MEMBERS NEWSLETTER

September 2016 - Q3

INCOSE®

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President's Corner

Alan D. Harding, alan.harding@incose.org

In my third INCOSE newsletter I want to reflect on a truly world class International Symposium (IS) 2016, at the Edinburgh International Conference Centre. I extend a huge thank-you to the Events Committee, Technical Operations, KMD Partners Events Management, and all the other volunteers and staff, who together delivered – an extraordinarily professional and successful symposium.

Registered attendance for the event was 849 people from 31 countries, the 3rd highest ever, and a new record for a symposium held outside of the USA. During the event we had five wonderful keynotes, a plethora of papers, panels, workshops, and other formats – including invited content, and because it was Edinburgh, the unique "fringe" events. I won't bombard you with statistics, but we served 3562 lunches, entertained 1748 people in receptions, and 500 of us enjoyed a fantastic Scottish-themed banquet at Prestonfield House as part of the IS 2016.

While on the Scottish theme, I have to mention the kilt that I proudly wore for much of the event. From my family history research I established that one of my 20th Great Grandfathers was John "The Red" Comyn, Lord of Badenoch and Lord of Lochaber (born 1269, died 1306), a Scottish nobleman and one of the co-Guardians of Scotland. He was very powerful in Scotland until he was murdered by the future King Robert I of Scotland, more well-known as Robert the Bruce. Having found this out, I had the kilt made, and I hope by wearing it I added a little to the local colour of the event.

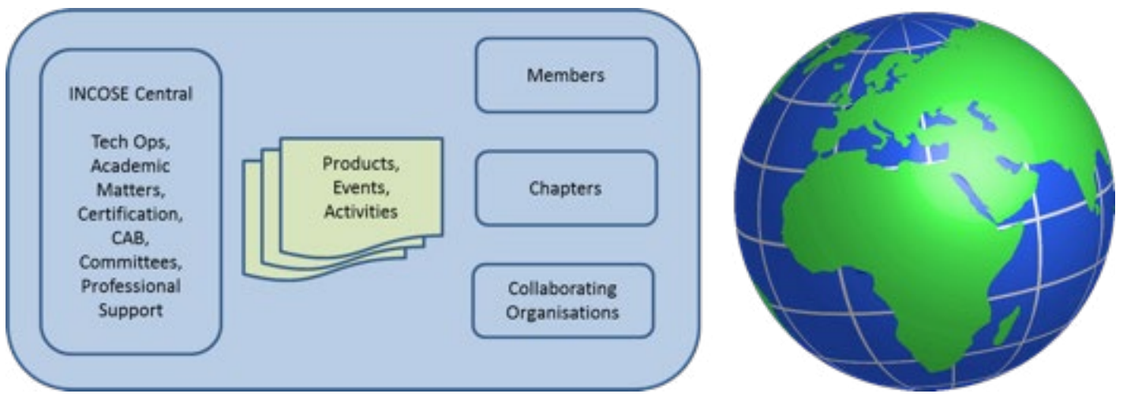
Figure 1. President Alan Harding, proud of his Scottish heritage

The symposium theme was "Achieving excellence through Systems Engineering." Our keynotes informed and inspired us on topics as diverse as: Design thinking; the energy "trilemma;" systems thinking for cities; improving conceptual design; and systems thinking for personal growth and transformation. If you want to listen to these again, or you were not able to be in Edinburgh with us, all our keynotes plus my opening remarks and Jon Holt's rendition of "Think Engineer" are available on the INCOSE YouTube channel: https://www.youtube.com/c/INCOSEYouTube.

In my introductory remarks to INCOSE leadership and the symposium as a whole, I talked about INCOSE's role as the world's authority on Systems Engineering, and our purpose to benefit humanity and the planet through continuing to evolve and promote systems engineering. Our Systems Engineering Vision 2025 provides us with global context, the current and predicted future state of systems engineering, and the grand challenges for systems engineering 2025. This Vision shapes much of the INCOSE Board of Directors' thinking and I encouraged everyone to make use of it in their thinking and discussions during the event. As you read this newsletter I renew my encouragement to all of your to make yourself familiar with the SE Vision, and to apply it in your INCOSE activities, and in your organisations.

INCOSE's role [is] as the world's authority on Systems Engineering… to benefit humanity and the planet…

The other key I discussed in my remarks was INCOSE's status as a global organisation, and the challenges we face to be effective as one. We are the world's authority on Systems Engineering, and we do have a footprint across the globe. However operating globally is a challenge, and we must ensure that all the INCOSE "working parts" fit together properly, underpinned by: quality information, clear procedures, defined roles and responsibilities, and practical methods to cope with diversity and differences across INCOSE. I will be working with INCOSE leadership and our professional support teams to ensure we have effective global mechanisms across the organisation. The one thing I asked all attendees at the symposium, and ask all readers of this newsletter to do is to "Think Global, Act Local" – to take into account our global context and ambitions in everything you do.



Notes from the Board

Rachel LeBlanc, marcom@incose.org

At the International Symposium (IS) in Edinburgh this July, the INCOSE Board of Directors had the opportunity to meet with a variety of members and groups. We kicked off the week with a strategy session on the Friday before the official start of the IS. This was a great opportunity for all INCOSE leaders to work on issues such as building a more global INCOSE, chapter governance and finance, outreach and alliance, and creating a new vision for INCOSE, to be shared with the membership in late 2016, early 2017. There were several occasions for additional engagement with INCOSE members over the weekend, and during the week of the IS, including with the Corporate Advisory Board and Academic Council.

At the board meetings during the IS, several appointments were approved:

Marketing and Communications Assistant Directors

- Marketing – Berber de Liefde
- Communications – Lisa Hoverman

Technical Operations Assistant Directors

- Application Domains – Carl Landrum
- Process enablers – Bob Swarz
- Analytic enablers – Charles Dickerson
- Internal Operation – Joe Marvin
- Standards – Gina Guillaume-Joseph

New Chapters Coordinator – Cecilia Haskins

Body of Knowledge and Curriculum to Advance Systems Engineering (BKCASE) Governor – Art Pyster

Systems Engineering Research Center (SERC) Representative – Jon Wade

Project Managers for 5-year Objectives

- Growth – DeAntony Hart
- Impactful Forums – Stephanie Chiesi

In addition to the appointments, the board established a Professional Training Initiative (PTI) to explore the creation of training materials by INCOSE and approved new policies for marketing and information technology.

Figure 1. Fun at the IS BoD Meetings

Tech Ops Update

Paul Schreinemakers, technical-director@incose.org

I hope that you had a great time at the 2016 International Symposium in Edinburgh, Scotland. We were treated with an excellent technical program and many networking opportunities and a great touch of Scottish and British culture.

One of the things introduced at the symposium is the new organizational structure of Technical Operations (TechOps), INCOSE's technical heart and the bee-hive for many members working on products and advancing Systems Engineering. In the previous Newsletter the reason was explained for re-visiting the Tech Ops structure that served us for 10-years.

The major improvement made is the new grouping of Working Groups (WGs) and Initiatives. In line with Systems Engineering Handbook v4 as well as statements in Vision 2025, the following grouping has been implemented:

- **Process Enablers** are the Working Groups that address the topics and processes as defined in the SE Handbook and ISO/IEC/IEEE 15288:2015. Among others, examples of the Process Enabler WGs are Architecture, Measurement, Risk Management, and Requirements.

- **Analytic Enablers** are those Working Groups that address the Systems Engineering Handbook v4 crosscutting and specialty engineering activities. This grouping also includes those WGs that focus on the analytic capabilities, required for good systems engineering. Examples of Analytic Enabler WGs: Decision Analysis, Competency, and Complex Systems.

- **Transformational Enablers** are leading the way to future developments of systems engineering. This grouping contains WGs and initiatives that mainly focus on the 5-year objective "Transformation" topics and the Vision 2025. Examples of Transformational Enabler WGs: Patterns, Model-Based Conceptual Design, Process Improvement, and the MBSE Initiative.

- **Domain Specific** Working Groups form the last grouping. These are the WGs that tailor and develop knowledge from/for the Process, Analytic, and Transformational Enablers, to the domain specific needs and applications. Examples of Domain Specific WGs: Transportation, Oil & Gas, and Critical Infrastructure.

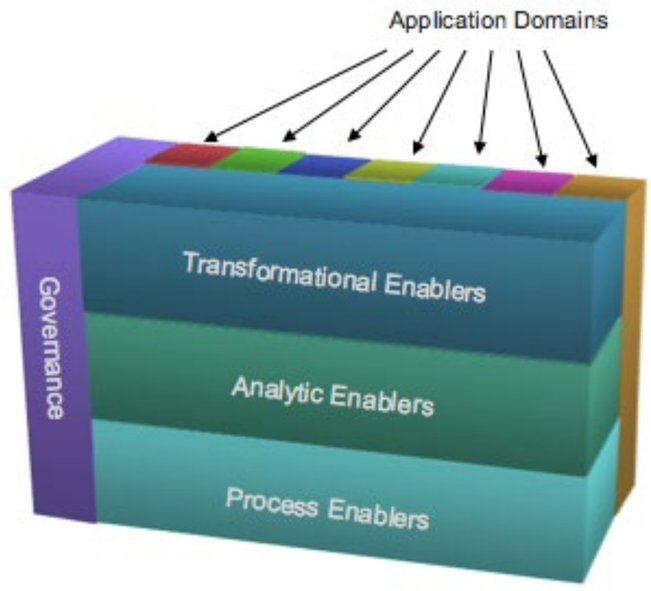


Figure 1. Technical Operations Grouping inline with the Handbook and Vision 2025

Tech Ops Update

On the INCOSE website, the grouping of all WGs and the Assistant and Associate Technical Operations Directors roles are located at: http://www.incose.org/ChaptersGroups/WorkingGroups

While setting up the new organizational structure for Technical Operations, we evaluated our objectives, Operational requirements, the Working Group and Governance functions, the Product and Working Group Lifecycles, as well as our interfaces to other INCOSE and External bodies.

With the Kick-off of the new Tech Ops architecture at the Symposium, we started a rollout scheme. We plan to finalize the rollout at the upcoming International Workshop at the latest. More elaborate information will be published on the INCOSE public website and in the IW2017 program booklet.

IS 2016 Keynotes

Lisa Hoverman, newsletter@incose.org

Every year at the International Symposium, stellar keynote speakers set the tone for each day and send attendees off for the year with compelling, inspiring sessions. This year, the tradition continued. On Monday, Professor Larry Leifer challenged audiences to strike the balance between the design and science paradigms. On Tuesday, Craig Lucas discussed addressing the energy trilemma from a systems perspective. On Wednesday Julie Alexander spoke to us about Smart Cities and how the cities of the future will require smart systems, both first tier *and* second tier cities. On Thursday, Kevin Robinson spoke to us on the ROI of MBCD, and Dr. Emma Langman challenged us on the stories we tell about ourselves . If you were unable to attend, missed one of these great speakers, or would like to relive the great messages each delivered, please take advantage of these being publicly available on our YouTube channel, as referenced earlier by our President. As editor of the Newsletter I was able to sit down with a few of the speakers and they answered a few additional questions about their plenary messages and profession. In this and the next issue, we'll share these interviews. This newsletter will feature the interview with the Opening Keynote speaker. Stay tuned for two more interviews in our next newsletter!

Dancing with Ambiguity

Embracing the Tension between Divergent and Convergent thinking in Systems Engineering, Opening Keynote Speaker: Professor Larry Leifer,

Interviewed by Lisa Hoverman, newsletter@incose.org

Professor Larry Leifer, Professor of Mechanical Engineering Design at Stanford University began his keynote pointing out that "ambiguity is the state of the world when we don't know the variables… uncertainty is when we know the variables but don't know the values, and that tension is a good thing – it holds up bridges and we need bridges." His talk challenged, attendees, and you as readers, to balance the equation between the design and science paradigms. He graciously answered a few additional questions to those posed at the IS 2016.

