MEMBERS NEWSLETTER

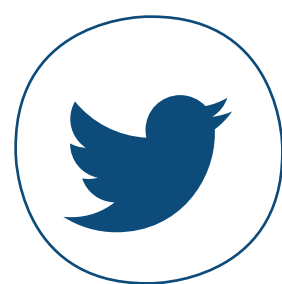## December 2016 - Q4

INCOSE

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President's Corner

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

This INCOSE Newsletter has a focus on Sector 3, Asia-Oceania. The timing is great as this week (6th-12th November), I have been in Bangalore, India, attending a series of landmark events for INCOSE, and systems engineering, in India. As well as these undoubted highlights for INCOSE, it has been a memorable trip for me, visiting the country of my Grandfather's birth.

During the week I participated in the INCOSE Academic Forum, the Asia-Pacific Council On Systems Engineering Conference (APCOSEC), and an Empowering Women Leaders in Systems Engineering (EWLSE) workshop. There was a distinct Indian flavour to all these events: from the ritual of the opening formalities; the warmth of the welcome we all received; to the wonderful music at the banquet dinner; and of course the delicious South Indian catering.

The conference drew papers and attendance from India, Australia, Japan, and South Korea, as well as France, Germany, The Netherlands, the UK and US. Keynotes were diverse and covered aviation, defence, healthcare, space, transportation, and my contribution on the global challenges for systems engineering and the journey towards model-based engineering.

As well as difference, there was much in common with other INCOSE events: a diverse range of application areas to learn from; great networking between colleagues old and new; great support from sponsors and exhibitors excited about the opportunity to engage with so many systems engineers.

What were my key takeaways from a week in India?

Keynotes were diverse and covered aviation, defence, healthcare, space, transporation, and my contribution on the global challenges for systems engineering...

Systems approaches are as relevant in India as they are anywhere else, informed by earlier UK and US work, but developing their own regional style.

• Systems thinking is being applied widely, considering factors across the whole breadth of PESTLE (political, economic, social, technological, legal, and environmental) – the social component is a typical Indian consideration.

• Here, we face the identical challenges of explaining what systems engineering is to decision-makers, and of developing well-rounded systems people through a combination of education and professional experience.

• INCOSE has a key role to bring together systems people from across the application domains, across academia, industry and government, and across the globe.

INCOSE India and the ISSE Bangalore chapter (ISSE is the Indian Society of Systems for Science and Engineering) jointly arranged the week-long systems engineering-focused events. The INCOSE Asia-Oceania sector supported the chapters. Special mention must go to Ramki Rahman and Stueti Gupta who took the lead for these wonderful events, ably supported by the INCOSE India leadership team, ISSE, and INCOSE Sector and Central.

Figure 1. APCOSEC 2016 Closing Ceremony

Like many of you I am now planning my involvement in the INCOSE International Workshop (IW) in Torrance, CA from 27th-31st January 2017. It is a great opportunity to be involved in our working groups and leadership meetings and committees, where you can understand and help shape the future of INCOSE. You can find the current schedule here, please take a look, and plan your time in Torrance effectively.

In particular I would recommend these sessions:

• Saturday 28th Jan 0800-1000 Opening Plenary, giving you an overview of our status and key plans

• Sunday 29th Jan 0800-0900 Town Hall meetings on infusing systems engineering into general education, and on systems science for systems engineering

• Monday 30th Jan 0800-0900 Town Hall meetings on recent INCOSE Information Technology (IT) improvements, and wider updates

• Tuesday 31st Jan 1500-1600 Closing Plenary, summarising the results and achievements of the workshop

Notes from the Board

Rachel LeBlanc, marcom@incose.org

The Quarter 4 (Q4) INCOSE Board of Directors (BoD) meeting took place in Fairfax, US -VA this October. Greatest among our priorities was to reach agreement on the 2017 budget for INCOSE. In addition, there was good progress made on further defining the strategic direction of the INCOSE 5-year objectives.

The INCOSE BoD defined the key priorities as:

• Positively impacting the broader systems community through work done under the 5-year strategic objectives. This includes a focus on establishing a membership function reporting to the Secretary with emphasis on recruitment and retention.

• Strategic integration of all 5-year objectives in order to increase the potential impact and likelihood of successfully achieving all objectives.

Key appointments:

• **Mike Celentano**
Technical Director, starting in 2017

• **David Endler**
Deputy Technical Director, starting in 2017

• **Professional Training Institute:**

    o **Muhammed Islam**, Lead

    o **Carol Batman & Tony Williams**, Co-Leads

Figure 1. BoD hard at work during the October meeting

In addition to a review on the progress of the 5-year objectives, the BoD made considerable progress on the Chapter Governance and Financial Model. This BoD reviewed the model as a topic at 3 strategy sessions and conducted 2 surveys on the topic. The BoD formed a task team to develop principles and recommendations.

Notes from the Board

The team developed the key underlying principles – transparency, risk and reward, accountability and responsibility, and esprit de corps. They also developed a list of five governance recommendations and six finance recommendations. After receiving feedback from the BoD, they will continue to refine their recommendations. The goal is to have BoD agreement on the new model at the International Symposium in 2017 with implementation following in 2018.

