, Cranfield University, Associate Director for Education
- Mr. Tom McDermott, GTRI
- Ms. Alice Squires, Washington State University, ASEE Division
- Mr. Larry Strawser, Johns Hopkins University
- Mr. Jon Wade, Stevens University, Associate Director for Education

Dexter Smith, the Associate Dean for the Engineering for Professionals program at JHU provided the welcome address to participants. These workshops were designed for professional Systems Engineers in academia, industry, or government with more than 15 years of experience in conducting and/or guiding Systems Engineering research (most of the attendees had 25 or more years of experience). Keynote addresses were provided by Ms. Kristen Baldwin, who discussed Government Grand Challenges, where she noted the three top challenges faced by the U.S.



Kristen Baldwin, Acting Deputy Assistant Secretary of Defense for Systems Engineering; Principal Deputy, SE; and acting Defense Standardization Executive for US DoD Trusted Systems Strategy and Design, addresses U. S. Government Grand Challenges



Department of Defense:

- The hardest challenge faced is designing systems for flexibility
- The “wickedest” challenge is designing safe secure cyber systems
- The scariest challenge is engineering for autonomy and artificial intelligence

Mr. Dennis Buede discussed Industry Grand Challenges and how we are missing the involvement of behavioral and social sciences in our systems engineering practices today. Mr. Rick Adcock discussed Academic Grand Challenges where the top areas of concern are:



Rick Adcock Discusses Academic Grand Challenges

-Getting people to want to become engineers; keeping and making engineering relevant

-Innovations at delivery and how to get engineering education to be something we want to do

-Tailoring individualized instruction and education tailored at all levels

-Not only improving technical skills but also improving interpersonal communications skills for the systems engineering community

The first workshop included a group of 32 professionals that formed four Breakout Groups where their expertise and experience were utilized to the fullest in order to achieve the objectives of their particular Breakout Group. Each team had eight members. This first workshop followed the framework coupled societal need to systems challenges, to Systems Engineering gaps as established in the INCOSE publication “A World in Motion: Systems Engineering Vision 2025” <http://www.incose.org/docs/default-source/aboutse/se-vision-2025.pdf>

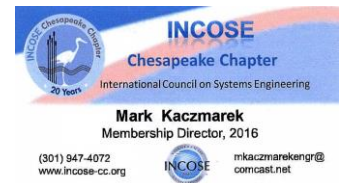
Domains addressed included:

1. Food and Clean Water
2. Healthcare
3. Education
4. Security and Safety

In this first workshop, each of the four groups defined a societal grand challenge in their selected domain. The following are some of the characteristics for what constitutes an appropriate Grand Challenge for this work:

- Represent complex and extremely difficult questions that are solvable (potentially within 10-20 years);
- Improve quality of life through positive educational, social, and economic outcome potentially affecting millions of people;
- Involve multiple research projects across many sub-disciplines to be satisfactorily addressed;
- Require measurable outcomes so that progress and completion can be identified;
- Compel popular support by encouraging the public to relate to, understand, and appreciate the outcomes of the effort.
- Is systemic in nature, i.e., requires advances in systems engineering and science.

Workshop 2 may be held in Torrance, CA at the INCOSE International Workshop 2017.



Chapter Business Cards

Please contact Mark Kaczmarek at membership@incose-cc.org to obtain your own Chesapeake Chapter business cards. Free to Chesapeake Chapter members.



Interested in Jobs & Networking

Contact Mark Kaczmarek at mkaczmarekengr@comcast.net

Or attend one of the Tech Expo Events in our area:

<https://www.techexpousa.com/>

Workshop 3 will be held at CSER, USC March 23-25, 2017. Final results will be presented at the International Symposium in Adelaide, Australia in July 2017.

The Professional's Book Review Series

George Anderson, ESEP

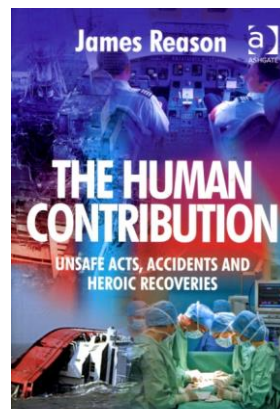
The Human Contribution

Unsafe acts, Accidents and Heroic Recoveries.