What is the #1 thing you hoped to convey in your plenary and have the audience retain?

"Systems engineering needs to re-focus on the humans in the system. This is the core value to be taken from the "engineering design paradigm.""

How have you seen the engineering perspective on Design-thinking change in the past 5 years, with specific developments from the past 2 years? How is Design-thinking applied differently outside of engineering settings vs. in?

"This is a tough question, especially in the context that the Stanford version of "design-thinking" has been evolving for over 50 years. My quick interpretation of the different use/interpretations of the design-thinking paradigm within and outside engineering is:

"Outside engineering: the design thinker frequently neglects implementation while focused on the human context. Inside engineering: the design thinker is frequently pre-occupied with implementation and neglects the human context.""

What industries do you perceive are the leaders in Design Thinking, and how/do these examples influence or affect (non-leading) industries?

"Tough question. Customer centric, often retail and marketing firms, are early adopters and benefit from adoption. Proctor and Gamble is a notable case (8000+ products; billions of customers) with a respectable history of adopting design thinking strategies for over 10 years.

B2B industries are late adopters, lacking a clear customer/user, they neglect the importance of other human roles in business implementation.

Both of the examples I share in the Keynote (Lockheed Martin Missiles and Space; and Volvo-Construction-Equipment) are excellent cases for the value proposition that allocating more attention to the humans in the business has profitable consequences."

Dancing with Ambiguity – A Warm Welcome

Where do you see the biggest opportunities and/or need for cross-pollination of design-thinking integration/implementation in education and industry?

The "design-thinking-paradigm" is applicable at all education levels and all industries. We have experience across most of these spectrums. In the moment, my focus is on taking the design-paradigm to science with a program proposal to NSF entitled the "Science of Team Science." We seek to transfer our design research findings from cross disciplinary engineering-design-team-dynamics to the realm of cross disciplinary-science-team-dynamics.

What do you envision being the biggest changes resulting from the study of design-thinking and broader application in the coming 5 years?

Most western societies have been overwhelmingly adherent to the "Taylorism" model of command-control organizational structures designed and optimized to maximize efficiency in the name of cost savings and/or profit. The design-paradigm places humans at the center and seeks to maximize human benefit.

A Warm Welcome

Warm Welcome to INCOSE New Members

Bruce Shelton, brshelton@icloud.com

Every year after the International Symposium, INCOSE gains many new members! We want you to know, we're thrilled you are here! For that reason, we've had one of our long-time members share some welcome information with you.

WELCOME to all of the new members to INCOSE. As an INCOSE member for over 23 years, one of the most important yearly events in INCOSE is welcoming our new members into INCOSE. We are thrilled you are here!

So, what is it like to be a new member? I remember not knowing anyone except for my sponsor at chapter meetings and symposia. So let me introduce you to the organization that is the world's leader in Systems Engineering and all of the value your membership brings.

First, INCOSE is made up of three geographic sectors (the Americas, Europe/Middle East/Africa (EMEA), and Asia/Oceania) and 72 chapters, worldwide. There are also members-at-large who are not affiliated with any chapter. For those of you from the United States, we have chapters in over 30 states with some states having multiple chapters. For the non-US members, there are chapters in 27 countries. Of these, there are 17 chapters in EMEA, 9 in Asia/Oceana, and 2 in the Americas. Last year, these sectors and their chapters added 2563 new members. Including you, we added 896 in EMEA, 224 in Asia-Oceana, and 1,443 in Americas. There are many new faces.

How can INCOSE help you gain the most value from your membership. Below I share some examples as to how you can take advantage of your membership.

To start, I recommend that you explore the INCOSE website, http://www.incose.org. On the website you will see various topic areas, like News and Events, Chapters and Groups, Products and Publications, and Certification. Each of the topic areas has a drop-down menu of various subtopics.

I suggest you start your exploration with the topic About INCOSE. A very important link here is Contact Us. This will put you in touch with the INCOSE main office should you have any questions about your membership. For the next stop on your exploration, investigate Chapters and Groups. I suggest this for two reasons. First by discovering your chapter, you can find out about their meeting schedule and location allowing you to attend a meeting in-person and meet other INCOSE members who can provide their personal insight into INCOSE. Please do not be shy!

Reach out to the members and introduce yourself and ask for advice and information. One bit of information you may obtain is knowledge about INCOSE working groups that members of the chapter participate in. You can discover more information about the working groups by going back to the INCOSE website and looking through the Chapters and Groups drop-down menu. There are numerous working groups, one or two of which should be of interest to you in your field of work. These working groups are advancing the art of systems engineering by studies and research year round. Additionally, these studies contribute to the Products and Publications, some of which are direct requests from either the Board of Directors or the Corporate Advisory Board (CAB). The Board of Directors, headed by the INCOSE President (currently Alan Harding) and the INCOSE President-elect (currently Garry Roedler), lead and guide INCOSE into the future, shaping priorities for the organization and its members. The CAB identifies products and research topics that will benefit Government, Industry, Academia, and you, in your field of work. Your company may even be a CAB member. Look through the Chapters and Groups drop-down.

The next topic area to examine is Products and Publications. Here, you will have access to the greatest library of systems engineering knowledge available anywhere. This library includes technical publications, periodicals, peer-reviewed papers and proceedings, webinars, and The Body of Knowledge and Curriculum to Advance Systems Engineering (BKCASE) Project.

Finally, another topic of importance to you is Certification. There are three levels of certification for new systems engineers, seasoned practitioners, or long-time experts. Certification can be the discriminator for you or your company in obtaining work. Please read more about this topic on the website and consider which level is best for you.

Whether you are just out of college or have been a professional for many years, INCOSE has something for you.

A Warm Welcome

As a young professional, you are building a résumé to prepare yourself for future job and personal growth challenges. You enhance your abilities by participation in educational and networking activities via your involvement with other INCOSE members. You learn, develop, and practice leadership skills via your participation in chapter activities, first as a volunteer and then as a chapter officer. You, as a seasoned professional, have risen through the hierarchy of needs and are looking for fulfillment in additional ways. You can apply your knowledge and leadership to the technical groups and committees, serving in INCOSE leadership positions, or mentoring the young professionals embarking on their careers.

EWLSE at IS 2016

Empowering Women at INCOSE International Symposium 2016

Alice F. Squires, alice.squires@wsu.edu and Regina Griego, griego@sandia.gov

The well-attended Empowering Women as Leaders in Systems Engineering (EWLSE) events at the International Symposium (IS) 2016 in Scotland offered a potpourri of storytelling, exchanging tips and insights among community members, navigating the leadership journey, investigating gender research, and sharing personal experiences – both trying and uplifting. Regina Griego (Sandia National Laboratories) organized an informal Sunday half-day workshop which included a panel: "Beyond the Resume: Personal Journey of INCOSE Women Leaders" led by Anne O'Neil (Anne O'Neil Consulting) with panel members Marilee Wheaton (Aerospace Corporation/USC), Donna Rhodes (MIT), Berber De Liefde (Rijkswaterstaat), Eileen Arnold (ConsideredThoughtfully), and Regina Griego. Each of the panelists talked about the unique aspects of their systems engineering journey. The workshop also included a World Café on four topics moderated by five facilitators:

- Gina Guillaume-Joseph (MITRE): When are you at your best? - "Hero in Victory vs. Hero in Retreat," - what are the ingredients of a situation that allow you to be your very best self as a leader?

- Richard Beasley (Rolls-Royce) : Emotional Intelligence - looked at impact of having (or not having) emotional intelligence, in leaders or yourself, and what are the important aspects of high Emotional Quotient (EQ)?

- Nicole Hutchison (Stevens Institute of Technology): Storytelling - how do you story yourself as a leader, how do you use stories to reach people as a leader?

- Berber De Liefde, and Claus Nielsen (Cranfield University): Power and Influence - what is your reaction to those words, and how does power & influence work in your leadership; does it look different for women than men?

EWLSE at IS 2016

Participants of the breakout sessions considered examples where they experienced supporting and non-supporting actions and behaviors in the leadership areas; practices they could build to support the aspect of leadership; relevance of the leadership practice to their career; and how we could collectively support each other in the particular aspect of leadership.

Alice Squires (Washington State University) moderated the "Empowering Women as Leaders" panel delivered during the conference. She kicked off the event by asking the audience to open their hearts and minds as the group investigated and discussed research, case studies, personal experiences, and a way forward to empowering women and men as leaders in systems engineering. Topics covered by the panelists included:

- Alice Squires: "The goal: for systems engineering leadership to thrive." The greatest difference in perception of gender bias appears to exist within one's own field where women, relative to men, favour research that suggests a gender bias and men, relative to women, favour research that suggests there is no gender bias. The difference in interpretation of the research itself creates an inherent obstacle to raising awareness and creating change.

- Erika Palmer (University of Bergen): "The current gender gap in engineering / systems engineering and the implications. " Overall, 19% of systems engineers are women, and within INCOSE, representation of women in chapter leadership stands at 18.5%. As diversity is a probabilistic result, the lack of women system engineers indicates that engineering teams are not utilizing the best possible talent.

- Claus Nielsen: "Recruiting qualified systems engineers." The current situation indicates that gender distribution is almost stationary in mathematics, physics, and engineering and although systems engineering appears to be more accessible than most engineering fields there is a large potential recruitment base that we are missing. If nothing changes, women will do fine; but will systems engineering?

- Regina Griego: "The impact of culture on women in leadership. " Many women leave or do not enter engineering because of the culture – either they do not like the workplace climate, or their boss, or they perceive engineering as being inflexible, or the engineering workplace non-supportive of women. There seems to be a labyrinth, not a glass celling, We see a few women get there, but it is a puzzle as to how they get there, to most women.

- Heather Feli (Ensign-Bickford Aerospace & Defense Company): "Empowering Women as Leader**s** in Systems Engineering - Industry Perspective." Empowerment is letting out the power that we have – access to our own resources, authority, and influence. When we become comfortable with the idea of falling down, we can be fearless. Mentors are important for interactive learning

and knowledge transfer and learning from experience.

Apologies were sent by the sixth panel member, Pat Hale (MIT). The panel had a very interactive, emotional, uplifting and sometime tense, question and answer period following the panel presentations, and the group had to wind down so as not to miss the networking break.

Feedback received during and after the conference on these EWLSE events included (most paraphrased):

- "I'm so glad INCOSE is finally talking about this stuff."
- "I was livid that we started by talking about changing the environment and culture but ended with how women need to adapt."
- "I am so happy that I attended the workshop and/or panel."
- "I really appreciated the synergy and storytelling."
- "I love you."

If you are interested in being matched to a systems engineering mentor, please start by emailing ewlse@incose.org. To become a member of EWLSE please log into your account on incose.org, go to Profile Home and add "Empowering Women" to your Committees/Working Groups.

Sector Updates

Europe/Middle East/Africa (EMEA)

Introduction

Jean-Claude Roussel, Jean-Claude.roussel@airbus.com

Thanks to the significant participation level of nearly 850 attendees and the high quality program, the International Symposium (IS) 2016 was a very successful event with stellar papers, tutorials, and panels. I am very happy and proud that this symposium was hosted in the EMEA sector. This event was good for INCOSE growth, and fostering synergies and cooperation within the EMEA sector itself.

Figure 1. A fine evening at IS 2016

First of all, I would like to start this short introduction by informing you about the appointment of Berber de Liefde (NL Chapter) as Assistant EMEA Sector Director for Communication, in addition to her present Communications role within INCOSE Central as Assistant Marketing Director. Many thanks to Berber; I am sure her support will be highly appreciated at both the EMEA and Central levels.