IT Update

Bill Chown, cio@incose.org

Over the past several months we have been reviewing the INCOSE web and Connect capabilities, and are working to deliver some changes to offer a more attractive member and non-member experience. As a first significant part of this upgrade, the collaboration space in Connect now has a newer template, with a cleaner look and more interactive features, and you will see continuing organization of data to maximize the value of this resource for all members. These changes also pave the way for a completely new INCOSE Store, which will roll out during December, and will offer easier member and non-member access to the valuable INCOSE products.

We are also planning major improvements to the look and ease of use of the main INCOSE web pages, coming out early next year.

I know there will be some changes that are not as desired, and so please use the Help information, and the INCOSE Web Issue Tracking list as your first entry point to report anything not as it should be.

I look forward to seeing many of you at the International Workshop 2017, where we will again be providing updates and opportunities for your feedback.

Sector Updates

Asia-Oceania: APCOSEC 2016

Purohit Geetika, PurohitGeetika@JohnDeere.com

NCOSE India Chapter and Indian Society of Systems for Science & Engineering (ISSE) jointly organized APCOSEC 2016, the 10th Asia-Pacific Council on Systems Engineering Conference (APCOSEC), in Bangalore, India from 9th to 11th November, 2016. The theme for this conference was "Systems Engineering in Asia Oceania - Success Stories & Challenges." This was the first and largest international systems engineering conference organized by INCOSE in India, and it received a phenomenal response - attended by over 400 delegates from India, Australia, France, Germany, Japan, South Africa, South Korea, the UK, and the US across various sectors including space, aerospace, defense, nuclear, automotive and healthcare, and more!

Figure 2. INCOSE President, Alan Harding, at APCOSEC 2016 sharing INCOSE Vision 2025

Figure 1. The well-attended APCOSEC 2016

Figure 3. Dr. K. Radhakrishnan, Former Chairman - ISRO, presents on India's Mars Mission – Mangalyaan

The conference opened with Mr. A. S. Kiran Kumar, Chairman, ISRO (Indian Space Research Organization). Mr. Kumar addressed the audience emphasizing the significance of systems engineering. INCOSE President, Alan Harding, in his address, highlighted the growing levels of systems complexity and the INCOSE Vision 2025. In the keynote address, Dr. Tomohiko Taniguchi, Special Advisor to Prime Minister of Japan, talked about the systems engineering challenges in the Japanese Bullet Train program. The conference program included plenary sessions on Space Launch Vehicles by Dr. B. N. Suresh (ISRO); Applications of Systems Engineering to Healthcare by Dr. Chris Unger (General Electric USA); Simulation-based Conceptual Design by Kent Harmon (Vice President, Targeted Convergence Corporation USA); Mars "Mangalyaan" Mission by Dr. K. Radhakrishnan (Former Chairman, ISRO); System-of-Systems by Dr. Prahlada Ramarao (Former CC R&D, DRDO); Systems Approach to Optimization by Aditya K. (Team-Indus) and Smart Connected World by Karmjit Singh Sidhu (TE Connectivity, USA).

There were 32 refereed and 14 non-refereed technical papers presented in parallel tracks at the conference covering various topics, including model-based systems engineering, systems engineering processes/lifecycle practices, aerospace systems engineering, systems engineering knowledge and competency development, systems-of-systems and complex systems design, modeling and simulation, and non-traditional applications of systems engineering. The conference also hosted a panel discussion, led by the Empowering Women Leaders in Systems Engineering (EWLSE) team, on the topic of "21st Century Leaders, Tackling Unconscious Bias," and a poster session featuring innovative projects from students and industry.

Various industries ranging from aerospace industry suppliers, to agriculture and healthcare, and systems engineering tool vendors sponsored the event. They exhibited their expertise and also held demonstrations at the sponsor booths. The conference banquet dinner featured a "Rhythms of India" musical program. INCOSE sponsored the dinner.

Sector Updates

Asia-Oceania: APCOSEC 2016

The conference "INCOSE Academic Forum on Systems Engineering Knowledge and Skills in the Education of All Engineers – an Asia-Oceania Perspective," organized at PES College, Bangalore on 8th November 2016 preceded APCOSEC. Following APCOSEC, the participants also had an opportunity to participate in a workshop organized by EWLSE, or attend technical tours to the ISRO Satellite Integration and Test Establishment (ISITE) and research labs at IISc (Indian Institute of Science) and CORI - Satellite Control Facility at PES University.

To learn more about the event, please visit the website – www.apcosec2016.org. For more conference pictures, please follow these links:

- Inaugural Function
- Day1 Plenary
- Day2 Plenary
- Technical Presentation Tracks
- Valedictory Function
- Networking and Stalls

Figure 4. Members of the INCOSE team at APCOSEC 2016

Beijing Summit

The INCOSE Beijing Chapter is the core organization of INCOSE in China. Dr. Zhang Xinguo chairs INCOSE Beijing; he is the Senior Vice President of Research and Development and Chief Information Officer of AVIC (Aviation Industry of China). Established in 2004, the objective of INCOSE Beijing is to advance the technical level and practice of international systems engineering knowledge body in both academia and industry, driving the application and popularization of China's systems engineering processes, methods and tool platforms, as well as promoting the development and exchange of systems engineering talents. To date, INCOSE Beijing

includes a number of individual members from science research, engineering technology, corporate management, and other fields, and has recommended corporation members to INCOSE Central.