James Reason, Professor Emeritus, the University of Manchester, UK

Published by: Ashgate Publishing Limited, Farnham, Surrey, UK, 2008 295 pages

Dr. Reason's book is essential reading for those wishing to gather a broad understanding of the human factors elements underlying the general study of safety and accident prevention. His insight into the subject is validated by an extensive research career serving a comprehensive list of industries and technical applications. Included in his industry experience are: aerospace, nuclear power, railways, maritime, petroleum, mining, chemical process, road safety banking and health care. Dr. Reason draws upon this wide range of experience to provide cogent and sometimes provocative insights into human behavior relating to performance of important and often critical tasks.



I won this book at one of our meeting raffles and knew that it was highly recommended by the speaker. I immediately started reading all the sections involving aviation as that is my area of interest. He is able to bring a great deal of insight into operational human factors without getting into too much detail. Those who want to understand more about the operational environment will want to look elsewhere but the human actor is well covered from multiple perspectives. The author insists that this book is not a scientific one but a presentation of his views on the philosophical view of management of hazardous systems. I think he is being modest as his descriptions of problems appear to me to be very thorough

The organization of the book is unusual in the arrangement of the major subject areas, labeled Parts I through V. He divides his main human safety message into Parts II and III and then in a change of pace spends an equal amount of ink in Part IV discussing HEROIC RECOVERIES. This is followed by the relatively brief but important "what can be done" closure in Part V.

The following are my brief comments on each Part.

Part I is the INTRODUCTION and his warm up descriptions of mind attributes.

Membership Arena

Mark Kaczmarek,
Membership

The Chesapeake Chapter proudly welcomes our new members:

October 2016

- Michael Cuthrell, IPKeys
- Rick Randall, MITRE
- Arnold Rausch, Bridges Consulting
- Patrick Shilts, JHU/APL

September 2016

- Michael Williams, University of Maryland
- Ray Longoria
- Edward Wagner, E.T. Wagner Engineering
- James Iversen, Engineering Sol, Inc.
- Peter Butziger, Vencore

August 2016

- Jordan Matthews, Johns Hopkins University Applied Physics Lab
- Dr Edwin Shuman, The MITRE Corporation
- Stephen Hollock
- Diahann Butler, Raytheon Corporation
- Arturo Davila-Andino, University of Maryland
- Edward Rodriguez, Booz Allen Hamilton Inc.

Part II is titled UNSAFE ACTS and arguably the body of the book if page count is a guide.

Part III discusses several aspects of ACCIDENTS from examples taken ranging from medicine to aircraft.

Part IV HEROIC RECOVERIES explores the roles of Training, Discipline and Leadership as well as lesser factors including Luck, Improvisation and Professionalism.

Part V ACHIEVING RESILIENCE closes out the book with discussions of accident prevention tools including the establishment of organizational thinking patterns.

Not surprisingly, Part IV has some interesting case studies that will offer something new to most readers. For instance the treatment of a Napoleonic battle in Spain in 1811 is somewhat removed from our normal range of reading. Other unusual cases include:

- General Gallini and the Paris taxis
- The Gimli Glider
- Captain Rostron and the rescue of the Titanic

Overall, the book serves as a rewarding journey into the human aspects of accidents and captures in a personal way the broad and stimulating work that Dr. Reason performed in his career. His book should be on every safety professional's shelf for reference and collaboration after it has been first read.