For the first time, we experimented at IS 2016 with a forum between EMEA Chapter Leaders and BoD members on Sunday evening. After I held a short overview of the EMEA Sector, an interesting Q&A session followed during which attendees identified topical aspects requiring further development, including translation of documents (English to other languages and vice-versa), student participation, Chapter Memoranda of Understanding, location of events, and more. The Q&A session developed into a soirée with handpicked wines and accompanying snacks. We agreed that this should be a recurrent forum at future international events, hosted by the Sector in which the event takes place, for example the Asia-Oceania Sector will arrange the forum at IS 2017.

Following the AFIS-EMEA Workshop held in Paris, October 2015, attended by 200 participants from 14 countries, INCOSE EMEA agreed this should become a regular biennial event. The next EMEA Workshop will be held in Germany (city still to be confirmed) in the second half of September 2017.

We are also planning to host an International Workshop (IW) in Europe. Targeting IW 2018, we submitted a proposal for Valencia, Spain as the host city. The commercial viability of the offer is currently being investigated in order to inform a decision at the next BoD meeting in October 2016.

United Kingdom (UK) Chapter

Richard Beasley, Richard.Beasley@Rolls-Royce.com

INCOSE UK held a training day on 8 June. Four 1-day tutorials were run; Systems Thinking (presented by Stuart Burge), Systems Engineering handbook and certification (Ian Presland), Model-based Systems Engineering (Jon Holt), and Interfaces (Hazel Woodcock and Paul Davis). 32 people attended; feedback was positive, and the reported outcome was good learning. The chosen quote of the day, overheard from one delegate: "Systems engineering is a second career for me – I didn't know it would be so interesting, compelling or useful."

INCOSE UK believes strongly in professional development and professional recognition. As a part of this belief, over the past 5 years we have arranged to offer UK professional registration (as a Chartered Engineer) through one of the professional engineering institutes licensed through the UK Engineering Council. This is a tremendous step forward in getting systems engineers professionally recognized as systems engineers. INCOSE UK is highly indebted and grateful to the Support the IET (Institute of Engineering and Technology) for their aid in getting us to where we

are today. As a next step forward, in July INCOSE UK announced a change in partner for this arrangement. We will be working with the SEE (Society of Environmental Engineers) who will allow a more flexible approach with greater input from INCOSE senior members in the registration process. We look forward to many more INCOSE members obtaining UK professional registration through this route, and the increased recognition of systems engineers as a valuable part of the engineering profession.

HSI becomes stronger because it attempts to take into account human factors, ergonomics and interaction design from the early stages of design, based on modeling and simulation (more specifically, on human-in-the-loop simulation or HITLS) leading to human-centered agile development approaches. For example this year, the theme of the International Conference on Human-Computer Interaction in Aerospace (HCI-Aero 2016) is "From Human-Computer Interaction to Human-Systems Integration." A real paradigm shift! HCI-Aero 2016 will be held in Paris, France, on September 14-16, 2016 (http://research.fit.edu/hci-aero/HCI-Aero2016/Home.html).

It was a considerable delight to have the INCOSE International Symposium (IS) held in the UK in 2016. Whilst this is strictly a central, and not chapter event, obviously the event location meant there was a significant impact on the chapter. Many INCOSE UK members participated to organize the event (specifically we highlight Ian Gibson, who did a remarkable job as Project manager for the IS). We were determined that, alongside the usual excellent technical content, that there would be a distinctly British theme to the event. This was achieved, with many contributions to the events on the "side" of the event – the "fringe," the pub quiz (attended by about 50, where every team had at least three nationalities), and the reading of the UK product "Think Engineer" led by INCOSE UK. Overall, it was pleasing to see so many members of the UK chapter (more than 130) attending – many managing to get to their first ever IS. Thanks to all – organizers, presenters, attendees. One senior INCOSE UK member's feedback – "a great event, and made me proud to be British." We would only add that the event also made us proud to be Systems Engineers and members of INCOSE.

The next event for the UK chapter is the annual UK conference, which is being held 15-16 November at the Scarman Centre in Warwick University. The technical program is just being finalized. There were many high quality papers submitted, and the event committee really struggled choosing from the high quality field. Registration opens soon, and we are looking forward to a tremendous event. At this event, the annual general meeting will be held, including the appointment of new Council officers. This will include the bi-annual change of chapter President, with Richard Beasley stepping down and Ivan Mactaggart stepping up for his two-year term as chapter president.

Poland Chapter

Aleksander Buczacki, aleksander.buczacki@incose.org

The Applying Systems Engineering for Embedded Systems Development conference was held on 17 June at the AGH University of Science & Technology in Krakow.

The Polish and German INCOSE Chapters, AGH University of Science and Technology and the Delphi Technical Center in Krakow organized the conference. The following sponsors supported the Conference:

- Delphi Technical Center Krakow;
- Project Performance International (PPI);
- No Magic Europe.

Attending were more than 100 participants, representatives of business, science, as well as students interested in systems engineering. The conference included the following presentations:

- Requirements-Based Verification of the Frigate's F125 Mission System - Piotr Malecki, Thyssenkrupp Marine Systems GmbH
- How 1D physical simulation can support development of embedded systems from early control development to final calibration - Yuri Durodie, Siemens Industry Software Inc.
- Rolling Out of Systems Engineering as a Natural Process - Georg Huennemeyer, Hünnemeyer Consulting
- System Design and Verification with MATLAB & Simulink - Marcin Piątek, Oprogramowanie Naukowo Techniczne
- "Step out of the car" a Glimpse into Systems Engineering for Automotive Active Safety Applications - Michał Szulc, Delphi Automotive PLC

Presentations can be downloaded at: http://incose.pl/en/presentations-from-the-krakow-conference-for-participants/

Israel Chapter

Avigdor Zonnenshain, avigdorz100@gmail.com

The Israeli INCOSE Chapter, INCOSE_IL, together with ILTAM organized various training activities in systems engineering with hundreds of participants. The main topics of interest were:

- Systems Engineering for complex systems
- Risks Management for complex systems
- Systems of systems
- Systems engineering in commercial companies &

SME's

- Systems safety

INCOSE_IL with the Gordon Center for Systems Engineering produced and distributed 2 professional Journals called THE VOICE OF THE SYSTEMS. See these journals in the following links:

http://www.iltam.org/incose_il/jan2016/

http://www.iltam.org/incose_il/june2016/

The Israeli chapter also hosted Paul Schreinemakers, Technical Director of INCOSE. On April 3, Paul Schreinemakers came to visit the INCOSE Israeli chapter. Paul visited one of the Israeli systems industries – Orbotech - they develop multidiscipline systems for Automated Optical Inspection & Shaping for Flat Panel Displays and printed circuit board (PCB) manufacturing. We also visited Afeka - Tel Aviv academic College of Engineering, where students earn master's degrees (see attached a photo from Afeka's tour at the Integration Lab). In the afternoon, Paul Schreinemakers met with Yigal Eskin – INCOSE_IL president and other representatives from the INCOSE_IL management team. We had a fruitful meeting in which we exchanged ideas on the chapter activities, goals, and ways to share knowledge.

Figure 2. Paul Schreinemakers visits the Israeli INCOSE Chapter (from left to right: Moshe Salem, Paul Schreinemakers, Dr. Moshe Ayal, Dr. Avigdor Zonnenshain)

Finally, the Israeli chapter highlights 2 special initiatives organized by the Gordon Center with the collaboration of INCOSE_IL:

- On February 17, we participated in a round Table on Integrating Human Factors Engineering with Systems Engineering. Following a one-day conference on this topic, we realized that we require more dialogue between the community of systems engineering and the community of human factors engineers. In this roundtable with about 20 representatives from both communities, we discussed mutual issues of interest- the needs, the difficulties, the opportunities, the proposed solutions. Following this meeting we have created two working groups:

- Education and training of both communities in Human Systems Integration (HSI)

- Practicing HSI in companies & organizations

- On May 4, we held a round table on the Development & Advancing RAMS as part of the systems engineering discipline. Following a preliminary assessment of the status of RAMS in Israel, we have initiated a process for improving RAMS through collaboration with the systems engineering discipline. During the round table meeting, there were fruitful discussions on education for RAMS, practicing RAMS & research in the area of RAMS. Based on the findings of this round table, we are organizing working groups on issues of education and research in the area of RAMS.

Italian Chapter

Lucio Tirone, lucio.tirone@aster-te.it

The first Issue of the Newsletter of the Italian Association of Systems Engineering, INCOSE Chapter Italia (Viewpoints), can be downloaded here: http://aise-incose-italia.it/download/viewpoints/.

Also, the translation of the Systems Engineering Handbook V4 in Italian is planned!

The second Italian Conference on Systems Engineering (CIISE'16) is on November 14-15 in Turin, see the conference website for info: www.ciise.it.

AFIS (French Chapter)

Jean-Luc Garnier, jean-luc.garnier@thalesgroup.com and Alain Roussel, alain.roussel@c-s.fr

AFIS has many activities that have happened and upcoming.

The Southern European Systems Engineering Tour (SESE 2016): The SESE Tour took place from 11-14 April. It involved the Spanish, French, Italian and Swiss chapters. In order to increase the impact of SESE in 2017, its preparation began during the IS 2016.

The AFIS yearly workshop: held on the 1st and 2nd of June, the Workshop gave the opportunity to summarize the progress of AFIS technical committees.

IS 2016: First, IS 2016 was a pleasant and fruitful event. During the Symposium, AFIS was active on three strategic topics: Product Line Engineering, Healthcare, and Systems of systems.

Figure 3. Members of AFIS at IS 2016

Sector Updates - EMEA

Systems Engineering Dissemination: AFIS identifies 3 scopes for dissemination of the Systems Engineering Body of Knowledge: experts, practitioners, and unaware people. The latest scope is huge and in constant evolution; consequently, difficult to be addressed. Olivier Terrien – who is an AFIS member and specialist in simplification and synthesis on technical topics – proposes that AFIS sponsor a project working on this subject. The aim is to communicate towards a broad audience on Systems Engineering, related methods, and tools in order to provide basics of the Systems Engineering discipline. The first vector of this project is an 80-page book.

Industry of the future: targeting this program, AFIS launched several projects: Systems Engineering and Product Line Management (PLM), diversification of Systems Engineering in the healthcare domain, and deployment of systems engineering towards small to medium enterprises (SMEs).

In cooperation with the French PLM Lab association, AFIS organized an event dedicated to systems engineering and PLM the 15th of June in Paris. Attending were more than 60 participants, representatives of business, science, and consultants. Of course, the maturity of the PLM deployment varies by company and we presented the first results of a survey conducted by AFIS to SMEs. The presentations of PSA and ELTA companies confirmed this diversity and the close relationships between systems engineering and PLM. For the next step, planned at the end of 2016, we will publish a glossary of the systems engineering and PLM key terminology. Points of contact: Jean-Pierre Daniel (jpdaniel92@gmail.com), Jean-Jacques Urban Galindo (jjug@neuf.fr).

The deployment of systems engineering towards healthcare will involve a project dealing with the fragility of elderly humans. This project aims to assess how systems thinking and innovating technologies or practices such as digitalization and living labs could help to better master this problem. A tea-time organized in cooperation with the Aerospace Valley and Cancer-Bio-Santé competitiveness clusters is planned on the 21th of September 2016 in Toulouse. In the frame of this event, Jean-Claude Roussel will present on INCOSE and the INCOSE Healthcare Working Group. Point of contact: Brigitte Daniel Allegro (Brigitte.daniel.allegro@gmail.com), Hervé Pingaud (herve.pingaud@univ-jfc.fr)

The regional deployment of AFIS in France increases our capacity to work in close relationships with SMEs. We have begun the cooperation with several SMEs and a document dedicated to the top management of SMEs will be issued in October 2016. Point of contact: Michel Galinier (mic.galinier@gmail.com)

Finally, we are preparing the Industry-Academics forum which is planned the 7th and 8th of December 2016 in Toulouse. The main theme addressed by the forum is "Innovation and Systems Engineering." We are also organizing the next robot competition (RobAFIS), which will end with the final the 7th of December. Points of contact: Eric Bonjour (eric.bonjour@univ-lorraine.fr), Marija Jancovic (marija.jankovic@ecp.fr), Jean-Claude Tucoulou (jc.tucoulou@afis.fr)

South Africa Chapter

René Oosthuizen, president@incose.org.za

As winter in the southern hemisphere gradually moves into "memory state," efforts are speeding up to get the annual South Africa (SA) conference in place. Registrations have been open for some time and delegate numbers are encouraging. Keep in touch via the INCOSE SA conference website where our six keynote speakers have just been announced.