As China speeds up integration into the world, the five concepts of *Innovation, Coordination, Green, Open, and Sharing* steer China's new development outlook. Every opportunity for China and the world to see and know each other is important. Today, innovative development represents an essential feature of current world, especially current Chinese social development. Innovation is the primary force leading to development, which will drive revolutions from China manufacturing to Chinese creation, Chinese speed to Chinese quality, and Chinese products to Chinese brands.

Therefore, the first INCOSE Beijing Summit of 22nd November 2016 focused on Innovation and Revolution with systems engineering. Sticking to the objectives of *"Innovation, Revolution, Openness, and Sharing,"* oriented to theoretical research and engineering applications, the Beijing summit not only provided an access for Chinese academia and industry to learn about both the global building of Systems Engineering Body of Knowledge (SEBoK), but also offered an opportunity to keep up with the developing trend of leading practice. Meanwhile, the Summit also provided systems engineering methodology and best practices for Chinese education and industries. INCOSE Beijing plans to gain worldwide recognition for Chinese innovation and manufacturing by integrating into the international systems engineering research and application community actively with its brand new status.

Figure 5. Advertisement for the INCOSE Beijing Summit

There were 9 guest speakers, including INCOSE President, Alan Harding; the INCOSE Beijing President, Zhang Xinguo; the Former Deputy Director of National Space Administration in China Aerospace Science and Technology Corporation (CASC), Former Director of Science and Technology Commission, Fellow of International Academy of Astronautics, Guo Baozhu; Director of the State Key Laboratory of Management and Control for Complex Systems, Vice President and Secretary General of Chinese Association of Automation, Wang Feiyue; Chief Integration Officer, Commercial Aircraft Corporation of China Ltd (COMAC), President of International Council of Aeronautical Science (ICAS),

Sector Updates

Beijing Summit

Susan X. Ying; Vice Presidents of Engineering and Tools Architect in AVIAGE SYSTEMS, Benjamin Lawler and Dale Miller; Assistant Department Head & Associate Professor in Department of Industrial Engineering, Tsinghua University, Director of Operations & Service Research Laboratory, Li Lefei; and Senior Experts of IBM Watson Internet of Things, Greater China Group, Victor Yee. The speakers shared the SEBoK and best practices with more than 150 guests from AVIC, China Aeronautics, China Commercial Aircraft, China Aerospace, Marine, Electronics and other industries, Tsinghua University, CCID Research Institute, and other universities, research institutions, and government departments.

Additional photos from the event are available here for download.

After these discussions, it was time to talk about actions. Carlos Lahoz, from IAE – Brazilian Air Force Department, conducted a brainstorming session to collect ideas and analyze how doable it is to organize an international systems engineering event in Brasil. According to Lahoz, thiswould be a great opportunity to increase the visibility and recognition of system engineering in the country.
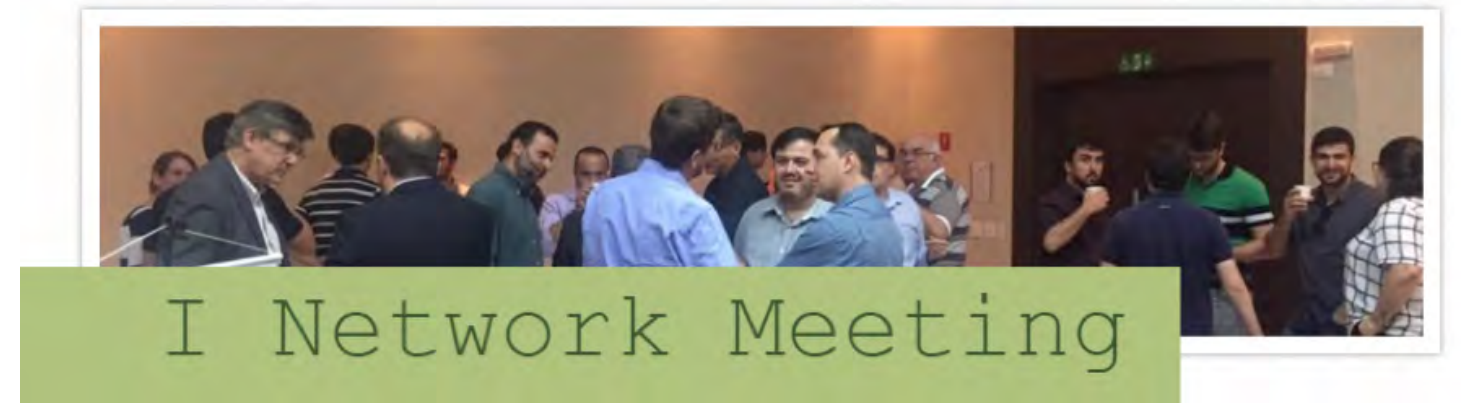

Figure 6. Attendees mingle at the first INCOSE Brasil "I Network Meeting"

Americas - Brasil

On 28th October 2016 INCOSE BRASIL held its first "I Network Meeting." The one-day event aimed to bring systems engineering professionals together, not only to share experiences, but also to discuss the next steps of systems engineering development in the country.