Please join the INCOSE Chesapeake Chapter BOD at these career fairs where the focus is on your career development. We are happy to answer any questions you may have relating to the merit of membership in our society as well as the opportunity we offer for continuous career expansion and growth. Please contact Mark Kaczmarek at mkaczmarekengr@comcast.net if you are interested in staffing the booth at one of the upcoming events. *CSEP's can receive PDUs for assisting the chapter.*

Maryland BWI Marriott 2016 Events:

- November 16, December 8

Virginia Tysons Corner Ritz Carlton 2016 Events:

- November 3, November 15, December 7

Events and Announcements

Scheduled Chapter Meetings and Monthly Dinner Lectures take place at the Johns Hopkins University Applied Physics Lab (JHU/APL) in the Building 1 Cafeteria and Parsons Auditorium and are held on the third Wednesday of each month unless otherwise

July 2016

- Charles Manto, Instant Access Networks, LLC
- Alexander Wachsmann, Northrop Grumman Corporation
- Dr George Palacek, DOD
- Hussein Karachiwalla, DOD
- James Johnson
- Edwin Marston
- Robert Kambic, Johns Hopkins University
- Mark Potter, Strategic Health Solutions, LLC
- Keith Willett, Stevens Institute of Technology

Announcement:

The PMI Baltimore Chapter is scheduling its "PMI Lunch Event Talks" for 2017, and the INCOSE Chesapeake Chapter has been invited back to speak on a Systems Engineering (SE) subject relevant to PMI Program and Project Managers. The PMI Chapter holds these one-hour lunch-time events on the 4th Monday of each month.

The only months already scheduled in 2017 are February and October. If any Chapter member has a PMI-relevant SE subject they'd like to present, please contact the Chapter Programs Director Gundars Osvalds, programs@incose-cc.org,

noted. 6 pm for Dinner Meeting (\$20 in advance / \$25 at door). 7 pm for Lecture (Free).

- **November 16** – 6 pm Dinner Meeting & 7 pm Lecture. “SE Standards Update”, Ken Zemrowski.

Other Events (Workshops, Tutorials, Symposiums, Galas)

- **December 7th** – Chesapeake Chapter Holiday Party, Awards Ceremony & Silent Auction to benefit the INCOSE Foundation and the Chapter Scholarship Fund. Cost: \$50


Save the Date to Join Us!

INCOSE Chesapeake Chapter Holiday Party, Awards Dinner & Silent Auction

Auction Proceeds Benefit the INCOSE Foundation Scholarship Fund

Wednesday, December 7, 2016
From 6 PM til 10 PM

The Engineers Club, Garrett Jacobs Mansion
11 W Mt Vernon Place, Baltimore, MD 21201
Registration Opens in October at www.incose-cc.org



New This Year ... A Silent Auction
to Benefit The INCOSE Foundation & Chesapeake Chapter
Scholarship Fund.

Donations and Sponsors for Silent Auction are Needed!

Contact: Ellie Gianni, president@incose-cc.org or
Gundars Osvalds, programs@incose-cc.org

Here's how you can help! Donate items for the Silent Auction. These can include: Artwork, Tickets to Sporting Events and Concerts or Plays, Sports Memorabilia, Collectables, & Themed Baskets (As Seen on TV, Spa Day, Edinburgh Scotland, Torrance California, Outdoorsman, Everything Italian, Games and Puzzles, Date Night, The Entertainer, Grillin and Chillin, and more!)



or any other Chapter Board member to discuss your proposed topic.



Keep up with the latest news and events. Find out about our new Board of Directors. Explore our extensive library of previous lectures from our Monthly Dinner Meetings. Learn of the Benefits of Joining INCOSE. Check out Systems Engineering education in the local area. All this and more awaits you at our

[INCOSE Chesapeake Chapter Website](http://www.incose-cc.org).

For any comments or suggestions about this newsletter please e-mail our [Editor, B. Azan](mailto:Editor.B.Azan) or our [Communications Director, Pat Williams](mailto:Communications.Director.Pat.Williams). We value your feedback.

Board of Director Officers, 2016

- | | |
|--|--|
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| - Past President: Mr. George Anderson, ESEP | - Communications: Mr. Pat Williams, CSEP |
| - President Elect: Mr. Michael Pafford | - Programs: Mr. Gundars Osvalds, ESEP |
| - Treasurer: Mr. Tony Gigioli | - Membership Committee: Mr. Mark Kaczmarek |

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