The Greatest Young Systems Engineer of the Year (GYSEOY) 2016 challenge, as well as a new initiative, the Wisest Systems Engineer Mentor of the Year (WiSEMOY), culminate at the conference when we announce winners and prize giving takes place.

Beyond the conference we're looking forward to two 2-day seminars entitled "Systems Engineering in 2016" to be presented by none other than Dr Kevin Forsberg, father of the SE Vee-Model in Gauteng (21-22 November 2016) and in the Western Cape (30 November to 01 December 2016). Dr Forsberg will also be a guest speaker at Chapter meetings in Gauteng and KwaZulu Natal.

This year witnessed a breakthrough for the INCOSE SA Chapter in spreading its wings to another province of the country, KwaZulu Natal (KZN). Plans are underway for an inaugural INCOSE SA KZN Branch Chapter meeting in Durban on 06 September 2016 with David Long, INCOSE Past-President, as guest speaker.

For those keen to pursue systems engineering certification, a CSEP Examination Preparation Course is occurring in Gauteng during the week 28 November to 03 December 2016.

IS 2016 in Edinburgh is likely to go down in the annals as one of the great INCOSE international events. More than 800 delegates registered for the conference, including an all-time high attendance from South Africa; 14 delegates, of which 7 presented papers and one participated in a panel discussion. Other South Africa members participated in business meetings and task teams. We thank our members for making our Chapter and country proud in the international arena.

South Africa was the proud recipient of a Platinum Chapter Circle Award for 2015, its 10th top award in a row – the Chapter received Gold Awards every year since 2006. Introduced in 2015, the Platinum Award is now the top Chapter Circle Award for achieving the highest goals and standards established by INCOSE. The Chapter also received the President's Award for Outstanding Achievement as an INCOSE Chapter for the second time, the first being in 2012.

EMEA - SA Continued

Figure 4. René Oosthuizen receiving the SA Chapter President's Award from INCOSE President Alan Harding

Finally, INCOSE SA expressed its interest to host IS 2020 in Cape Town based on the success of EMEASEC 2014, held in October 2014. We presented this interest during IS 2016 to the EMEA Sector Chapter Leader meeting as well as the INCOSE Events Committee.

Asia/Oceania

SESA (Systems Engineering Society of Australia)

Ray Hentzschel, president@sesa.org.au

Great work by the INCOSE UK team to put together an excellent IS 2016, and for Edinburgh for giving us their few days of summer!

The IS was an excellent opportunity to take some time and concentrate on learning, professional development, and seeing the breadth of systems engineering and applications from all parts of the world. The varied program allowed all to explore a number of areas of interest, and to extend ideas for future research and development. It was great to catch up with colleagues from around the world and meet new people in the profession.

The technical program was excellent, with interesting keynote speakers and confident conference chair. It was professionally stimulating and good fun as well, especially the conference dinner. The food was good, entertainment fantastic, allowing for a truly Scottish cultural experience.

From a SESA management perspective it was an excellent opportunity to engage in the business of advancing the profession, as we developed the implementation procedures for the newly negotiated Chartered Australian Systems Engineering certification.

The venue (EICC) was great, just the right size. The conference staff were exemplary, polite and very helpful.

The INCOSE organisation was outstanding and insightful.

It was great to see such a large Australian contingent at the symposium in Edinburgh in the lead up to Adelaide 2017. We are looking forward to the challenges ahead that SESA will face putting together the next IS in Adelaide, and looking forward to seeing everyone to visit us down under.

India Chapter

For the past few years, the INCOSE India Chapter conducted activities from its base location in Bangalore. It has been challenging to engage its membership, with varying levels of expertise, working in industries in different stages of systems engineering adoption (such as aerospace, automotive, medical instrumentation, information technology), and geographically spread out enough to make it unattractive to travel for regular interactions with the community.

This year, the INCOSE India Chapter decided to expand its activities to conduct local events in prominent cities across the country. So far, three such local events occurred in Pune, and one event in Hyderabad. All these events boast enthusiastic participation from INCOSE members and non-members engaged in the practice of systems engineering.

The first local meet-up was hosted by the John Deere Technology Center, Pune, in December, 2015. Representatives from across automotive and IT industries, such as Eaton, Cummins, TCS, Capgemini, and even educational institutions, such as IIT Bombay, attended the meeting. The attendees received a brief overview of INCOSE and activities planned by the Chapter. Dr. Anand from TCS also shared information about the development of a new ISO standard on System Architecture processes.

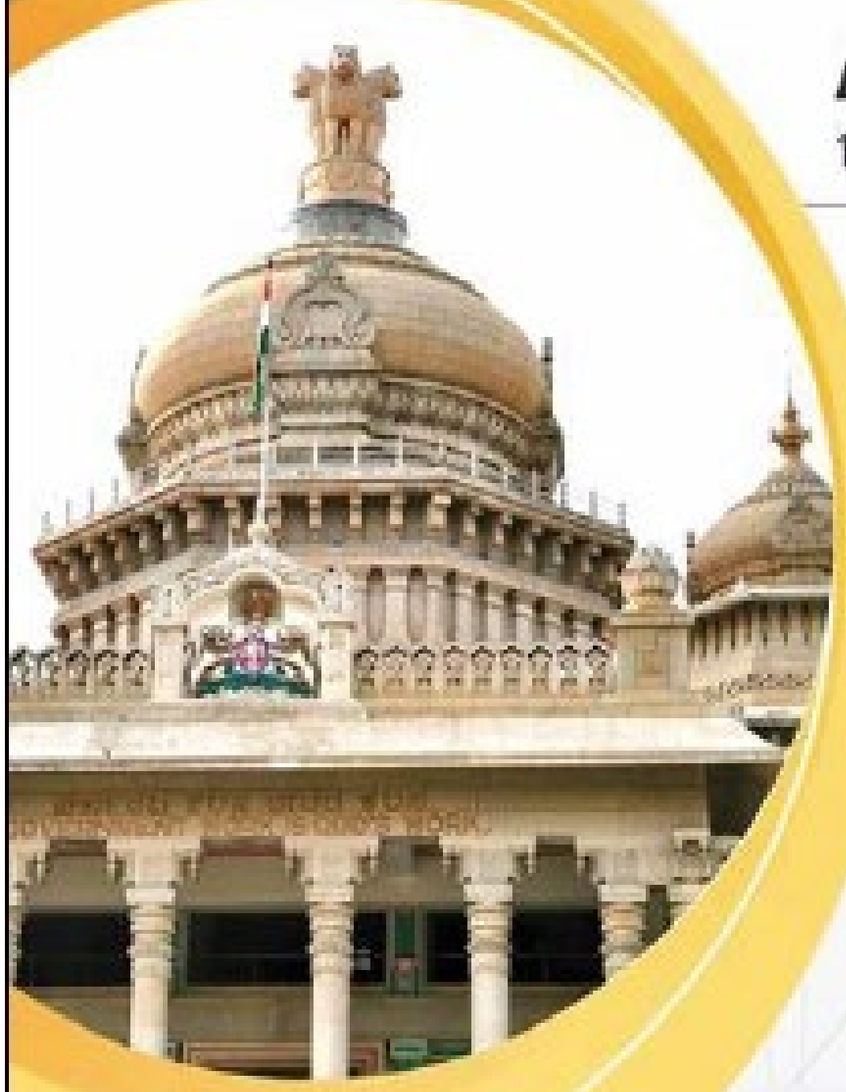
Cummins India Limited, Pune, hosted the second meet-up in March, 2016. Apart from updates about the Chapter's activities, the attendees listened to an overview of systems engineering activities at Cummins, and an engaging talk on "Systems Thinking for Engineers" delivered by Dr. Anupam Saraph.

Figure 5. India Chapter Pune Event

In July, 2016, a circle event was held in Hyderabad. Twenty engineers attended the event, representing various engineering organizations including Rockwell Collins, Medtronic, and Tata consultancy Services and Cyient. Vijay Chari, President of the INCOSE India Chapter conducted an awareness session on INCOSE and its objectives through a standard INCOSE presentation and answered several

INCOSE India Chapter

www.apcosec2016.org



APCOSEC 2016

10th Asia Oceania Conference On Systems Engineering

9th – 11th Nov 2016
Le Meridien, Bangalore, India

"**APCOSEC 2016** welcomes academicians, researchers and industry practitioners to participate in one of the largest conclave of systems engineering community in Asia Oceania to exchange ideas,information, opinions, and share their research findings and experiences"

The conference program includes plenary session speakers of international repute, technical paper presentations, invited talks, panel discussions, exhibitors and much more, from various sectors including Space, Aerospace, Automotive, Nuclear and Healthcare sectors.

KEY NOTE / PLENARY SESSION SPEAKERS

- ***A S Kiran Kumar**, Chairman – Indian Space Research Organization (ISRO)*
- ***Dr Alan Harding**, President – INCOSE*
- ***Dr Kota Harinarayana**, Chairman - Systems Engineering Advisory Board, DRDO*
- ***Dr Tomohiko Taniguchi**, Professor – Keio University, Japan*
- ***Dr Chris Unger**, Chief Systems Engineer – GE Healthcare, USA*
- ***Dr B N Suresh**, Vikram Sarabhai Distinguished Professor, ISRO*
- ***Kent Harmon**, Vice President, Targeted Convergence Corporation, USA*

Conference supported by:

Indian Space Research Organization (ISRO). India

Defence Research & Development Organization, India.

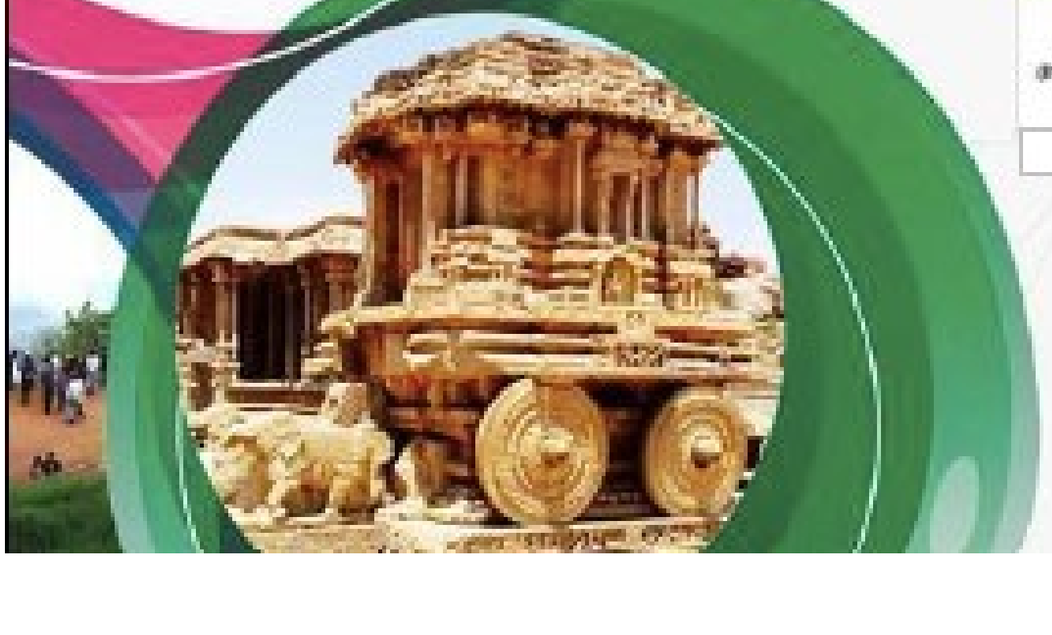
Department Of Atomic Energy, India.