"Providing this kind of interaction, focused on knowledge exchange, is a fundamental part of our mission as an INCOSE Chapter."
-Joao Prado, Programs Director of INCOSE BRASIL

The forty systems engineers, from a wide variety of industries who attended the event, discussed three systems engineering cases that EMBRAER engineers presented: STAMP methodology in the aeronautical industry - led by Amanda Iriarte; Requirements Management in Unmanned Aerial Vehicle (UAV) development – led by Luis Santiago; and systems engineering for cyber security – led by Gustavo Bertoli.

In addition to the use cases, Wellington Martins, also from EMBRAER, presented a brief description of the INCOSE Certification program, along with his experience as a CSEP (Certified Systems Engineering Professional). The attendees also had the opportunity to engage with Oliviano Neto, event sponsor and CEO of Open Mile Brasil, speaking to how consulting companies can provide systems engineering support to new industries.

"We have to use SE with passion, not just because someone told us to do!"

Amanda Iriarte, EMBRAER

Americas - Hampton Roads Area

INCOSE Hampton Roads Area Chapter offers Free SE Handbook V4.0 Training

John Clark, john.clark@incose.org

The INCOSE Training Working Group and the INCOSE Hampton Roads Area chapter are providing INCOSE Systems Engineering (SE) Handbook V4.0 and other free training for all INCOSE members, employees of INCOSE CAB organizations, and employees and students of INCOSE Academic Council organizations.

The SE Handbook V4.0 weekly series began on Thursday 8 October 2015 and completed on 21 April 2016. All sessions are available for download. To access the materials, click on https://connect.incose.org/Library/Tutorials/training/SitePages/Home.aspx, log-in to Connect using your INCOSE username and password, scroll to SE Handbook V4.0 Tutorial, click on Tutorial ID: 01_October 2015, the Tutorial Session you want, right click on 'Save target as…,' and download the files. Tutorial Session: 00_Shared Documents contains the schedule and reference documents.

The SE Handbook V4.0 tutorial also provides tips and personal help in systems engineering. We provide a certificate of completion on request. The tutorial consists of weekly 60-minute sessions. There is no need to register, just join in. We strongly recommend reading of the applicable sections of the INCOSE SE Handbook V4.0 before each session. Course materials include the shared documents, tutorial slides, questions, and audio and video recordings for download and use at your convenience. Most slides contain speaker notes in the PowerPoint Notes View.

Questions? Contact john.clark@incose.org.

Sector Updates

Americas Orlando

INCOSE Orlando Tours the Orlando VAMC

Eddie B. Smith, eddieboydsmith@gmail.com

On 15th September 2016, INCOSE Orlando held their monthly meeting at the new Orlando Veterans hospital, which has come in under budget at over $600 million. Our chapter took an exclusive "behind-the-scenes" tour of the recently opened and very complex Orlando Veterans Affairs Medical Center (VAMC) in Lake Nona, US - FL. This "medical city" includes research companies, universities, and other hospital facilities.

Figure 8. The large Orlando VAMC campus with hallways and tunnels for smart vehicles. Dr. David Flinchbaugh, INCOSE Orlando chapter secretary, poses with patriotic artwork found in the Orlando VAMC

Figure 7. The Orlando Veterans Affairs Medical Center

The challenges of designing, developing, and maintaining complex systems are unlike the challenges associated with their complicated, but relatively straightforward predecessors. Complex systems and these challenges capture the interest of many disciplines, including systems engineering. Systems within the medical sector have been as much a part of the trend in growing complexity as any, and medical facility designs are evolving to support this growth. The University of Central Florida (UCF) supported the Orlando VAMC development effort through a contract for systems engineering. The Orlando INCOSE current past president is Chairman, Department of Industrial Engineering and Management Systems at UCF. It is safe to say there was some INCOSE influence going into the Orlando VAMC!

The hospital spreads over many acres and thirty-six buildings. One of these buildings house two simulated operating rooms, which is unique for the Veterans Affairs agency. For the first time, VA doctors will have a dedicated place to train – they will come to Orlando for training on complex medical issues. Long hallways and below ground tunnels mandate the use of 'smart' or automated delivery vehicles. The automated delivery vehicles return to a common area for recharging after navigating hospital corridors, people, and obstacles.

Americas WMA

Washington Metro Area

Muhammad F. Islam, mfi@gwu.edu

INCOSE WMA Hosts Largest SEP Exam Session to Date

On Saturday, October 29th, 2016, INCOSE WMA hosted the largest SEP exam session to date with more than one hundred test takers. The INCOSE Certification Program Office administered this paper-based test. INCOSE Chesapeake chapter provided a free bus for the test takers from Johns Hopkins University Applied Physics Laboratory. WMA Board of Directors would like to thank the volunteers, proctors, and Systems Engineering Professional (SEP) test participants for making this event a milestone in INCOSE certification.

Figure 9. Many test takers gather for the largest INCOSE SEP Exam in certification history

Sector Updates

Americas WMA

INCOSE WMA Celebrates Veterans Day

On Wednesday, November 9th, INCOSE WMA hosted a Veterans Day reception to thank our active service members and veterans. Registration for the event was free for active service members and veterans to honor them. Cub Scouts from NCAC Pack 1576 conducted a color guard led by Bear Scout Fayyaz Islam. Active service members and veterans introduced themselves to the audience and gathered for a cake cutting ceremony.