REGISTRATION DETAILS

REGISTRATION FEES FOR INTERNATIONAL DELEGATES

EARLY BIRD (INCOSE MEMBER)	REGULAR (INCOSE MEMBER)	EARLY BIRD (NON MEMBER)	REGULAR (NON MEMBER)	STUDENTS
450$	550$	550$	650$	300$

Early Bird Offer Ends by 30-Sep-2016



CONTACTS

Conference Program & General queries:
apcosec2016@gmail.com

Marketing & Event Management
komal@eblitzcreations.com

Sector Updates

Asia-Oceania Continued

questions on ASEP and CSEP certifications.

The awareness session followed with a talk session by Vijay Chari on "Systems Thinking." He covered its relevance and importance in the context of systems engineering. Vijay emphasized the three key components, Knowledge, Cognitive skills, followed by Individual traits and elaborated each one of them with examples. Vijay did touch upon the systems engineering competency framework during the talk and the session was very informative and interactive.

Figure 6. Hyderabad event group photo

Recently, in August, 2016, Eaton Technologies, Pune hosted a local circle meet-up event which featured updates about the chapter, an overview of systems engineering at Eaton, and an invited talk on the state-of-the-art of systems engineering tools and software by Raghavendra Bhat, Technical Consultant, ANSYS Software.

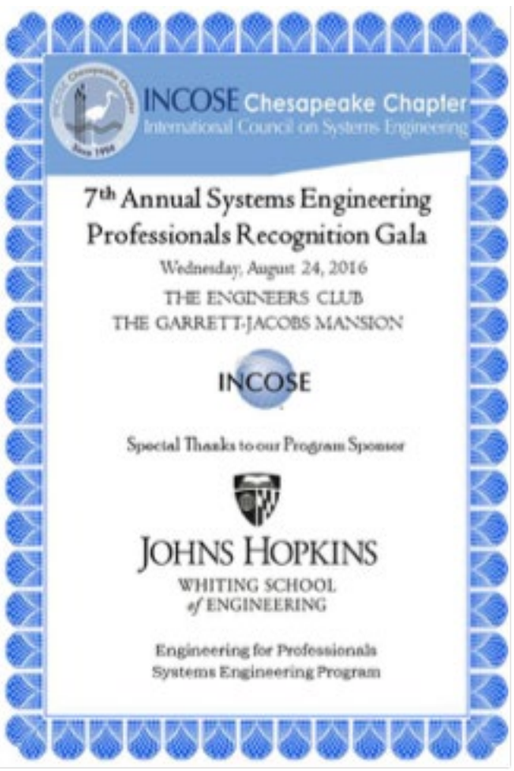
These local meet-ups all had enthusiastic participation, and provided members an opportunity to network with individuals practicing systems engineering in various domains, and to learn about each other's initiatives and best practices. The INCOSE India Chapter plans to regularly conduct these local meet-ups in key cities across the country.

Americas

Compiled by Steven Dam, steven.dam@specinnovations.com

Chesapeake Chapter

The 7th Annual SEP Gala. The INCOSE Chesapeake Chapter hosted its 7th Annual Systems Engineering Professional (SEP) Gala and Recognition Dinner this month. The event took place at The Engineers Club Garrett Jacobs Mansion in Baltimore Maryland on August 24. Over 85 attendees participated in this event. New this year, Chesapeake Chapter jointly presented recognition certificates to all newly certified Associate Systems Engineering Professionals (ASEPs) in attendance at this event. Newly Certified Systems Engineering Professionals (CSEPs) received medallions and certificates while the newly certified Expert SEPs received certificates, medallions, and shirts embroidered with the ESEP logo. The Washington Metropolitan Area (WMA) Chapter participated in the event, with Dr. Muhammad Islam presenting awards to the WMA participants.



Guest speakers included Ms. Kristen J. Baldwin and Ms. Courtney Wright, CSEP-Acq. Ms. Baldwin is the Acting Deputy Assistant Secretary of Defense for Systems Engineering, appointed in January 2016, while continuing as Principal Deputy, Systems Engineering. She is the principal systems engineering advisor to the Secretary of Defense and is responsible for establishing and executing engineering policy and oversight across the Department. Ms. Baldwin also serves as the acting Defense Standardization Executive. She oversees the US Department of Defense (DoD) strategy for Trusted Systems Design.

Enchantment Chapter

The Enchantment Chapter Announces a set of collaborative workshops to be held October 28-29 at New Mexico Tech in Socorro, NM. The eight workshops are: Systems Engineering Cultural Transformation; SE as Multidiscipline Enabler/Art/Science; High Performance Teaming; Systems of Systems Evolutionary Integrity; Agile Security Adaptable to Attack Evolution; Organizational Teaming for Joint Project Pursuit; Agile HW-Development Infrastructure/ConOps; and Fil-Fast Rapid Innovation Concepts. Attendees can self-select areas of interest. These workshops are sponsored by the INCOSE Enchantment Chapter and New Mexico Tech's Electrical Engineering Department.

Sector Updates

October 28-29, 2016
Socorro, New Mexico
New Mexico Tech
Joseph A. Fidel Center
8 Collaborative Workshops
Co-Sponsored by:
INCOSE Enchantment Chapter
NMTech EE Department

Self-Select for Interest:
1st Day: sample 4 topics
2nd Day: contribute 2 topics

- **Systems Engineering Cultural Transformation**
- **SE as Multidiscipline Enabler/Art/Science**
- **High Performance Teaming**
- **Systems of Systems Evolutionary Integrity**
- **Agile Security Adaptable to Attack Evolution**
- **Organizational Teaming for Joint Project Pursuit**
- **Agile HW-Development Infrastructure/ConOps**
- **Fail-Fast Rapid Innovation Concepts**

Details and registration at www.incose.org/enchantment

Huntsville Chapter

It is with great sadness that we observe the passing of Mr. Thomas F. Albro, 67, on June 17, 2016. Tom was an active member and past Board member of the INCOSE Huntsville (Alabama) Chapter. He was for many years a resident of Westminster, Maryland, and moved to Huntsville, Alabama in 2007 to work as a senior systems engineer on the Lockheed Martin Targets and Countermeasures Program for the Missile Defense Agency.

Thomas F. Albro.

Tom was a U.S. Air Force veteran and a 1978 graduate of Rochester (New York) Institute of Technology with a BS in Electrical Engineering. He was an IEEE Senior Member. Tom is survived by his wife, Ruth, and two adult children. Many will greatly miss him.

Los Angeles Chapter

Several members of the INCOSE-LA chapter attended the International Symposium in Scotland in July. The recent Chapter Newsletter included several reports from those members. In addition, Marilee Wheaton, Jorg Largent, Phyllis Marbach, Alan Kirschbaum, and Stephen Guine spoke at the August Speaker meeting held at The Aerospace Corporation in El Segundo California. The speakers recounted Corporate Advisory Board meeting knowledge sharing and goals, Chapter goals and accomplishments, Working Group activities, technical track information and keynote speaker highlights. The LA Chapter earned the "Platinum Circle" award, in recognition for performing to the highest goals and standards of the INCOSE organization during 2015 under the leadership of President Stephen Guine. Eric Belle received a Recognition Award for his role as Americas Sector Assistant Director. Jorg Largent, Newsletter Editor, and Terry Rector, 2016 Chapter President, received individual service awards in recognition of their support to the profession and the LA Chapter.

Past-president Stephen Guine "paid the piper" at the symposium banquet Thursday night in Edinburgh.
Photo by Alan Kirschbaum

Sector Updates - Americas

LA Chapter Continued

The INCOSE-LA July speaker meeting, held for the first time at Caltech, was well attended by both members and guests to hear Dr. Andy Feng, Vice President of Architecture at Yahoo, describe Big-Data Technology Innovation. See www.incose.org/los-angeles for more information about other and upcoming events: the Fifth Annual Mars Rover Expo on September 10, a Networking Event in Orange County on September 21, and a Speaker meeting at The Aerospace Corporation with Dr. Suzette Johnson on The State of Agile in Systems Engineering.

INCOSE-LA is a co-sponsor of the Conference on Systems Engineering Research (CSER) 2017 along with the University of Southern California Virterbi School of Engineering, Systems Architecting and Engineering, and the Stevens Institute of Technology. This is the premier event in the advancement of the science and discipline of systems engineering. Papers are due October 2, 2016 and can be submitted here: Viterbi.usc.edu/sae/cser2017.htm.

San Diego Chapter

The San Diego Chapter of the International Council on Systems Engineering (INCOSE), the San Diego Section of the American Society for Quality (ASQ) and the INCOSE Foundation, are proud to announce we are hosting the fifth annual San Diego Engineering Night on September 25, 2016, at the USS Midway Museum in Downtown San Diego. The San Diego Engineering Geek Night on the USS Midway Museum is a local industry and academic event dedicated to raising Science, Technology, Engineering, and Mathematics (STEM) awareness and support for local K-12 schools in the San Diego region.

An increasing complexity of today's systems along with a current and projected long-term shortage of qualified workers inspires INCOSE to encourage future generations to pursue engineering and science careers. These fields include aerospace, defense, telecommunications, energy, water and waste management, transportation, homeland and cyber security, health care as well as others.

INCOSE's goal is to specifically help STEM programs that have funding shortfalls in local schools. The programs, better known as STEM, are designed to interest and excite students about careers in technical and scientific fields such as systems engineering. Over the past five years San Diego's INCOSE chapter has awarded grants to 54 teachers totaling about $48,000 for projects that enhance students STEM education in their classrooms. The program's grant money has been generously provided by local companies and individual contributions.

San Diego Engineering Night begins at 6 p.m. Attendees will enjoy admission to the USS Midway Museum, a guided tour, flight simulator rides, a spaghetti buffet, a student robotics demonstration, teacher/student demonstrations of STEM projects, networking with engineering colleagues and a fantastic flight deck view of San Diego Harbor. Ticket prices for this event are subsidized by the San Diego Chapter of INCOSE and are only $30 for adults, $20 for those 6-17 years of age, and children 5 years of age and under free. In addition, a family package is available for $100 which includes admission for 2 adults and up to 4 people between 17 and 6 years of age. Tickets can be purchased online later this month at http://sdincose.org/5th-midway-event and sponsorships are still available. For more information about INCOSE's San Diego Chapter, the San Diego Engineering Night, or other local INCOSE events, please visit: www.sdincose.org.

Washington Metropolitan Area (WMA) Chapter

INCOSE WMA hosted a Chapter Meeting on Impacts of DODAF Changes. At the August 2016 meeting of the Washington Metro Area Chapter of INCOSE, Dr. Steven Dam, INCOSE Director of Americas and President of Systems and Proposal Engineering Company (SPEC Innovations) presented on the impacts the Department of Defense Architecture Framework (DODAF) changes. The event was held on Wednesday, August 10th at Tysons Corner. The meeting was live broadcasted at satellite locations at Vencore in Chantilly, VA and Noblis at Washington, DC. Dr. Dam provided an overview of how different architecture methodologies evolved over time, the creation of DODAF, and the recent changes in the framework. The presentation was interactive and attendees at the satellite locations also participated in the Q&A session along with the main location.

Dr. Steven Dam presents on DODAF

At the meeting, former INCOSE President David Long received a Lifetime Achievement Award.