The November chapter meeting followed the Veterans Day reception where co-chair of NIST Cloud Computing Security and Cloud Computing Forensic Science Working Groups, Dr. Michaela Iorga presented "Cloud Security and Forensics in an Interconnected World." Three remote locations, Washington, DC (Noblis), Chantilly, VA (Vencore) and Fairfax (GMU Student Chapter) joined the meeting live and asked questions to the speaker. INCOSE WMA has a long-standing relationship with NIST working groups and interest in various security domains. Any INCOSE members interested in joining the NIST Cloud Security Working Group and Cloud Forensic Science working group can contact Dr. Iorga by email at michaela.iorga@nist.gov.

Figure 10. Veterans cutting the cake with Scouts at the reception

Figure 11. INCOSE WMA Veterans Day Celebration Cake

Figure 12. INCOSE WMA November meeting presentation by NIST Scientist Dr. Michaela Iorga

INCOSE WMA President Visits New England Chapter

On Thursday, 17th November 2016, INCOSE WMA President Dr. Muhammad F. Islam visited the New England chapter and presented at their November general meeting. INCOSE New England chapter President Isaac Burk received Dr. Islam and introduced him to the chapter. Dr. Islam presented an overview of activities INCOSE WMA did this year and discussed opportunities for collaboration between the chapters and members. Members of the chapters share commonalities in supporting the same government clients, working at organizations with presence in both areas and industries. Dr. Islam, Mr. Burk, and the New England chapter members exchanged ideas for future collaborations by sharing information, live telecasting of meetings, and supporting chapter logistics. Lively presentation and discussions followed with an informative question and answer session. INCOSE Secretary Dr. Tina Srivastava and INCOSE Treasurer Meaghan O'Neil atteneded the meeting.

Figure 13. Dr. Islam presents at the New England Chapter Meeting

Figure 14. Dr. Islam with members of the New England Chapter

Academic News

Academic Forum Visit to Bangalore India

Rick Adcock, r.d.adcock@cranfield.ac.uk

Overview and Aims

INCOSE has a number of education-based activities ranging from systems engineering support to STEM to masters curriculum. One such activity is a series of academic forum meetings around the following theme: "To enhance the ability of engineering education to meet future societal needs by increasing the use of relevant Systems Engineering Knowledge, Skills and Attitudes (SE-KSA) in the university education of all engineers."

We believe this theme provides a focus for INCOSE to build relationships with the wider academic community and to have a real impact on the future of engineering education. Reports on previous forums are at www.INCOSE.org. INCOSE Academic Forum held a meeting on 8th November 2016 at PES University Bangalore, in conjunction with the Asia Pacific Council on Systems Engineering Conference (APCOSEC). The aims of this forum being:

1. To share the results of previous academic forums with the Asia-Oceania community

2. To identify regional challenges which the forum must consider and to share regional approaches from which the forum might benefit

3. To identify specific regional activities which can be added to the ongoing forum work

The forum had two parts. A morning session of presentations and discussion featuring some of the activities already underway in India, including presentations on:

• Systems Perspective in the Indian Engineering Curriculum, Dr. C. P. Ravikumar, Texas Instruments, India

• Teaching the Elusive Structure of Systemic Reality, Dr. T. V. Gopal, Professor, Anna University, India

• A Case Study of Engineering at PES University, Professor Mahendra Nayak, CORI, PES University, India

• Integrating Systems Engineering in Engineering Curricula: A 5E Approach, Professor Vishwakarma, VIT, Vellore, India

In the afternoon session, the attendees split into smaller groups to discuss detailed topics. Attendees examined three questions. In each case, some of the outputs from previous forums were available for review and discussion and then delegates offered their own ideas and perspectives. In general, the discussion validated the previous work, adding some very interesting perspectives in a number of places. We want to note that all groups contained both engineering faculty and current undergraduate students. Most groups also had representation from industry. A brief summary of the discussion is below:

Summary of Forum Discussion

1. Integrating SE-KSA into existing teaching

Two groups reviewed a list of SE-KSA related topics. They identified some of the most important topics, which aligned well with previous groups. The key topics include using systems thinking to understand complexity and problem context; system architecture, requirements, and trade-off; and a systems approach to risk and lifecycle management.

Attendees strongly agreed that the best way to teach systems engineering topics is NOT to include explicit systems engineering courses early in the curriculum, but to build up SE-KSA over the curriculum using case studies and examples. The systems engineering knowledge included in curricula should enhance the teaching of engineering topics by encouraging a wider perspective on problems and solutions and showing industrial examples of cross discipline problem solving. The material should build up to a tool kit, which will enhance the student's final year design projects. Only at this point, when the students have an understanding of the value of a thorough approach should the curriculum introduce explicit systems engineering material.

Attendees suggested that we should consider the build-up of SE-KSA as a spiral lifecycle approach, with each year of the curriculum building on the next to enhance both student understanding of real world issues and give them tools to deal with them. This is a very promising way of describing the approach, which we will consider at future meetings.