David Long receiving a Lifetime Achievement Award

21st Annual INCOSE Region II Fall Mini-Conference

When: Saturday, 5 November 2016, 8:30 AM to 4:00 PM
Location: UCSD Extension University City Center
6256 Greenwich Dr., San Diego, CA 92122
Theme: Systems Engineering Role in the Future of Industry

This is the ONLY Systems Engineering professional symposium in San Diego this year; so don't miss attending this day of stimulating thought and discussion with fellow professional engineers, and those interested. The symposium centers on the crucial role of systems engineering in fields such as Aerospace, Biotech/Medical, Test, and more. Presentation abstracts continue to be received. We are also planning Career Transition and Educational Opportunity topics. All of the above industries and needs are strongly represented in San Diego, and combined, will play a major role in our future.

All interested parties are welcome and encouraged to attend. Broad participation is good for everyone!

Registration	If planning to register at the conference, please send e-mail to Eric Villhauer, villhauer.eric@gmail.com. Contact Eric, as needed, at (319) 325-5385. (An Online Registration capability is being set up, too.)	
Fees	Registration before 5:00 PM on 10/30	Registration after 5:00 PM on 10/30
INCOSE Member	$55	$65
Non-member	$70	$80
Student	$30	$40

REFRESHMENTS: A continental breakfast as well as a lunch of sandwiches and drinks will be provided, and **are included in the registration fee***. Please state vegetarian preferences with your registration.
* Catering orders close on 10/30 at 4:00 PM, we will purchase a few extra lunches but if you register after 10/30 there is a possibility that you may not have a lunch.

Topics to be Presented and Discussed:

- Unmanned Aircraft Systems: Role of Systems Engineering in UAS development, including an overview of interoperability and regulatory environment
- The Science of Laws Institute presents Lawmaking with Systems Engineering Methodologies: How Systems Engineering tools and techniques can be applied to the creation and optimization of the laws of government
- Agile Systems Engineering
- Data Science and Systems Engineering
- Health Care and BioMed: Role of Systems Engineering in health care and biomedical devices
- Job Networking (throughout the conference)

Additional related topics are still in development. A detailed agenda with topics and presenters will be available by the end of September.

Mini-Conference POC: Eric Villhauer at villhauer.eric@gmail.com or call 319.325.5385.

Thomas F. Gannon, tgannon@wpi.edu

INCOSE Members Trained as ABET Program Evaluators To Evaluate Programs Outside of the US

Submitted by Steve Sutton

Michael Milligan, Executive Director and CEO of ABET, attended the International Symposium (IS) 2016 where he gave a presentation entitled, "INCOSE's Role in Assuring Quality in Systems Engineering Education Worldwide." He also met with the Academic Council and the Board of Directors, and he attended a session with UK academicians and industry representatives to discuss the training and education of UK systems engineers. As a former US Air Force Officer and faculty at the US Air Force Academy, he has a great appreciation for systems engineering and wants to include systems engineering in the education of all engineers.

INCOSE members, trained as ABET program evaluators, will evaluate three programs at two universities outside of the US in the fall of 2016.

Significant Revisions to Criteria for Engineering Programs Proposed by ABET

Submitted by David Olwell

The Engineering Accreditation Commission (EAC) of ABET has proposed significant revisions to the criteria for engineering programs. These revisions will significantly affect undergraduate engineering education. Many of the changes reflect an increased appreciation for the role of systems engineering in engineering practice and reflect INCOSE participation in the process. You can view a discussion of the changes and the actual text at http://www.abet.org/blog/news/criteria-updates-from-the-july-eac-commission-meeting/.

International Science and Engineering Fair 2016

Dorothy McKinney, dorothy.mckinney@me.com

It is enough to restore anyone's faith in the future: 1600 high school students from over 60 countries around the world demonstrating their ingenuity and insights in a wide variety of science, research and engineering projects. Four Fellows and five other INCOSE members served on the 2016 team of judges that INCOSE sent to the International Science and Engineering Fair (ISEF). This team reviewed projects and awarded prizes to the projects that best exemplified the application of systems engineering.

The team of INCOSE Judges for ISEF 2016 consisted of (from left to right in Figure 1): Julie Walker, Mark TenEyck, Dorothy McKinney, Rick Dove, Shazad Contractor, Bill Mackey, Chris Giudice, and John Walker (Jerry Fisher, who led the team in preparation for the event, was not able to be present for ISEF).

Figure 1. INCOSE judges for ISEF 2016

INCOSE has awarded a $1500 prize for the best systems engineering project at the ISEF for the past 9 years, as well as awarding Honorable Mention certificates to additional students. This year, a second place award of $500 was also made, funded by Dorothy McKinney and Shazad Contractor of the San Francisco Bay Area Chapter. The two winners were:

- Alex Cristian Tacescu of Fresno, CA won first place for his Project Maverick: Alex designed, built, and tested a full sized prototype platform demonstrated at the fair. The platform is intended to help an individual who has a walking disability to get around the house and get around tight corners. To provide maximum maneuverability the drive system uses four wheels and eight motors. Each wheel module has two independently controlled motors, one for steering and one for driving. The user is able to stand on the platform and steer the platform around the home. The system is also equipped with two intelligent safety features that allows the robot to avoid collisions and to autopilot through doorways and narrow passages. The safety system is implemented using infrared distance sensors. The system design is modular, and feasibility of mass production was a cornerstone of the design.

Figure 2. Alex Tacescu, First Place winner

Academic News

- Megan Guinn O'Briant of Arligton, VA won second place for her project Power of Touch: Challenges in Designing Haptic Sensing and Feedback for a Neural Controlled Bionic/Prosthetic Hand. Her inspiration was her best friend, who was born missing one hand. She designed not one but a family of plug-and-play prosthetic hands; the user can plug in the one needed for the task at hand, choosing between a light hand comfortable to wear for long periods, and a heavier one needed when heavy lifting and a strong grip is essential. These prosthetic hands include haptic (touch) feedback, so the user can literally feel what the hand is touching. The INCOSE judges were impressed with this project for at least two primary reasons. Megan O'Briant completed the project using a systems engineering approach from concept inception and design, to implementation and verification. In addition, she used prototyping to build at least three types of fingers, (1) a rapidly moving finger; (2) a light touch finger for delicate grasping; and (3) the tightly grasping finger for sure-handed manipulation. Not only did she conceive of these fingers, but she actually designed and built each type of finger. Megan was well versed on her subject and executed the project by herself.

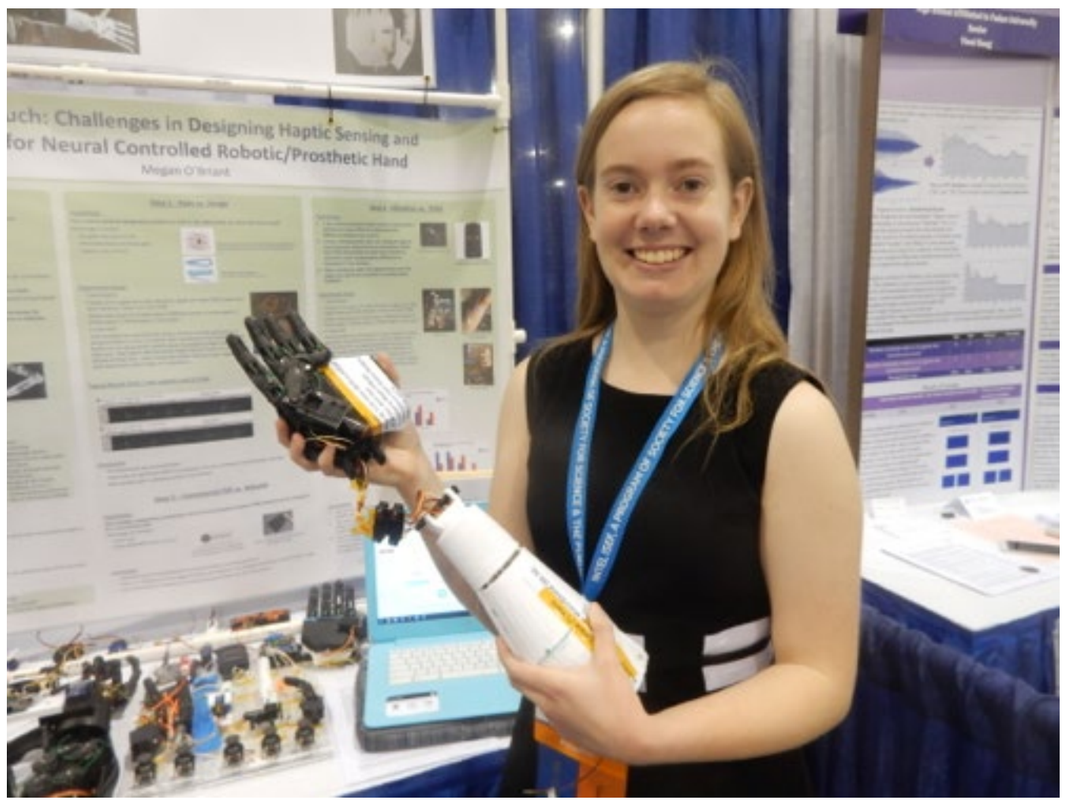


Figure 3. Megan Guinn O'Briant, Second Place winner

This year, we awarded 12 Honorable Mention awards. These went to:

- Jalicia Azzalyna Desiree Smalley for "Sleep Tight". This project developed a device to detect nocturnal hypoglycemia (which can be fatal to diabetics).

- Simone Braunstein of New York, NY for "A Novel Haptic Actuator for Robotic Surgery: Utilizing Soft Robotic Pneumatic Networks, a Closed Loop Control System, and an Electro-Pneumatic Control Board to Accurately Restore an Operator's Sense of Touch". The focus of this project was research and development of a haptic robotic surgical controller gripper prototype to offer a surgeon the intuitive ability to remotely grasp an object, and to accurately replicate the pressure that the end effector encounters on the operator's hand.

- Alexander Frederick Wul for "CastMinder: Embedded Smart Sensors and Companion Software to Detect the Onset of Conditions Associated with Cast and Splint Complications and to Promote Patient Healing in Orthopedic Casts and Splints". This system literally speeds bone growth for healing, as well as providing pain-decreasing treatment and sensors for conditions (such as infection) that would require a doctor to remove a patient's cast.

- Samuel Ferguson of El Cajon, California for "The Other Side of Me: An Arduino Based Game for Bilateral Integration in Autism Spectrum Disorder". This project provides a "therapist on a box" – literally a box with game-like materials a child can interact with, connected to a computer gaming-like system, which provides the same kind of feedback therapy that a trained therapist provides to autistic children to help them integrate the operation of the two sides of their brain (the lack of bilateral integration is a major problem caused by autism).

- Syamantak Payra of Friendswood, TX for "Brace Yourself: A Novel Electronically Aided Leg Orthosis" The purpose of this project was to develop an Electronically-Aided, Active-Assist Knee-Ankle-Foot-Orthosis (EA-KAFO) that restores natural walking gait using a gyroscope/orientation-sensor on the opposing leg (no current commercially available units provide active assistance to bend the user's knee). Bill Mackey was impressed with this project because in recent years, he personally has been challenged with the symptoms cited as the incentive for this project. Bill told the young student that he could personally use this device.

- Matthew Hileman for "Reflected Laser Communications for Small Satellites". This project implemented frequency modulated laser communications, which allow a very small satellite to communicate with minimal onboard hardware.

- Drew Prevost of Huntsville, Alabama for "Development and Systems Integration of a Modular Power Factor Corrected Pre-regulator, LiFePO4 Battery Charger, DC Motor Controller, and Battery Monitoring System". Drew's system provides a very scalable solution to battery monitoring, power factor correction charging and motor control. To understand the impact of his innovation, consider that tesla currently offers only a few different battery sizes for their electric cards, and each size requires a different power control design. Drew's design can be used across a very wide range of battery packs with no change.

- Russell W. Ludwigsen of Albuquerque, New Mexico for "Passive Reduction of Involuntary Arm/Hand Tremors, Phase III". This project developed a light, low-cost brace which a patient with Parkinson's disease, multiple sclerosis, traumatic brain injuries, or even an adverse reaction to a medication can use to reduce tremors when performing fine motor tasks, such as writing.

Academic News

- Vidur Tenali Prasad of Kettering, Ohio for “Traffic Camera Dangerous Driver Detection (TCD3): Contextually Aware Heuristic Feature & OFA Density-Based Computer Vision with Movement Machine Learning Analysis of Live Streaming Trac Camera Footage to Identify Anomalous & Dangerous Driving”. The TCD3 project identifies anomalous and dangerous driving patterns from traffic camera feeds, to improve road safety by assisting law enforcement in apprehending dangerous drivers, perhaps under the influence of intoxicants.

- Muhammad Shahir Rahman of Portland, Oregon for “A Smart Burn and Spill Proof “SAFE” Microwave that Spares the Salad: Novel Application of Levenberg-Marquardt Algorithms in Bayesian Analysis for Real-Time Numerical Thermodynamic Modeling”. The primary goal of this project’s research was to create a practical and intelligent cooking device that can automatically cook the food to the desired temperature without any required user input.

- Rahul Ramesh of Chandler, Arizona for “A Novel Algorithm for Detection of Plasmodium falciparum Parasites in Digitized Blood Samples (Malaria).” The project was designed to allow the diagnosis of malaria in the under developed world using a smart phone application. The smart phone microscope uses an algorithm developed by Rahul that identifies and counts the numbers of erythrocytes infected with malaria in the blood. The ratio of infected erythrocytes to uninfected erythrocytes is used to diagnose malaria. The advantages of this system are its high reliability and the ability of ordinary people to use it effectively. Rahul hopes this inexpensive but reliable malaria diagnosis tool will help save lives.

- Eshika Saxena of Bellevue, Washington for “A Portable Optoelectronic Molecular Identification and Spectral Analysis System for Assessing the Quality, Safety, and Composition of Food and Pharmaceuticals Using Machine Learning”. Her project addressed problems with the quality of human food. Her interest in the subject arose from her personal experience of falling ill on a trip to India from drinking contaminated milk.

The following photos highlight some of the honorable mention winners and their projects.

Figure 4. Jalicia Azzalyna Desiree Smalley and “Sleep Tight”

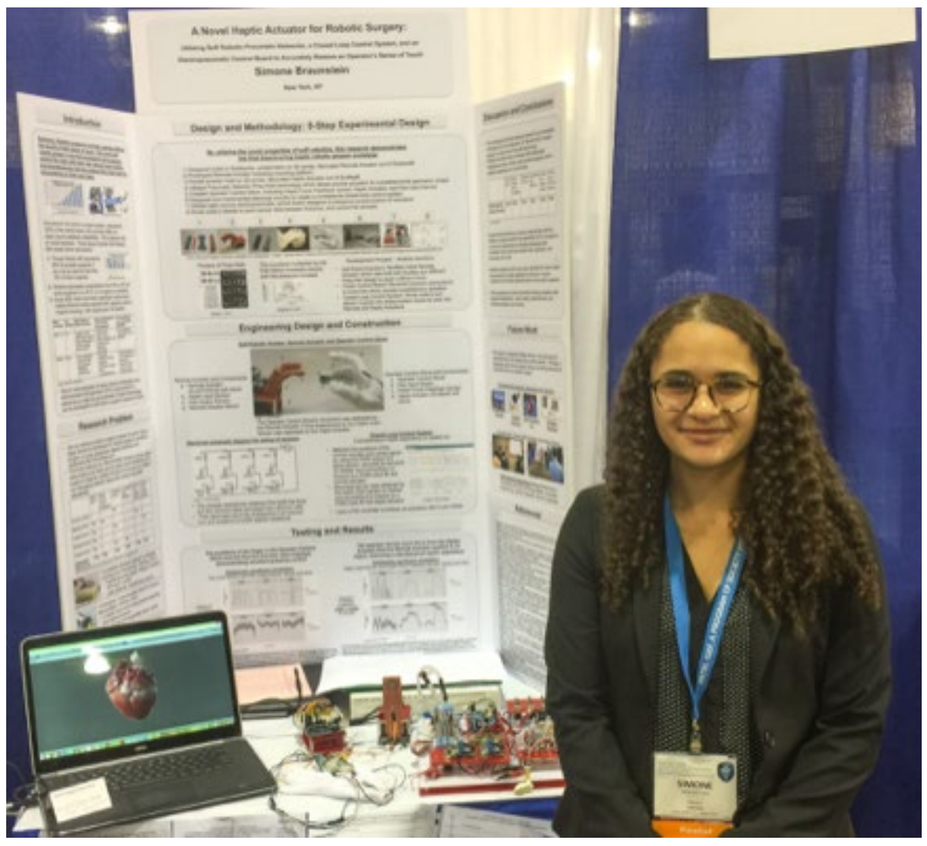


Figure 5. Simone Braunstein and “A Novel Haptic Actuator for Robotic Surgery”

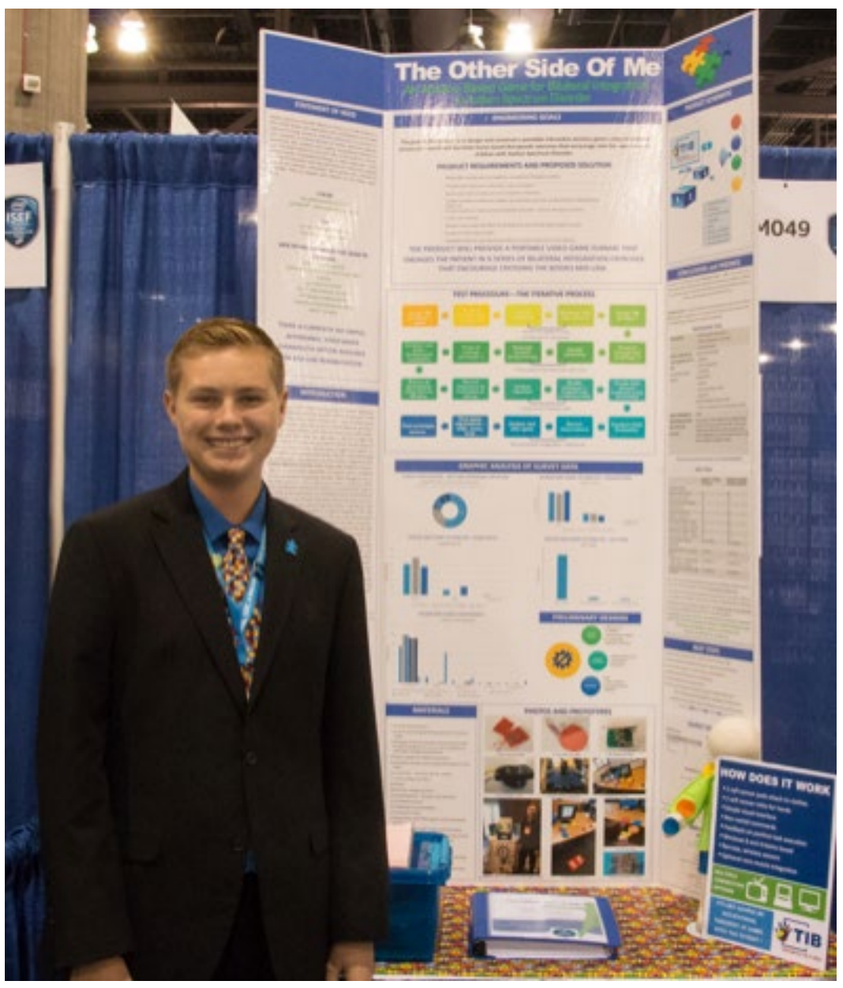


Figure 6. Samuel Ferguson and “The Other Side of Me”

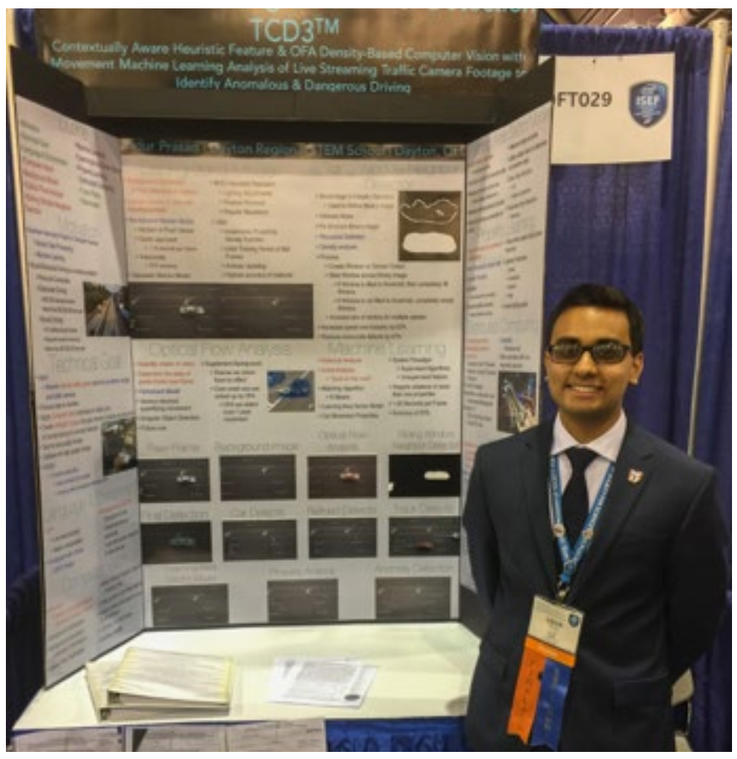


Figure 7. Vidur Tenali Prasad and “TCD3”

Working Group & Affiliated Organisation News

Guy André Boy, gboy@fit.edu

Human Systems Integration Working Group

The first international INCOSE Human-Systems Integration (HSI) Working Group's Workshop will be October 4-5, 2016 at the Florida Institute of Technology.

The mission of INCOSE HSI Working Group (HSIWG) is to develop recommendations, guidelines, and standards for improving human centered design (HCD) and systems engineering. Human-centered designers are HSI architects. They work in concert with other systems engineering engineers and managers to improve understanding and provide guidance in the design and development of complex life-critical systems. HSIWG's role is to further develop an understanding of organization design and management that can support HCD, as well as of modeling and simulation, advanced interaction media, complexity analysis, and cognitive engineering. This first HSI workshop will gather worldwide specialists to share and discuss what HSI is about and plan for further HSI developments within INCOSE and beyond.

Agenda — Gather viewpoints and experiences / Discuss practical and fundamental cases / Make syntheses / Provide recommendations and guidelines / Develop the next version of the HSI portion of the Systems Engineering Book of Knowledge (SEBoK) and SE-Handbook.

Logistics — HSIWG Office: call Delilah Caballero at +1-321-309-4960 or email dcaballe@fit.edu.

HCI-Aero 2016

The International Conference on Human-Computer Interaction in Aerospace, HCI-Aero 2016, is currently underway, September 14-16, 2016 in Paris, France. This year, the theme is "From Human-Computer Interaction to Human-Systems Integration, " emphasizing systems instead of only user interfaces. Alan Harding, President of INCOSE, is a keynote speaker. Connect to:

http://research.fit.edu/hci-aero/HCI-Aero2016/Home.html

http://research.fit.edu/hci-aero/HCI-Aero2016/Attending.html

Report onthe International Society for Systems Science Conference

Len Troncale, lrtroncale@cpp.edu

The International Society for Systems Sciences held their annual conference at the University of Colorado at Boulder in July 2016. There were 180 participants along with a number of INCOSE members. The theme for the conference was "Realizing Sustainable Futures in Socio-Ecological Systems." In addition to plenaries and many presentations on sustainability, there were also sessions that discussed how to advance the basic theory of systems that should inform all systems applications.