2. Tackling the practical issues

Similarly to the first question, both groups considering this second question agreed that we need SE-KSA integrated into all subjects and NOT as a separate course. SE-KSA should integrate with multi-disciplinary realistic projects, involving industry and showing the real world impact of systems ideas.

Attendees raised and discussed three practical concerns. First, do students understand why we need systems engineering and do ALL faculty share this understanding and have the knowledge and skills to teach it? Second, can we find space in an already crowded curriculum and can we show the value of doing this? Finally, how do we teach cross disciplinary and complexity in a constrained education environment? How do we persuade students to tackle realistic and therefore risky projects and how do we assess individual work and discipline focus in cross disciplinary projects?

Academic News

All of these ideas align well with planned academic forum activities for next year.

3. Long term success

The group looking at this topic suggested that we should treat engineering education as a system:

• Understand the complexity of the education context (Stakeholders, competencies, industrial need, skills gaps, and more)

• Use this to create an engineering education architecture, showing how a mixture of domain skills, SE-KSA, and cross disciplinary work will best prepare future engineers for practice

• Deliver new education artefacts, which practitioners and professors can integrate, test, and support within the curricula

If we developed this 'system,' we could look for ways to allow students to choose from curriculum artefacts and then grade students on how they do things as well as the results they get. This would require methods to identify objective, evidence based outcomes and benefits to the community. It also requires a change in the way we view engineering education and curriculum accreditation in society.

Conclusion

Overall, the forum was very successful in achieving its aims and including members of the Asia-Oceania community into the academic forum. Many thanks to all members of the Indian chapter of INCOSE and the APCOSEC team for their support, in particular Ramesh Kumar Ramakrishnan, Ramakrishnan Raman, and Udit Kumar Sahoo. Special thanks to Professor Mahendra Nayak, Dr. Venkatarangan M.J. and faculty and student support from PES University. We look forward to future academic forum events in the Asia-Oceania region.

EWLSE Update

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Alice Squires, alice.squires@wsu.edu

The Empowering Women as Leaders in Systems Engineering (EWLSE) mission to develop engaging content and delivery approaches for promoting successful strategies for developing women leaders in systems engineering across cultures, locations, and domains is being realized through discussions and continued presentations at local and regional events. Tracks at both international (International Workshop 2016 and International Symposium 2016) and regional events, such as the INCOSE Regional Mini-Conference 2016 conference held in Los Angeles, CA April 9-10, 2016,

EWLSE Update

inspired awareness in individuals and chapters and continued to snowball more events to be held. We detail three such successive events below

EWLSE Dinner at the Socorro Systems Summit

Regina M. Griego, griegor@sandia.gov

The inaugural Socorro Systems Summit sponsored by the INCOSE Enchantment Chapter (New Mexico) occurred on 28th-29th October 2016 in Socorro, NM. As part of the summit, Empowering Women as Leaders in Systems Engineering (EWLSE) held a dinner gathering on Friday evening at the Socorro Springs Brewery. The invitation went to over 40 participants and 24 men and women attended the dinner, including six students from the INCOSE Student Chapter at UTEP (University of Texas at El Paso). The intent was to share a dialogue in which participants shared their leadership stories, exchanging tips and insights about navigating the systems engineering leadership journey, with particular emphasis on the women systems engineers' brand of leadership. After everyone enjoyed a beverage and a helping from the pizza, pasta, and salad buffet, Regina Griego, Principal Systems Engineer at Sandia National Laboratories, started the conversation by sharing her story of leadership. Each participant shared their journey and gave testimony to the many women leaders in their lives. Some provided information on efforts that they were involved in to increase participation of women as leaders in systems engineering. The gathering also provided attendees with the opportunity to share information and ideas about, and to possibly collaborate on, activities that encourage young women to pursue careers in science. INCOSE leaders like Kevin Forsburg and Jack Ring provided sage advice. Everyone felt that the collective testimonies and camaraderie were very meaningful and the students were particularly inspiring as our future.

EWLSE Panel at the 2016 San Diego Chapter Mini-conference

Stephanie Chiesi, schiesi@gmail.com

Another example of requests for EWLSE inclusion in INCOSE events includes planners for an annual mini-conference held by the San Diego chapter that attended the RMC 2016 EWLSE track. Through discussions with the mini-conference organizers, the planners included an EWLSE plenary session at the San Diego mini-conference on 5th November 2016.

Unlike the RMC 2016 track, at the San Diego mini-conference the EWLSE presentation was one of the plenary sessions. With a commensurate number of participants to previous events, the session once again started with all attendees asked to introduce themselves by name and to share what empowers them. This exercise was one of the first things experienced by the facilitator at the first EWLSE meeting attended at the 2015 International Symposium (IS), and it was a great kickoff to the program as it gave the entire audience a

EWLSE Update

chance to learn a little about each other, to reflect on what empowerment may be, and also provided smiles and laughs to start the program. As this session was shorter than the previous track experience, this also helped the audience get very comfortable with the environment for discussion and the panel session.