The current President of ISSS, John Kineman, secured the participation of a number of groups from relevant science-, and systems science-based professional organizations such as AAAS, American Society for Cybernetics, Systems Dynamics Society and IIASA, including some not formerly aware of ISSS or systems theory such as Future Earth and the Wild Foundation. Some of the latter will now establish associations and formal cooperation with ISSS because, like INCOSE, they have recognized that advances in systems science can help them better achieve their objectives.

More than a dozen INCOSE members registered as participants. They participated in the program through their involvement in papers, posters, and discussions. The first plenary session cited several joint projects between INCOSE and ISSS as did others throughout the week. The early plenary on Thursday was essentially devoted to Systems Engineering with three INCOSE members presenting, Anand Kumar, Rick Dove, and Diana Mann, followed by Bill Schindel and Len Troncale in the later plenary session on Systems Theory and Modeling. The 161-page Program and Abstract Book (ISBN 978-1-906740-14-6) featured pictures and biographies of several long-time INCOSE members.

INCOSE members were very active across the schedule providing evidence that INCOSE is affecting work on the systems science knowledge base while simultaneously learning more about the needs for extending that knowledge base to support future SE work. Janet and Michael Singer, together with Mary Edson, the new President of INCOSE-affiliated IFSR, held sessions on the SEBoK and Systems Education in general. Gary Smith chaired the Paper Session on Systems Engineering and delivered two research papers. Rick Dove chaired a Paper Session, delivered one plenary talk and one research paper. Anand Kumar chaired two Paper Sessions, delivered two research papers, and gave one plenary talk. Bill Schindel gave a plenary talk and participated in a plenary discussion. Dr. Len Troncale delivered 9 hours of workshop/tutorials on 3 different days, gave two plenary presentations on 2 different days totaling 35 min of presentation, presented 20 posters including 7 student posters specifically on Application of Systems Processes Theory (SPT) to Systems Engineering, and engaged in 2 hours of additional discussion in plenary panels. Three projects in INCOSE's Systems Science Working Group (SSWG) were covered across these presentations. In fact, one of the awards for "best student paper" (the Anatol Rapoport Award) partially evaluated one of the ongoing SSWG projects reporting on knowledge he learned as a participant in the online working group discussions.

The next ISSS Annual Conference will be next July in Vienna, Austria.

ISSS/INCOSE Joint Presentation on Advances in Systemology at ISSS 2016 Conference

David Rousseau, david.rousseau@systemsphilosophy.org

The International Society for the System Sciences (ISSS) held their sixtieth annual conference in Boulder, CO, from the 24th to the 29th of July 2016. The conference included a plenary panel discussion and breakout session on emerging prospects for attaining a new systemic synthesis. Five experts representing different specializations in Systemology gave brief presentations on their work and its increasing recognition in academic and industry. The presentations ranged over systems engineering, science, research, practice and philosophy, and reflected on how these different stands can contribute to the formation of a new systemic synthesis that could make the 'whole systems perspective' scientific and practical.

The first contributor was William (Bill) Schindel, leader of the Systems Patterns Working Group within INCOSE's Model-Based Systems Engineering initiative, and co-lead of the INCOSE Agile Systems Engineering Life Cycle Model Project. Bill presented his S* minimal general systems meta-model, and discussed its prospects as a general modelling foundation for Systems Engineering. Next was Len Troncale, chair of the ISSS's Systems Integration Group (SIG) on Systems Biology and Evolution and the SIG on Systems Pathologies, and regular contributor to the INCOSE Systems Science Working Group (SSWG). Len gave an overview of the Systems Processes Theory (SPT) he pioneered, and discussed SPT's prospects as a general theoretical core for Systems Science. The third speaker was John Kineman, the 2015/16 President of the ISSS and contributor to the forthcoming, "A Guide to Systems Research: Philosophy, Processes and Practice" (Springer, 2016). John explained the "Holon Relational Framework" which he developed from the models of Robert Rosen to be a version of Participatory Actions Research (PAR), and discussed its prospects as a general methodology for Systems Research. The penultimate speaker was Jennifer Wilby, chair of the ISSS SIG on Critical Systems Theory and Practice (CSTP). She discussed how emerging general systems theories and concepts could lead to powerful advances in the effectiveness of Systemic Methodologies. The last speaker was David Rousseau, chair of the ISSS SIG on Research Towards General Systems Theories and the SIG on System Philosophy. He presented a view on how systems concepts evolve in the history of any discipline, and discussed how different disciplines are currently converging towards holistic systems models of their subjects of inquiry.

Following the panel discussion was a 1.5-hour breakout session for extended discussion with audience members. David Rousseau facilitated the discussion and Gary Smith and Mary Edson documented it through mind mapping.

Gary Smith serves as INCOSE's Health Ambassador, and co-leader of the project "Unity in Diversity" within the International Federation for Systems Research (IFSR), and Mary Edson is the current President of the IFSR. See the following figures.

Figure 1. Systemology and Systems Engineering Discussion

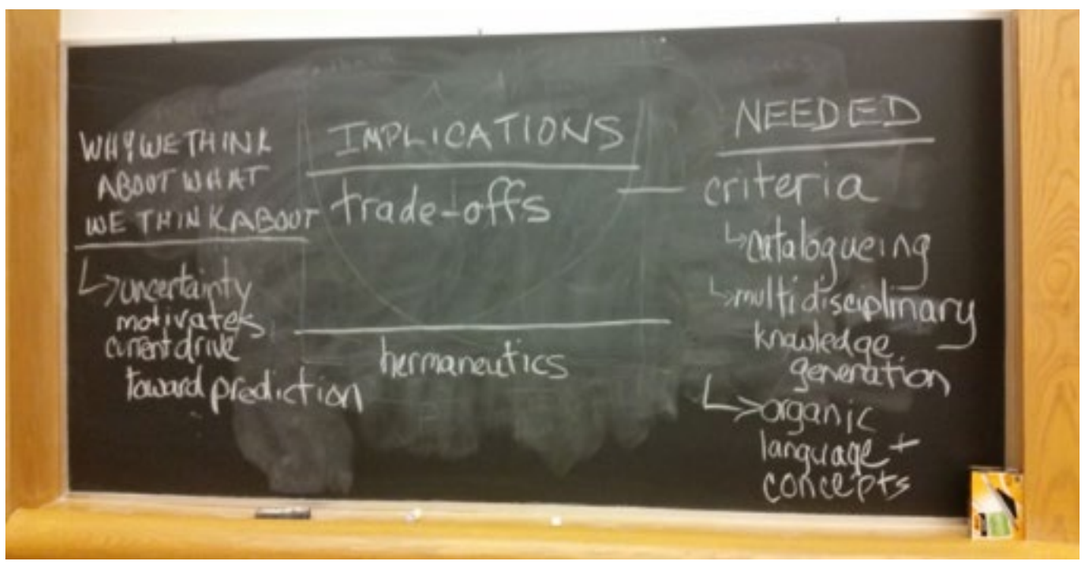


Figure 2. Systemology and Systems Engineering Discussion

Thank You to John Kineman and Judith Rosen for creating this opportunity in the ISSS conference programme, James Martin of the INCOSE SSWG for supporting the planning and funding of the session, and Mary Edson and Gary Smith for co- facilitating and documenting the breakout discussion. Finally, yet importantly, I would like to thank Bill Schindel, Len Troncale, John Kineman, and Jennifer Wilby for being so generous with their time and advice, and for helping to present an exciting overview of recent advances and future opportunities in the field of Systemology.

IS 2016 Fun

Spotlight ON! - Duncan Kemp

INCOSE Spotlight on Duncan Kemp

Interviewed by Sandy Young, info@incose.org

Name: Duncan Kemp, CEng FIET

Titles/Organizations: Chief Systems Engineer and Specialist Fellow for Systems Engineering, United Kingdom Ministry of Defence

Place of Birth: Edinburgh, Scotland, UK

Current Residence: Wiltshire, UK

Duncan Kemp leads a discussion at the IS 2016 Banquet

Domain: Defence, Information Services and Rail

Studied in college: Computer Science

Year joined INCOSE: 2001

Role(s) in INCOSE: INCOSE UK Board Member, UK Academic Director, SE Vision 2025 Team, Transportation Working Group Co-chair 2009-2012, presented papers at 12 International Symposiums, including three best papers

Years in systems engineering: 25

1. Why did you become a systems engineer?

I am a second generation systems engineer, so I started to learn about systems engineering as a very young child. My father taught the Royal Air Force's Aerosystems course in the 1960s. Early in my career I found I had an aptitude for systems engineering, which led me to drift towards more and more challenging systems roles.

2. You wrote an award-winning paper on systems engineering leadership styles. What characteristics of systems engineering leadership work best in the sectors you have worked in?

There are two key lessons for me:

First, you need to match your style to the situation. Getting a group of scared people out of a burning building requires a very different approach to delivering a major equipment programme. Escaping a fire requires quick, early, and confident decisions, while programmes often require well informed decisions to be made at the last possible moment.

Second, you need to bring people with you by gaining consensus that we need to do something first, and only then collaborate to develop the solution. As engineers we often try to do this the wrong way around, developing the solution and then trying to convince people to follow it.

3. If you were not a systems engineer, what would you do?

I'd be an executive chef. I love cooking, and like to perfect a specific recipe. Currently I am working on my barbeque skills. My homemade smoked brisket and pulled pork are very popular at the moment.

4. What project or accomplishment are you most proud of in your systems engineer career?

I was involved in helping deliver some force protection equipment to UK forces. The operational feedback was that it saved lives. I have also worked to improve systems engineering into the UK rail industry, helping to deliver billions of pounds of savings. Very different contributions, but both making clear differences to people's lives.

5. How has INCOSE benefitted you?

Systems engineering can be quite a lonely profession. We often work as individuals or in small teams. Coming to an INCOSE event is amazing. I get a chance to meet like-minded people, who are facing similar challenges to me. My INCOSE friends are also incredibly helpful at work. I have often asked for help on a particular challenge – and had suggestions back within 24 hours.

INCOSE IS 2016 Pictures

Note from the Editor

Lisa Hoverman, newsletter@incose.org

Publication of the International Council on Systems Engineering

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On the Web	http://www.incose.org
Article Submission	newsletter@incose.org

Publication Schedule. The INCOSE Member e-Newletter is published four times per year. Issue and article/ advertisement submission deadlines are as follows: 2nd Qtr 2016 issue – 15 May; 3rd Qtr 2016 issue – 15 Aug; 4th Qtr 2016 issue – 15 Nov. For further information on submissions and issue themes, visit the INCOSE website as listed above.

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Who are we? INCOSE is a 10,000+ member organization of systems engineers and others interested in systems engineering. Its mission is to share, promote, and advance the best of systems engineering from across the globe for the benefit of humanity and the planet. INCOSE charters chapters worldwide, includes a corporate advisory board, and is led by elected officers and directors.

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Welcome to the third Newsletter of 2016. I enjoyed seeing many of you in Edinburgh! I look forward to seeing INCOSE continue to advance the state of the art of systems engineering as the world authority in this space, buoyed by the inspiration from the International Symposium, and other great initiatives covered in this issue. This newsletter highlights our truly global presence and shows that no matter where you are on this spinning sphere, INCOSE leads as the source for all things systems engineering .

Thank you to all who contributed to this Newsletter and updated members on the IS and news in your niche of systems engineering. I look forward to your upcoming contributions (submission dates below!) and articles as we continue to improve the Newsletter.

Have a wonderful September!

Due Dates for Q4 2016 Newsletter:

General Content (GC): 15 November

Late Breaking News (LBN): 30 November (with communication to the editor)

Due Dates for 2017 Newsletter:

Q1 Newsletter GC: 15 February; LBN: 25 February

Q2 Newsletter GC: 15 June; LBN: 25 June

Q3 Newsletter GC: 15 August; LBN: 25 August

Q1 Newsletter GC: 15 November; LBN: 25 November

IS 2016 INCOSE Booth, the heart of it all!

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