As the session keynote speaker, in addition to panel facilitator, Stephanie Chiesi from Raytheon Missile Systems discussed what it meant to be an empowered technical leader and what the challenges are that women face, not just at a senior level for leadership, but in reaching that level. Her discussion and examples were not just on the current workplace, but also on day-to-day interactions in growing up and the role that unconscious bias played in that environment with the role models encountered such as teachers, other adults, and activity leaders. Following the keynote talk was a panel for questions and discussion that included: Claudia Rose of BBII enterprises and past San Diego chapter president, Candace Conwell of SPAWAR, Kathy Houshmand of the US Navy Research Laboratory, and Randy Woolley.

The discussion by the panelists, questions, and interaction from attendees proved engaging and insightful about where we can make the most impact in continuing to encourage and empower women as leaders in systems engineering. The discussion ranged from how can industry, academia, and government employers help retain technical women, to, what are the barriers seen at the college level and younger, to how can the title of the group also better involve men and the pursuit of equality amongst the genders as leaders? As multiple participants commented later in the day, it was an engaging session and the group discussion could have continued.

EWLSE at APCOSEC 2016

Geetika Purohit, PurohitGeetika@JohnDeere.com

EWLSE and the INCOSE India chapter also organized an EWLSE panel discussion at the 10th Asia Pacific Council on Systems Engineering Conference (APCOSEC) in Bangalore, India on 9-10th of November 2016 and an after conference leadership workshop on 11th November. This was the first engagement of EWLSE in India. The panelists Vipin Balan (General Electric, India), Dr. T. V. Gopal (Anna University, India) and T. K. Anuradha (Indian Space Research Organization, India) expressed their experiences with "21st Century Leaders, Tackling Unconscious Bias" moderated by Dr. Shamsnaz Virani (Worcester Polytechnic Institute, USA). The panelists represented the diversity of systems engineering population and expressed perspectives from industry, academia, and government agencies. The audience enjoyed the session – evidenced by the excellent question and answer session. It generated increased interest in future EWLSE events and memberships.

Stueti Gupta (Executive Committee Member, INCOSE India Chapter) started the leadership workshop with

a welcome note for all the attendees, followed by introduction to INCOSE and EWLSE by Shamsnaz Virani. Alan Harding, INCOSE President, also addressed the audience and set the context for the workshop. He was followed by Dr. T. V. Gopal (Anna University, India), who shared his thoughts on the topic "Is it on target for women? Or are women on target?" Thereafter, Seema Raghunath (Leadership Coach, Director - The Corporate Chamber), led an interactive session for the participants covering topics such as, "Leadership Presence / Overcoming Fear" and "Leadership Development / Power & Influence." The event was highly engaging, triggering further discussions and insights. Seema also shared her views on the topic of work-life balance on requests from the participants. The EWLSE APOSEC event was very successful with participation from over 40 members both men and women from various organizations including the Indian Space Research Organization, John Deere, Aeronautical Development Agency, Honeywell, Indian Institute of Science, Vemana Institute of Technology, DSATM and Hindustan Aeronautics Limited. Alan Harding commended Ramakrishnan Raman (Assistant Sector Director - INCOSE Asia Oceania) and Stueti Gupta for organizing this event.

Figure 1. INCOSE team at the EWLSE workshop

Figure 2. EWLSE workshop attendees

EWLSE Update

EWLSE sessions are continuing at other regional events. The leadership team continues to engage group members and to respond to requests for sessions, panels, and more. For more information, please join the group on incose.org through the following steps:

- Login to your member account
- Select Profile Home
- Scroll to My Committees/Working Groups
- Select Browse/Join a Working Group
- Select "Empowering Women" on the right
- Scroll down to Committee Tasks
- Select "Join this Working Group"

Spotlight ON!

Stephen Cook

Name: Stephen Cook

Titles/Organizations:

- Director and Principal Consultant at Creative Systems Engineering
- Professor of Defence Systems at the University of Adelaide

Place of Birth: Amersham, England, UK

Current Residence: Adelaide, Australia

Domain: Defence and Academia

Studied in college: Electronic engineering, systems engineering and computer science

Year joined INCOSE: 1998

Roles in INCOSE: INCOSE Fellow, past-president Systems Engineering Society of Australia (INCOSE chapter in Australia), and member of various working groups: Systems of Systems Engineering, Model-based Conceptual Design, Systems Science, and Complex Systems

Spotlight ON!

Years in systems engineering: 35

1. Why did you become a systems engineer?

I started my career as a design engineer working on telephony and aerospace equipment in the late 1970s. Soon I was responsible for designing systems comprising new designs and a significant amount of existing equipment. I was keen to find out the best way to go about it, and had the opportunity to do so when I became the project engineer at British Aerospace Australia for the design of the electronic subsystem of a scientific satellite.

2. What are your favorite and least favorite parts of being a systems engineer?

I enjoy being a thought-leader in the industry – whether it be as an academic and teacher, a consultant, or as a practitioner working on major projects. It is fabulous working in areas that appreciate the value of systems engineering and where it is understood and thoughtfully applied in both the acquisition and supply side.

On the other hand, it is a struggle trying to help with situations or projects that are destined for a bad outcome because their management is convinced that systems engineering is something they can do without. Fortunately, this does not happen very often.

3. What piece of advice would you give to someone considering a career as a systems engineer?

First, take an engineering degree or other degree that will give you a good grounding in mathematics and science. Then start your career in detailed design and implementation, and progress through equipment, subsystem, and overall system design. Always seek challenging work that gives you the opportunity to demonstrate high performance – the hallmark of a successful systems person.

4. You have published more than 200 articles and reports over the course of your career. Tell us briefly about one that you are most proud of and why.

I am currently finishing a report on recommendations for rolling out Systems of Systems Engineering (SoSE) within the Australian Department of Defence. This report seeks to shape SoSE practice for years to come, and I believe the recommendation will bring substantial improvements over the previous arrangements.

5. What do you like to do outside of work?

I have been a competitive in-line speed roller-skater for more than 20 years, and I am ramping up my training for the national championships next January. I'm also a competitive table tennis player and play several times a week. As I have said for 40 years, with just a bit more coaching I know I can make it to the next grade ...

Local Chapter Outreach Initiative

Ian Gibson, Ian.Gibson@jacobs.com

In 2017, INCOSE members will see a pilot initiative rolled out across the globe, designed to support chapters to engage with their local engineering communities, peer professional bodies, and national organizations. At three designated points in the year, chapter leaders will be able to apply for funding to support specific outreach activities within their local area of interest. We will use a standard application request, available over the next few weeks, and announced at the International Workshop 2017 (IW2017), on social media, and in the Q1 2017 Newsletter.

We will choose the set of winners at each round to try to maximise the overall global effects and benefits of the local outreach initiative. We encourage unsuccessful bidders not only to bid again in future, but also to see if they can still pursue their outreach ideas in another form – after all, they are all likely to be good ideas in the first place. We will also welcome proposals to conduct outreach activities in collaboration with other chapters, or organizations if that appears to be the most suitable approach. We encourage proposals requesting funding with 1:1 or higher, matching funds, from the local chapter or from collaborating organizations. Ideas for outreach proposals include, but are not limited to:

• Attendance at nationally/regionally recognised recruitment events/trade shows to promote INCOSE.

• Attendance at special meetings where an INCOSE chapter received an invitation to provide systems engineering expertise.

• Attendance at events held by other professional bodies to speak on systems engineering and represent INCOSE.

• Development of targeted outreach material.

• Publication and dissemination of targeted outreach material.

Further information will be available through the Sector Directors, and on Connect, once we fully define the process. Where chapters wish to specifically engage in promoting INCOSE, we encourage them to contact the marketing and communications team at marcom@incose.org for further guidance and advice.

Arriving attendees at the APCOSEC Inaugural Function

Note from the Editor

Lisa Hoverman, newsletter@incose.org

Hello! I hope that you enjoyed reading the final Newsletter of 2016.

I personally feel that the Newsletter has come leaps and bounds in this second year of publication with your inputs and ideas – so Thank You! Please keep sharing these with us as we embark on continuously improving this for our growing readership. I hope that you see some of your suggestions implemented in this issue. We welcome feedback and contributors!

I look forward to seeing many of you at the International Workshop 2017 where INCOSE minds gather to continue to advance the state of the art of systems engineering as the world authority in this space, buoyed by the inspiration that derives from some of the wonderful events and work detailed in this newsletter. This newsletter again highlights the growing INCOSE global reach and clear leader as the source for systems engineering in established and emerging fields.

From my author across the way (and pond!) stated about the IW, "*It provides an unparalleled opportunity to engage with experts across the full range of systems engineering pursuits, and to both find out about developments in the state of the art whilst still at a formative stage, and to help shape the dialogue and direction of travel for INCOSE and its various activities, ranging from technical working group publications to new initiatives.*" - IG"

A sincere note of appreciation to all who contributed for this Newsletter and updated members on APCOSEC, the many events, and opportunities in INCOSE and your niches of systems engineering. I look forward to your upcoming contributions (2017 submission dates below!) and articles as we continue to evolve the Newsletter.

Have a terrific December!

Due Dates for Q1 2017 Newsletter:

• General Content (GC): 15 February

• Late Breaking News (LBN): 25 February (with communication to the editor)

Due Dates for other 2017 Newsletters:

• Q2 Newsletter, GC: 15 June; LBN: 25 June

• Q3 Newsletter, GC: 15 August; LBN: 25 August

• Q1 Newsletter, GC: 15 November; LBN: 25 November

INCOSE Member Newsletter

Publication of the International Council on Systems Engineering

Publication Schedule. The INCOSE Member e-Newletter is published four times per year. Issue and article/advertisement submission deadlines are as follows: 1st Qtr 2017 issue – 15 February; 2nd Qtr 2017 issue – 15 May; 3rd Qtr 2017 issue – 15 Aug; 4th Qtr 2017 issue - 15 Nov. For further information on submissions and issue themes, visit the INCOSE website.

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.

2016 INCOSE Board of Directors

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	Mike Celentano

A few parting shots of great INCOSE events in Q4 - we look forward to seeing more of your great INCOSE captured moments in 2017!

2017

annual **INCOSE**
international workshop

Los Angeles, CA, USA
January 28 - 31, 2017

Join us for the Annual INCOSE International Workshop

When
January 28 to 31, 2017

Where
Torrance Marriott Redondo Beach

Registration is now open!

www.incose.org/IW2017

LOS ANGELES

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